



conway

focus

Conway secures HEA PRTLTI 4 funding

Minister for Education & Science, Ms Mary Hanafin, TD recently announced the latest cycle of HEA PRTLTI funding and awarded UCD €29.838 million; €17.547 million capital infrastructure funding for the development of the UCD Science Centre and €12.291 million recurrent funding for projects in the humanities and sciences. Within the sciences, UCD Conway Institute was involved in two of the four main collaborative programmes to receive recurrent funding.

Complementing existing research programmes in both the Conway and CSCB (Centre for Synthesis & Chemical Biology), the new (Bio)pharmaceutical & Pharmacological Sciences programme builds on the €72m National Institute for Bioprocessing Research and Training (NIBRT), which is being established by the IDA at Belfield campus.

Together, these landmark initiatives will concentrate on providing trained researchers for Ireland's emerging biopharmaceutical industry (e.g. Wyeth, Amgen). There will be a particular focus on the production of biological therapeutics - molecules produced by cells that can be used to treat common human diseases such as arthritis, kidney disease and inflammatory bowel disease.

The second programme involving UCD Conway is the Biomedical Science Network, which will facilitate national consolidation and co-ordination of research and training activities in the biomedical sciences. In particular, the programme will support the development of clinical-scientist programmes. It is hoped this network will be instrumental in delivering a coherent information portal and nationally accessible platform for

molecular/ translational medicine and biomedical sciences.

Overall, the UCD programmes include collaboration with twelve universities and institutes: UCC, Trinity College Dublin, DCU, NUI Maynooth, University of Limerick, RCSI, Queens University, Cork Institute of Technology, ESRI, Dublin Institute of Technology, IT Tallaght, NUI Galway.

Announcing the awards the Minister said that the PRTLTI has helped create a core physical and human foundation for research excellence. "To date, the PRTLTI has awarded some €605 million to innovative research and infrastructural projects across the higher education sector".

Director's Message

As Director of UCD Conway Institute of Biomolecular & Biomedical Research, I am delighted to welcome you to the inaugural issue of 'Conway Focus'. Through this publication, we look forward to highlighting the research achievements of Conway scientists and the events that shape the identity of this Institute on the national and international stage.

In recent months, we have been defining research strategy and identifying the platforms for future development within the Institute. The announcement by Minister Mary Hanafin in relation to the 4th round of PRTLTI funding was particularly welcome. The award through the Biomedical Sciences Network will enhance the Institute's mission of translational sciences, in particular giving an opportunity to fund clinician-scientist PhD posts. The award in (Bio) pharmaceuticals and

Pharmacological Sciences further strengthens the links of the Conway and CSCB with NIBRT in this important area for Ireland.

Congratulations to Dr Orina Belton, Dr Patricia Maquire, Dr John Crean and Dr John Baugh on their recent appointments as lecturers and to Dr Antonio Campos-Torres and Dr Barry Boland on their temporary lectureships.

My thanks to the seminar committee for the superb programme of the 7th annual UCD Conway Festival of Research, a showcase for the research activity of the Institute. I hope you enjoy the day!

Samuel Allen



Janet Allen

Professor Suzi Jarvis joins UCD Conway with her nanoscale function group



Prof Suzi Jarvis

Professor Suzi Jarvis and her nanoscale function group recently joined UCD Conway Institute. Her multidisciplinary team has a skills base that includes physics, electrical and mechanical engineering, materials science, mathematics, chemistry, biology and phycology.

Using atomic force microscope (AFM) techniques, Professor Jarvis investigates the nanometre-scale functionality of organic and biological molecules. AFM uses a probe or tip under controlled conditions to build a 3-dimensional image of a sample. Frequency modulation AFM (FM-AFM) is an extension of the technique for extra sensitive measurements that is used extensively in ultra-high vacuum.

Professor Jarvis pioneered the implementation of this technique in liquid, which means that it can now be used for studying biological materials under physiological conditions. Her own group have used the technique to study model membranes and the membrane-fluid interface on a sub-molecular scale.

