

CANCER IMAGING: FROM MOLECULES TO HUMANS

Thursday 17th May 2018

11:00 – 17:00

UCD Conway Lecture Theatre

PROGRAMME & SPEAKERS

Free registration & agenda on EVENTBRITE.IE

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PROGRAMME

- 10:30 – 11:00** *Registration and coffee/tea*
- 11:00 – 11:10 **Welcome address**
Prof. William Gallagher, Director of the UCD Conway Institute, Professor of Cancer Biology at UCD and Director of BREAST-PREDICT
- 11:10 – 13:10 *Session 1*
Chair: Assoc. Prof. Aoife Gowen, Associate Professor, UCD School of Biosystems and Food Engineering
- 11:10 – 11:40 **High Content Analysis - a valuable tool for cancer research**
Prof. Aideen Long, Professor in Molecular Medicine, Trinity College Dublin School of Medicine
- 11:40 – 12:10 **Label free spectroscopic imaging for pre-cancer and cancer diagnosis**
Prof. Fiona Lyng, Professor, Dublin Institute of Technology and Head of the DIT Centre for Radiation and Environmental Science
- 12:10 – 12:40 **Fast-tracking molecular diagnostics in oncology via digital pathology and automated image analysis**
Prof. William Gallagher, UCD
- 12:40 – 13:10 **High sensitivity deep tissue imaging of structure and function for applications in cancer and regenerative medicine**
Prof. Martin Leahy, Professor and Chair of Applied Physics, NUI Galway and Adjunct Professor at the Royal College of Surgeons
- 13:10 – 14:00** *Lunch*
- 14:00 – 16:40 *Session 2*
Chair: Prof. William Gallagher
- 14:00 – 14:30 **Bio-responsive near infrared fluorophores for real-time imaging**
Prof. Donal O'Shea, Professor and Head of Department of Pharmaceutical & Medicinal Chemistry, Royal College of Surgeons in Ireland
- 14:30 – 15:30 **Keynote: Translational imaging: exploiting tumour growth signals and microstructure for imaging**
Prof. Eric Aboagye, Professor of Cancer Pharmacology & Molecular Imaging and Director of the CRUK-EPSCRC-MRC-NIHR Comprehensive Cancer Imaging Centre, Imperial College London
- 15:30 – 15:50** *Coffee break*
- 15:50 – 16:20 **Microwave breast imaging - from concept to first patient study in Ireland**
Dr. Martin O'Halloran, Senior Lecturer, School of E&I/School of Medicine, NUI Galway and Director of the Translational Medical Device Lab
- 16:20 – 16:50 **Image guided surgery- here and now**
Prof. Ronan Cahill, Professor of Surgery Mater Misericordiae University Hospital and UCD School of Medicine & Medical Science
- 16:50 – 17:00 Discussion and closing remarks

SPEAKERS



Prof. Eric Aboagye

*Professor of Cancer Pharmacology and Molecular Imaging, Imperial College London
Fellow, United Kingdom Academy of Medical Sciences*

Director, Cancer Imaging Centre, Imperial College London.

Co-director, Imperial College London Experimental Cancer Medicine's Centre

Theme lead, NIHR Imperial Biomedical Research Centre Imaging Theme

Prof. Aboagye's primary research interest is in the field of molecular imaging: discovery, development and application of molecular imaging methods, particularly positron emission tomography and magnetic resonance imaging, to study tumour biology and novel therapies. Working at the interface of chemistry, mathematics, and biology, he has made fundamental discoveries in visualising complex cancer processes in living subjects, and translated these methods to provide advanced tools for detecting drug distribution and consequences of drug-target modulation in humans, as well as tools for *early* disease detection and objective response assessment. His research group is well known internationally for developing methodologies that permit visualisation and quantification of core tumour biologic phenotypes including cell proliferation, apoptosis, angiogenesis, hypoxia, and growth factor receptor signalling. More recently his team has also developed imaging tools to enable better characterisation of choline, glycogen and fatty acid metabolism. Mathematical modelling approaches for tracer kinetics and texture analysis have been developed and applied hand in hand with the chemical-biology approaches.

