



Queen's University
Belfast

Institute for Global
Food Security

We are exceptional

NEWSLETTER MAY 2013

WELCOME

It is with great pleasure that we publish the first edition of the Institute for Global Food Security newsletter. Food Security in its totality relates to ensuring that all people, at all times, have physical and economic access to adequate amounts of nutritious and safe foods. These foods must be produced in an environmentally sustainable and socially just manner. People, wherever they are, must be able to earn a living wage growing, harvesting, catching, processing, transporting, selling and serving food. Our Institute aims to play an important role in delivering food security, not only for our local population but have an impact world-wide. We have an exceptional research team in place which will grow further. We are working towards developing world leading research facilities that will put Queen's University at the forefront of research in this vital area. We warmly welcome support and collaborations, big or small, from both local and international stakeholders.



Institute for Global Food Security launched at Riddel Hall



Artist's concept of the new IGFS building to be constructed on Lennoxvale Avenue.

Present at the launch were, (from left to right), the chairperson of the Agri-Food Strategy Board, Tony O'Neil, the Vice-Chancellor, Sir Peter Gregson and Tesco CEO, Philip Clarke

On March 14th 2013, and after seven years of growth, development and vision, the new Institute for Global Food Security was launched at Riddel Hall. Since the inception of the UK's first Institute of Agri-Food and Land Use in 2006, the work of the Institute has become internationally recognised for its excellence in research and teaching. Over time the Institute has focused even more intently on its core founding principles. It is that focus and achievement that led to the re-launch and a new investment programme, securing its long term future as the

leading centre of its kind on the island of Ireland and one of the best equipped in the world. Acknowledging the impact of the work of the Institute, the University has committed more than £33m to support, nurture and promote its growth. Part of this investment will allow for a new purpose-built teaching and research facility for the Institute for Global Food Security, within the new £28 million Biological Sciences building planned for Lennoxvale. Tesco CEO, Philip Clarke, was present to help launch the new institute and praised the institute's record on safety, quality

and authenticity. He also used the event to announce a new partnership with Northern Irish farmers, increasing the amount spent on locally sourced meat by £500 million, a major economic boost to our important agri-sector. The institute launch also featured a roundtable discussion with representatives from leading food companies aimed at helping those present drive regional growth and competitiveness. Mr Clarke also opened a new £2.5m laboratory, housing state-of-the-art equipment provided by Waters Corporation. The new lab has been partly financed by the EU and Invest NI.

Professor Andrew Meharg officially welcomed to Queen's University

Professor Andy Meharg was officially welcomed to Queen's University as Professor of Plant and Soil within the Institute for Global Food Security on May 2nd. Following a welcome address by the Head of the School, Professor Christine Maggs, Professor Andy Meharg took to the platform to deliver his inaugural lecture, entitled, 'Arsenic on your plate'. He spoke of his years of intensive research into the inorganic arsenic contamination of rice grown in certain parts of the world and its impact on the human diet. Arsenic is highly toxic, and continuous exposure to relatively low levels in the diet can result in serious illness and death. Andy's research has shown that rice contains about ten times more arsenic than other crops, and that rice from some regions, such as Bangladesh, India, China and the USA often contains even higher levels of arsenic as it is grown on contaminated land.

Andy gave a fascinating and insightful lecture that both shocked and educated those attending. Of particular concern were the high levels of inorganic arsenic consumed by babies and young children in addition to adults that have a gluten free diet and consume much greater amounts of rice based or derived foodstuffs. Andy Meharg's work has led directly to the current reassessment of arsenic, in respect to standards and acceptable levels, in food and rice-based products by the EU, US and WHO. His work also led to the Food Standards Agency in the UK to recommend that children between one and four-and-a-half years of age should not be given rice drinks as a substitute for cows' milk, infant formula milk or breast milk

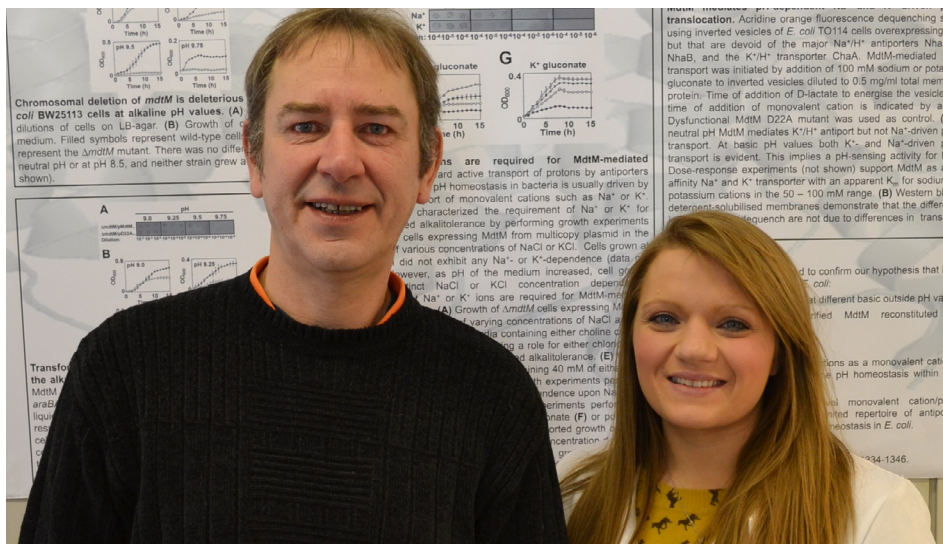
Professor Andy Meharg will be continuing his work on Arsenic contamination in foodstuffs and water while at IGFS. He will be working with Mr Manus Carey, a new member of staff that has joined us from QUESTOR. They'll also be commencing a new study aimed at trace metal profiling in meat.