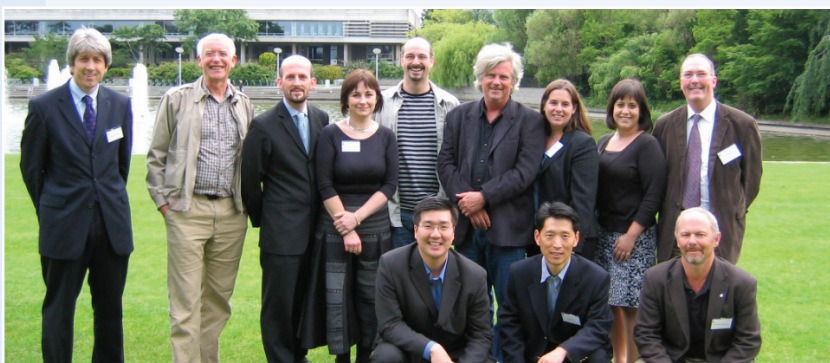
One aspect of this research focuses on the mechanical properties of biological membranes that act as a wall, either inside or surrounding a cell. The strength of these walls is important in understanding how viruses or drugs can enter cells. Suzi

Jarvis' group have used AFM to feel the individual molecular bricks that constitute these walls.

Water and ions are always present in biological systems and the group found that the ions are attracted to multiple 'bricks' thus joining them together and strengthening the wall.

The group are also using AFM to pull apart the individual amyloid fibrils in an effort to understand these self-assembled protein structures. Amyloid has long been associated with a range of debilitating and incurable human diseases but there is now growing evidence to suggest that physiological amyloid exists in a diverse range of organisms. The Jarvis group has identified amyloid structures in the attachment adhesives of five species of algae and an invertebrate organism. They hope to discover what triggers amyloid formation in a range of physiological contexts and also how it can be controlled so that it does not give rise to disease.

International workshop on epigenetics takes place in UCD



Speakers and organisers pictured at the workshop: (L-R), back: Prof Eamonn Maher, Prof Peter Jones, Dr Patrick Corley (Irish Cancer Society), Dr Amanda McCann, Dr Steven Gray, Prof Kevin Sullivan, Dr Dana Dolinoy, Dr Joyce Ellen Ohm, Dr Mark Watson. (L-R), front: Prof Allen Yang, Dr Hoon Ryu, Prof Michael Skinner.

An international workshop entitled **Epigenetics: From Mechanisms to Medicines** took place in O'Reilly Hall, UCD from 24th-26th June 2007. Under the auspices of the Dublin Molecular Medicine Centre, UCD Conway investigator Dr Amanda McCann was instrumental in the organisation of the successful event.

Epigenetics describes mechanisms and phenomena that affect the phenotype of a cell or an organism, but do not involve changes in the DNA sequence. The modifications of the protein and DNA

components of chromatin that constitute epigenetic changes can be transmitted through multiple generations. This heritable information system in addition to DNA sequence (epigenome) can account for the complexities of human development and disease causation, and can be affected by environmental factors. As we delve into the causes of disease at the molecular level, the importance of epigenetics is increasingly evident.

The first day of the conference, entitled *Epi-Mechanisms*, encompassed epigenetic mechanisms and research

techniques. There were presentations from international speakers including Prof Wolf Reik, Babraham Institute, Cambridge, UK; Dr Carole Charlier, University of Liège, Belgium; Prof Stuart Schreiber, Broad Institute of Harvard & MIT, USA and the keynote lecture, sponsored by AIB, was given by Prof Marcus Pembrey, UCL Institute of Child Health, UK.

The second day of the workshop entitled *Epi-Therapeutics* concentrated on epigenetics in development and disease and included speakers such as Dr Joyce Ellen Ohm, Johns Hopkins University, USA; Prof Michael Skinner, Washington State University, USA and Dr Dana Dolinoy, Duke University Medical School, USA. The keynote lecture sponsored by the Irish Cancer Society was given by Prof Peter Jones, USC / Norris Comprehensive Cancer Center, USA.