He has received a number of awards including the British Association for Cancer Research Translational Research Award and the British Institute of Radiology Sir Mackenzie Davidson Medal. He was elected to fellowship of the United Kingdom Academy of Medical Sciences in 2010. He is author of over 200 publications and 12 patents on cancer drug development and imaging and has contributed to the early careers of excellent researchers including 20 PhD students who have graduated under his primary supervision and 35 post-doctoral fellows primarily mentored by him; several of these researchers have established their own research groups. Prof. Aboagye has acted as an Advisor to international pharmaceutical & Imaging companies including GE Healthcare, LightPoint, GSK, Roche and Novartis Pharmaceuticals.



Prof. William Gallagher

*Professor of Cancer Biology in the UCD School of Biomolecular & Biomedical Science
Director of the UCD Conway Institute of Biomolecular and Biomedical Research
Director of the first Irish Cancer Society Collaborative Cancer Research Centre, BREAST-PREDICT
Chief Scientific Officer at OncoMark Ltd.*

A major focus of Prof. Gallagher's research work is the identification and validation of candidate biomarkers of breast cancer and melanoma, with particular emphasis on translation of transcriptomic and proteomic datasets into clinically relevant assays. In addition, his team utilises lentiviral-based approaches to investigate the functional relevance of candidate tumour progression-associated genes at both in vitro and in vivo levels, as well as engages in preclinical evaluation of novel anti-cancer agents.

Prof. Gallagher has a track record of success in attracting European funding and has participated as a co-ordinator/partner in several EU framework programmes. He previously co-ordinated 3 Industry-Academia Partnership (& Pathways) Programmes in breast cancer (Target-Breast), melanoma (Target-Melanoma), and prostate cancer (FAST-PATH) and two FP7 programmes, SYS-MEL and RATHER. Since 1999, he has attracted more than 65 million euro in research funding from both national and external sources, over 28 million euro of this as a principal applicant. Together with Prof. John Crown, Prof. Gallagher was also co-PI on a major Science Foundation Ireland-funded Strategic Research Cluster, Molecular Therapeutics of Cancer Ireland, which ran from 2009 to 2014 (www.mtci.ie). This was one of the most extensive organ-independent programmes in translational cancer research within Ireland, involving extensive collaboration with pharmaceutical, biotech and imaging companies.

Prof. Gallagher has received a number of awards based on his research work to date, including the BACR/AstraZeneca Young Scientist Frank Rose Award in 2004, the St. Luke's Silver Medal Award in 2008, and the RAMI Doctors award in Oncology in 2013. Prof. Gallagher has had productive collaborative interactions with a variety of other industrial partners throughout his research, and has filed multiple patents.



Assoc. Prof. Aoife Gowen

Associate Professor in the UCD School of Biosystems and Food Engineering

Dr. Aoife Gowen is Principal Investigator in the UCD Spectral Imaging Research Group. Her research area is multidisciplinary, involving applications of spectral imaging and chemometrics to biological systems, including foods, microbes and biomaterials. After completing her undergraduate degree in Theoretical Physics (2000), she moved to a new discipline - the highly applied research area of Food Science. Her PhD thesis, completed in 2006, concerned mathematical modeling of food quality parameters and optimization of food process operations. During her time as a post-doctoral researcher (2007-2013) she investigated the intersection of near infrared spectroscopy, chemical imaging and chemometrics for characterization of biological systems. She has been successful in gaining funding awards to support her research activities, including a European Union Marie Curie International Outgoing Fellowship and a

European Research Council (ERC) starting grant. Further information on her research group can be found here: <http://www.ucd.ie/sirg>