Professor Andrew Meharg (centre left) pictured with Professor Christine Maggs (centre right), Professor Sean Gorman (left) and Professor Chris Elliott (right)

Dr Christopher Law awarded BBSRC research grant

As highlighted recently in the popular media, antibiotic resistance is a major global animal and human health concern. One of the mechanisms that pathogenic bacteria have evolved to resist the effects of antibiotics is that of multidrug efflux. This process is mediated by molecular pumps, made of protein, that are embedded in the fatty membranes that surround the bacterial cell. An understanding of the structure and mechanism of these membrane proteins is vital if we are to understand how they recognise and transport their antibiotic substrates. Dr Christopher Law of the Institute for Global Food Security has been awarded a £430K (FEC) research grant from the Biotechnology & Biological Sciences Research Council, BBSRC, to investigate the structure and mechanism of one of these efflux proteins, called MdtM, via an approach that combines X-ray crystallographic and biophysical methods. It is envisaged that the information generated, in combination with biochemical studies designed by Christopher's PhD student, Scarlett Holdsworth, to test if the protein performs other physiologically relevant functions, will be of use in the fight against antibiotic resistance in harmful bacteria.

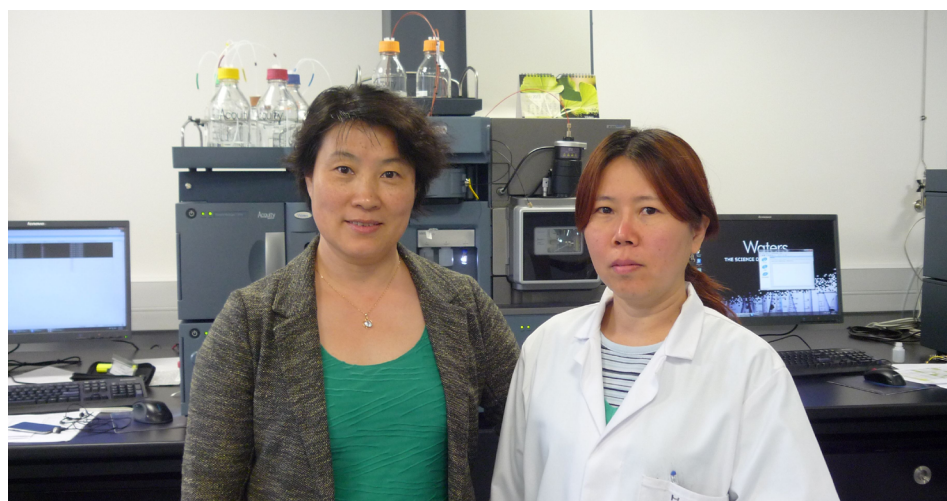


Dr Christopher Law pictured with his PhD student Scarlett Holdsworth

Dr Yun Yun Gong embarks on two internationally significant 'Grand Challenge' research projects on global health

Dr Yun Yun Gong has secured two new research projects, supported by the Bill and Melinda Gates Foundation. The first project, starting in July and worth \$1.17 million over two years, is led by Dr Gong, teamed with the Institute for Global Food Security, the WHO International Agency for Research on Cancer (IARC) and London School of Hygiene and Tropical Medicine. The project goal is to identify the mechanism by which aflatoxin exposure causes child stunting in the first two years after birth, identify mechanistic biomarkers, validate these biomarkers in order to apply to future intervention studies to improve child growth outcomes.

The second project begins work in June and is being led by the Michigan State University with Dr Gong serving as an epidemiologist responsible for data analysis and interpretation, the funding total is \$750,000 for two years. The goal of the project is to improve scientific and public health understanding of how dietary mycotoxin exposure, in conjunction with other risk factors for diarrheal diseases, affects child growth development in low-income nations.