The winner of the best poster talk 'Loss of IGF2 imprinting in breast and colorectal cancer is a somatic epimutation rather than a congenital event' was Dr Adele Murrell, University of Cambridge, UK and the best poster prize went to Ms Angela O'Gorman, National University of Ireland, Galway for the poster entitled 'IK B-α as a target for epigenetic silencing in colon cancer'.

Novel research collaboration between UCD scientists and AstraZeneca to target diabetes

A research collaboration to develop therapeutic strategies to combat diabetes has been established between AstraZeneca and UCD Conway Institute investigator Dr. Philip Newsholme. The new venture is the result of novel findings by Dr Lorraine Brennan and Dr. Newsholme on cell metabolism and the regulation of insulin secretion published recently in the journals *Diabetologia* and *Diabetes*.

Nearly 200,000 people in Ireland are thought to have diabetes, one of the three major killers in this country along with heart disease and cancer. Altered

metabolism is thought to be common to all three diseases.

Stress at cellular level causes metabolic dysfunction of the cell and it can affect many different cell types such as those found in the muscle, liver, endothelial, kidney and the pancreas. The pancreatic beta-cell is of particular interest to Dr. Newsholme as the metabolic dysfunction of the cell results in reduction in appropriate levels of insulin secretion.

Major sites of metabolic dysfunction are enzymes and proteins associated with the mitochondrion and the plasma

membrane. Working with scientists at the University of São Paulo in Brazil, Dr Newsholme and his team discovered that the plasma membrane associated enzyme NADPH oxidase can, under certain conditions associated with the pathogenesis of diabetes, contribute to mitochondrial dysfunction leading to beta cell dysfunction and demise.

Having identified novel sites of dysfunction, Dr. Newsholme hopes that, in collaboration with AstraZeneca, he will be able to develop a number of therapeutic strategies to target diabetes in the coming years.

Leading scientist set to advance prion research in UCD

Proteinaceous infectious particles (prions) are known to cause a number of diseases that affect the brain and nervous system in both animals and humans. Bovine spongiform encephalopathy (BSE) in cattle and its human equivalent, Creutzfeldt-Jakob disease (CJD) are the most well-known prion diseases.

Both these diseases are inevitably fatal and characterised by severe neuronal loss and spongiform degeneration. Another hallmark is the presence of deposits in the brain known as amyloid plaque.

There is some similarity between prion diseases and neurodegenerative diseases such as Alzheimer's, which affects nearly 35,000 people in Ireland today. There is no known treatment for either prion disease or Alzheimer's at present. However, UCD Conway principal investigator, Professor Michael Scott hopes to change this.

In collaboration with other research groups, Professor Scott hopes to identify some commonality between prion and other neurodegenerative diseases. In order to advance his research, he is establishing the first transgenic laboratory in UCD. Located in the specific pathogen

free (SPF) facility of UCD Conway Institute Biotechnical Services, it will open in September 2007.

Professor Scott led the establishment of the transgenic laboratory in order to facilitate his prion research and also provide support to other research groups within the university. By investigating modified prion genes in animal models, he hopes to understand the method of propagation of prions, to identify novel targets for therapy and elucidate how prions cause disease.

NovaUCD 2007 Innovation Award

UCD Conway principal investigator, Professor Ciaran Regan received the NovaUCD 2007 Innovation Award in recognition of his successes in the establishment of key strategic and collaborative links with industry and in the commercialisation of neuroscience research.

Professor Regan's achievements include securing €10 million in funding from Wyeth Discovery and Science Foundation Ireland to establish the Applied Neurotherapeutics Research Group at UCD Conway Institute. This group, which aims to identify novel neurotherapeutic targets, has already generated eight invention disclosures. This link was of critical importance in Wyeth's later decision to establish a €13 million bio-therapeutic drug discovery research facility at the Institute.