Prof. Aideen Long

Professor in Molecular Medicine, Trinity College Dublin School of Medicine

Prof. Long is a Principal Investigator in the Trinity Translational Medicine Institute, based on the St James's Hospital campus. She joined the Department of Clinical Medicine in 2005 where she was appointed Senior Lecturer in Molecular Medicine. Prior to joining Trinity she held the post of Senior Lecturer in Biochemistry at the Royal College of Surgeons in Ireland. She was Dean of Graduate Studies at Trinity from 2013 to 2016. Her research focuses on the signalling aspects of leukocyte-endothelial cell interaction and the elucidation of mechanisms used by lymphocytes to circulate from the bloodstream into tissue. The processes of leukocyte extravasation and tumour cell metastasis share many common mechanisms. Her research group is particularly interested in the regulation of cytoskeletal shape during the migratory process and the structural proteins and enzymes that regulate this. A major focus of her lab has been the study of the Protein Kinase C (PKC) family of enzymes and their role in T lymphocyte function, including migration and cytokine secretion. This research is important in the context of elucidating the mechanisms of inflammatory and autoimmune diseases such as inflammatory bowel disease and multiple sclerosis. At a translational level the group has studied mechanisms used by the Hepatitis C virus to manipulate PKC activity resulting in subversion of the immune system and unresponsiveness to interferon-alpha therapy. In addition they have investigated the response of PKC isoforms (and other signalling molecules) to bile acids in models of oesophageal and colonic cancer. Aideen Long has been an active member of the Irish Society for Immunology and was elected president of the society in 2007. She served in this post until September 2013 during which time she was actively engaged in promoting Irish immunology both at home and abroad.



Prof. Fiona Lyng

*Professor, Dublin Institute of Technology
Head of the DIT Centre for Radiation and Environmental Science*

Professor Fiona Lyng holds a BSc from Trinity College Dublin and a PhD from University College Dublin. She is Head of the Dublin Institute of Technology Centre for Radiation and Environmental Science (<http://www.dit.ie/resc/>, @RESCDIT). Her research is focussed on developing Raman spectroscopic approaches for cancer diagnosis and prognosis and has been funded by Horizon2020, Science Foundation Ireland, Health Research Board, Irish Research Council and Enterprise Ireland. She has published over 100 peer reviewed research papers, has an h-index of 34 and >4000 citations. Prof. Lyng has filed 3 patents and licensed technology to an Irish start up company. She is a member of the management committee

and a working group leader in the COST Action Raman4Clinics, which pools European expertise in the field of novel, label-free and rapid technologies based on Raman spectroscopy for clinical diagnostics. She won the Enterprise Ireland 'One to Watch' Award in 2011 and was awarded an Honorary Professorship of DIT in 2012.



Prof. Martin Leahy

*Professor and Chair of Applied Physics, NUI Galway
Adjunct Professor at the Royal College of Surgeons*

Prof. Leahy completed a DPhil in BioPhotonics at the University of Oxford and he and a colleague established Oxford Optronix Ltd., where he was Director of R&D. From 1995 he had various research and teaching posts at the University of Oxford. After a period in industrial consultancy and joined the Physics Department at the University of Limerick where his group specialized in tissue optics and microcirculation imaging, a number of projects in the area of biomedical instrumentation and lecturing in physics. He is also Fellow of the Institute of Physics, Fellow of the Royal Academy of Medicine in Ireland and Fellow of SPIE. For 2010 he was programme committee member, panel moderator for SPIE Photonics West BIOS in San Francisco and host of the BioPIC European Bioimaging conference in Dublin. Prof. Leahy has held senior management roles in industry (e.g. Founding Director of R&D at Oxford Optronix Ltd.) and academia (e.g. Founding Director of CPI www.cpi.ul.ie and First Scientific Director of the National Biophotonics and Imaging Platform www.nbipireland.ie). He was founding MD of Limerick West Windfarms Ltd. and Millstream Energy and PI on the research projects that spun out Biomass Heating Solutions Ltd. and Wheelsbridge AB. Since his return to full-time academia, he has played a leading role in graduate biophotonics education through www.nbipireland.ie/moodle and www.biophotonics.ul.ie/resources.html and the Biophotonics and Imaging Graduate Summer School www.nbipireland.ie/events/bigss. His main research interests are in tissue optics and in the advancement of existing technologies such as laser Doppler and laser speckle as well as the development of new modalities such as TiVi and cmOCT for 2D, 3D and 4D imaging of the microcirculation. He has secured more than €7M in external R&D funding since 2007 and his citation rate is rapidly rising since 2009.