Dr Yun Yun Gong (left) with her postdoctoral researcher Dr Chou Srey

IGFS scientists uncovering new biomarkers and nutrient-deficiencies associated with Alzheimer's

Scientists at the Institute for Global Food Security are using some of the world's most sensitive mass spectrometry equipment available to tackle the rising health problem of Alzheimer's disease. Dr Brian Green and Dr Stewart Graham lead a Network Cooperation Grant from Alzheimer's Research UK which is applying a technique called high-resolution 'metabolomics' to Alzheimer's. The researchers recently published their work in a top journal, *Analytical Chemistry*, examining the 'metabolome' of the human brain and the biochemical changes that occur in Alzheimer's. They have also teamed up with clinical collaborators at Belfast City Hospital's memory clinic and have profiled blood samples from healthy volunteers and people with Alzheimer's. The researchers have discovered specific metabolites which are dramatically altered in patients with Alzheimer's. Excitingly this could lead to the development of a new test to diagnose the disease in its earliest stages. The work also suggests that there are nutrient-deficiencies in Alzheimer's which could be potentially be addressed through the diet. The project aims to identify new biochemical fingerprints called biomarkers in human brain tissue that could indicate whether someone has Alzheimer's disease. This could lead to the development of a blood test that can distinguish between normal ageing, mild cognitive impairment (MCI) and Alzheimer's disease.

IGFS researchers secure Proof of Concept Funding

Two IGFS researchers, Dr Brian Green and Dr Irene Grant, have been successful in obtaining backing from the Invest Northern Ireland Proof of Concept scheme.

Two awards of £106,000 were made to researchers in the Institute to take significant steps towards commercialisation of their research.

Dr Brian Green's project is entitled: "Development of a metabolomics blood test for the pre-symptomatic diagnosis of Alzheimer's disease"

Dr Irene Grant's project is entitled: "RAPID-bTB: Rapid detection of bovine tuberculosis (bTB) bacterium in veterinary diagnostic samples"

New FP7 project launched

ECO-FCE is a new €6m FP7 project being led by a team including Prof. Chris Elliott and Dr Niamh O'Connell from Queen's and Elizabeth Magowan from the Agri-Food and Biosciences Institute (AFBI).

The project aims to improve the efficiency of feed use by pigs and broiler chickens and includes 17 partner organisations from across Europe. Queen's are responsible for co-ordinating the project and will also recruit a research assistant to investigate the relationship between feed efficiency and leg health in broiler chickens.



Dr Brian Green (left) and Dr Stewart Graham



The Institute for Global Food Security has been recognised as a Waters Corporation Centre of Innovation. Mike Harrington of Waters Corporation is pictured presenting Professor Chris Elliott with the dedication plaque. Also pictured is the Institute manager, Mrs Joyce Watterson (left)

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We want to build a 'food-fortress', ensuring everything we import is of the highest quality and that what we sell locally and internationally is also 100 per cent safe, nutritious and authentic

”

Professor Chris Elliott
14 March 2013

Student and Staff News

Dr Caroline Meharg has joined IGFS as a Lecturer in Functional and Comparative Genomics. Previous to working at Queen's she was employed as a Next Generation Sequencing Bioinformatics Research Fellow at the University of Aberdeen and the Max Planck Institute for Biology of Aging in Cologne. Caroline's interest is in Next-Generation Sequencing and the study of genomes/transcriptomes and their responses to and interaction with the environment. Some of her recent work includes identification of genes/networks involved in P uptake efficiency of wild grasses/crop plants, microbial diversity analysis and host genotype-specific interactions with commensal gut bacteria. Future research plans include the continued application of high throughput genomics/transcriptomics and proteomics approaches in the context of Food Security.

Dr Chou Srey has joined IGFS as a postdoctoral researcher for Dr Gong. Chou obtained her PhD from Queen's in 2010 and moved to Leeds working alongside Dr Yun Yun Gong for two years at the Institute of Genetics, Health and Therapeutics at Leeds University.

Carley Bailie recently commenced a two year post doctoral research position with Niamh O'Connell to investigate strategies to maximise production efficiency in broiler chickens in commercial windowed housing without compromising welfare. The research is funded by the DARD Research Challenge Fund initiative and research partners include Moy Park Ltd and St David's Poultry Team.

Maeve Shannon, an Advanced Food Safety MSc student, has been awarded a PhD scholarship from DEL allowing her to investigate how dietary endocrine disruptors are involved in the pathogenesis of diabetes and obesity. She will be under the supervision of Dr Lisa Connolly.

Mr Manus Carey has moved to IGFS after 16 years working at QUESTOR. Manus will be working with Prof. Andy Meharg, further progressing research on arsenic in foods and groundwater. He'll also be working on a new study concerning trace metal profiling for meats.

Dr Lisa Connolly was invited to the Robert Gordon University in Aberdeen as a guest speaker to give a lecture entitled: Endocrine disrupting food and environmental contaminants.

Gareth Arnott has also commenced a two year post with Niamh O'Connell as a Research Fellow in International Dairy Production. The post is being funded by AgriSearch and will involve horizon scanning and 'mining' relevant research in dairy production and communicating this to agricultural and scientific communities. This will involve working closely with AFBI and Cafre. Gareth completed his PhD at Queen's under the supervision of Prof. Bob Elwood and produced a number of highly regarded publications from this work. More recently, he worked with Scotland's Rural College in determining the implications of pre-natal environment on the subsequent health, welfare and productivity of farm animals.

Information on the new MSc in Advanced Food Safety scholarships can be found by [clicking here](#).

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