On presenting the NovaUCD 2007 Innovation Award to Professor Regan, UCD President Dr Hugh Brady said, "Ciaran is one of those special individuals who combines excellence in teaching and in research with a commitment to commercialise the resulting research-generated intellectual property and in establishing key strategic links with industry."

Professor Regan's research focuses on understanding mechanisms of brain plasticity and in exploiting these mechanisms as novel drug targets. He is a named inventor on six UCD patents and also co-founded a successful UCD spin-out company, Berand Neuropharmacology in 2004. Berand is developing novel therapeutics for the treatment of autism and obesity.



Professor Ciaran Regan

Celtic Twilight sculpture unveiled in Conway courtyard

'Celtic Twilight,' a six-metre high rod and tubular stainless steel sculpture created by renowned Irish artist Edward Delaney in 1974 has been donated to University College Dublin by developer Mr David Arnold in memory of his father.

The sculpture, which was originally located in the American Airlines Building on Baggot St, Dublin, will be on permanent display in the courtyard of the UCD Conway Institute.

Edward Delaney was born in Mayo in 1930. He studied at the National College of Art and Design in Dublin and, with the support of the Arts Council, studied casting in Germany. In 1959 and 1961, he represented Ireland at the Paris Biennale.

His best known works are two famous Dublin landmark monuments: the 1967 statue of Wolfe Tone and famine memorial at the northeastern corner of St Stephen's Green, Dublin, and the statue of Thomas Davis in College Green, Dublin. In 1979, his statue of Wolfe Tone was blown up by loyalist terrorists, but the head survived undamaged and the statue was fully reconstructed.



STARs 'Research Survival Skills' workshops support secondary teachers

Fourteen secondary school teachers got a taste of the common techniques used in third level research during the summer in UCD Conway Institute's *Research Survival Skills* workshop.

The teachers were all participants in the 2007 Science Foundation Ireland STAR (Secondary Teacher Assistant Researcher) programme, which aims to help teachers learn new skills and knowledge that they will be able to pass on to their students in order to cultivate and promote an active interest in science and science projects.

This workshop was the first of a five week series being delivered by education and outreach officers (Treo*) in research institutes across Dublin. The schedule included an NMR workshop in the Centre for Synthesis and Chemical Biology, a demonstration of superconductivity by the Physics department and concluded with a DNA workshop held in the UCD Conway Institute.

The DNA workshop investigated the different methods by which DNA can be visualised in the classroom. This involved running gel electrophoresis, purifying DNA from a banana using common household



STAR Edel Morrow from Hartstown Community School pouring a DNA gel

materials and building a physical model of the double helix.

Further workshops were held as part of the series in the Royal College of Surgeons in Ireland, Dublin City University and University of Dublin, Trinity College. These looked at areas such as using the internet as a resource for teaching science, activity based learning in science subjects and examining outreach initiatives available to second level students.

*Treo - Irish network of education and outreach personnel involved in science promotion activities in third level research institutes

UCD Conway launches intranet for 600 researchers

On July 18th 2007, UCD Conway Institute launched the first phase of the UCD Conway intranet, which has been developed in an effort to streamline business processes and improve communication among the 600 members of the Institute located on campus and in off-site locations.

The intranet has been designed with interactive and informative features. Information about seminars, education courses as well as funding and job opportunities that were being circulated to researchers on a fortnightly basis by email will now be available in a more timely fashion on the intranet.

Other features of the intranet include access to online forms that will allow researchers to report faults, set up and modify *Labstore* accounts and provide input to the intranet content. It is hoped to further expand this set to include registration and abstract submission to Conway conferences such as the annual Festival of Research and postgraduate symposium.

The directorate have been working with *Shared Perspective*, an IT solutions provider on this project. They also developed the *Labstore* system, a custom-made, on-line shopping facility for researchers within the Institute.



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