Prof. Donal O'Shea

*Professor and Head of Department of Pharmaceutical & Medicinal Chemistry,
Royal College of Surgeons in Ireland*

Prof. O'Shea received his Ph.D. degree in Chemistry from University College Galway in 1994. He held post-doctoral positions in the University of Edinburgh and Carnegie Mellon University, Pittsburgh following which he was a research scientist at Eastman Kodak Company in Rochester, New York. In 1999 he returned to academia to a position in University College Dublin and was promoted to associate Professor of Chemistry in 2007. He moved to the Royal College of Surgeons in Ireland as Prof of Chemistry in 2013. His research interests include near-infrared fluorophores as research tools and for fluorescence guided surgery. The central theme of his research lies in the advancement of new strategies for the synthesis and functional assessment of structurally complex molecules. Specific goals include the development of new light activated anti-cancer and anti-microbial agents, the investigation of novel concepts for drug selectivity and the generation of chemical tools to assist in gaining a molecular level insight into biological processes. His research has its foundations in medicinal organic chemistry and chemical biology with strong collaborative links with biological imaging and medicine. Current projects include: near-infrared fluorochromes for real-time in vitro and in vivo imaging; tools for chemical biology and fluorescence guided surgery; a new class of photodynamic therapeutic agent with anti-cancer and anti-bacterial potential; innovative methodologies for pharmaceutical synthesis utilizing microflow reactors; mixed metal Li/K amides (LiNK chemistry) as new reagents for synthetic chemistry.



Dr. Martin O'Halloran

*Senior Lecturer, School of E&I/School of Medicine, NUI Galway
Director of the Translational Medical Device Lab*

Dr. Martin O'Halloran is Director of the Translational Medical Device Lab at NUI Galway, the first medical device lab in Ireland to be embedded in a regional hospital and co-located with a clinical trials facility. Dr. O'Halloran is also a non-executive director of the BioInnovate Programme (awarded IMDA's Best Academic MedTech Programme in Ireland 2016) at NUI Galway. Originally qualifying as an engineer, he re-trained in clinical research to ensure his lab-based research could be translated into the clinic, and have a clear and tangible impact on patient care. In 2011, he was the youngest-ever successful co-proposer of a European COST Action (entitled "MiMED"), and is now leading a network of over 180 medical device researchers from 24 countries, focused on the clinical translation and commercialisation of medical devices in Europe. The quality of his research has been recognized both nationally and internationally, and in only the last 4 years he was awarded Engineers Ireland Chartered Engineer of the Year 2014, SFI's Early Career Researcher of the Year 2016, and the IRC's inaugural Researcher of the Year 2017. He has also secured 4 grants from the European Research Council, one each year from 2014-2018, and currently leads a team of 25 researchers developing a wide range of diagnostic and therapeutic

technologies. Through his medical device work, he has been co-inventor on 7 patents, two of which have already been licensed to Irish medical device companies.



Prof. Ronan Cahill

Professor of Surgery Mater Misericordiae University Hospital and UCD School of Medicine & Medical Science

Prof. Cahill graduated MB,BAO,BCh (Hons) from University College Dublin in 1997 and then completed his basic and specialist surgical training in Ireland, gaining both MD by thesis (Health Research Board Clinical Research Fellow) and FRCS by examination. Thereafter, he was a clinical fellow at the IRCAD/EITS Institute in Strasbourg, France from 2007 to 2008 before moving to the Oxford Radcliffe Hospitals as senior fellow and then consultant and senior clinical researcher from 2008 to 2010. Ronan returned to Ireland in 2010 as consultant general surgeon (specialist interest in colorectal surgery) at Beaumont Hospital before taking up the position of Professor of Surgery at University College Dublin, and the Mater Misericordiae Hospital in June 2014.

He is a recipient of both the Bennett and Millen Medals (RCSI Millen Lecturer 2010) and was the ASGBI Robert Smith Lecturer in 2014. He has authored over 150 peer reviewed publications, five book chapters and four National Guidelines. He is an editorial board member of five indexed surgical journals, including Colorectal Disease and the European Journal of Surgical Oncology and is a member of the SAGES Research Committee (SAGES Career Development Award recipient 2009). He has a major academic interest in Surgical Innovation and New Technologies and active basic science, clinical and device development research partnerships both nationally and internationally.