



College of Engineering, Mathematical & Physical Sciences

College Bulletin

EMPS showcases research during ESB sustainability week



Pictured from left: Dr John Sheridan; Dr Sharon Davin; Prof. Don McElroy; Prof. Michael Gilchrist; John Campion; Fergus Keane; and, Grainne Keane.

Researchers from the UCD College of Engineering, Mathematics and Physical Sciences (EMPS) showcased critical projects in the broad arena of sustainability to an industrial audience during ESB sustainability week.

The Solar Energy Cluster Group in the School of Chemical and Bioprocess Engineering discussed the potential future for solar power in meeting Ireland's energy requirements, and provided demonstrations

of photovoltaic (PV) technologies. This event was hosted by ESB Executive Director for Sustainability John Campion, who is on the oversight board of this Science Foundation Ireland (SFI) research cluster.

Dr Antonio Ruzzelli of the UCD Clarity centre presented their novel home energy monitoring system, which can recognise appliances around your home and determine how efficient they are, and how efficient they



Clarity energy monitoring event with (from left): Fergus Keane; Dr Antonio Ruzzelli; Brid Horan; Dr Aiden Doherty; Grainne Keane; and, Professor Chen-Ching Liu.

could be, at an event hosted by ESB Director of Energy Solutions Brid Horan. The Clarity group has also presented to the ESB's recently established green investment fund, Novus Modus.

Professor Mark O'Malley's Energy Needs Ireland (ENI) group from the UCD Electricity Research Centre looked to 2060 and predicted what the shape of Ireland's energy industry might be in 50 years' time. This was hosted by ESB Deputy CEO John Shine.

The motivation behind these events was to foster mutual co-operation between UCD and the ESB, and to educate and inform each other of the work and research being carried out in the area of sustainability by both organisations.

The importance of innovation

A half-day workshop was held on June 8 to highlight the importance of innovation education and the concepts behind the TCD/UCD Innovation Academy. The workshop was organised by Dr Amanda Gibney, supported by Professor Julie Berndsen and Dr Emer Cunningham. The invited speakers, Professor Roy Sandbach (P&G), Martin Grant (Cranfield University, UK) and Chris Kurjan (IDL Ltd), addressed the ways in which innovation will impact

on our world over the next 20 years, and discussed the evolution of successful industry/university interaction in innovation education. The speakers had extensive knowledge and experience of design-led innovation and a comprehensive understanding of the importance of multi-disciplinary teamwork. Leading design consultancies and multinational corporations recognise the potential that can be realised from a collaborative culture

between business, technology and human values experts. This multidisciplinary approach has been used across the US and Europe in developing higher education courses and programmes, preparing students to function within their working environment. The UCD/TCD Innovation Academy aims to provide students from a range of disciplinary backgrounds with the opportunity to develop their innovation potential.

Highest honour for Professor Da-Wen Sun

In recognition of his outstanding academic achievements, Professor Da-Wen Sun, Professor of Food and Biosystems Engineering at UCD, was awarded membership of the Royal Irish Academy (RIA) on May 28, 2010. This is the highest honour that can be attained by scholars and scientists working in Ireland. Professor Da-Wen Sun's many scholarly works have become standard reference materials for research workers in the areas of computer vision, computational fluid dynamics modelling and vacuum cooling. He has published over 200 peer-reviewed papers in high-impact international journals and has edited ten authoritative books. He is editor-in-chief of the journal *Food and Bioprocess Technology* and editor of the series *Contemporary Food Engineering*. Thomson Scientific ranks him among the top 1% of authors cited in *Agricultural Sciences*. Professor Sun holds visiting professorships at several Chinese universities.

Founded in 1785, the RIA is Ireland's premier learned body and vigorously promotes excellence in scholarship in the sciences, humanities and social sciences. For 225 years, membership of the RIA has been keenly competed for, as it is the highest academic honour in Ireland and a public recognition of



Prof. Da-Wen Sun, MRIA, with Prof. Nicholas Canny, President of the RIA.

academic achievement. There are now 442 Members of the Academy, and in its entire history only 2,833 people have been Members. Those elected are entitled to use

the designation 'MRIA'. Professor Sun was among only 24 academics on the island of Ireland to achieve this highest academic distinction.

Architecture student exhibition



On Saturday May 22, a new permanent exhibition opened to the public in the heritage centre located in the 'Board of First Fruits' church at St Mullins, Co. Carlow. The exhibition was designed and built by the fourth-year students of architecture at UCD between January and May of 2010, as part of their design studio programme. The group of 11 students was led by Peter Cody and Chris Boyle. Structured around ten separate storylines supported by a documented recording of local oral history from the 1938 schools project, and a corresponding wall of images, each story in turn illuminates an aspect of the life and times of this place.



Above and left: The 'Board of First Fruits' church is the venue for this fascinating exhibition.

Woven together they collectively impart to the visitor the rich tapestry that is St Mullins. The exhibition further extends itself into the

surrounding landscape and visitors are encouraged on leaving to explore the many adjacent archaeological sites.

Charles Nwankire wins Science Speak

Our congratulations go to Charles Nwankire, who recently took first prize in the Science Speak competition for his presentation entitled 'Nano Engineered Surfaces to Prevent Fouling'. Charles is a PhD student under the supervision of Dr Denis Dowling of the Surface Engineering Group, UCD School of Electrical, Electronic and Mechanical Engineering.

Science Speak is a joint initiative organised annually by the RDS and *The Irish Times* in association with Irish Universities Promoting Science. It is sponsored by Discover Science and Engineering and Pfizer.

Postgraduate students from seven universities – UCD, UCC, TCD, DCU, NUI Galway, NUI Maynooth and UL – participated in the event. Charles was described by the panel of judges as being “a wonderful science communicator with an inherent ability to inspire”. Speaking after his success, Charles said: “Through participation in Science Speak I have learnt a considerable amount about being a more effective communicator and to tailor my presentation to the target audience. My presentation was based around my PhD research on anti-fouling coatings and I have gained enormously from my research at UCD. In addition to the technical skills, I particularly



Winner: Charles Nwankire and his son Chidiebube.
Photograph: Marc O'Sullivan

enjoyed participating in a leading edge nano coatings project involving a number of EU project partners”.

To see a webcast of Charles' winning presentation please visit http://www.rds.ie/cat_webcast_detail.jsp?itemID=325384

Innovation Day

The TCD–UCD Engineering Design Innovation Day was held on April 27, 2010, organised by Professor Michael Gilchrist of UCD and Professor Brian Broderick of TCD.

Approximately 60 current postgraduate and postdoctoral research projects from across TCD and UCD, which have direct links and relevance to industry, were presented at an open public forum. The day began with an opening address from Conor Lenihan TD, Minister for Science, Technology, Innovation and Natural Resources. The research featured on the day covered four thematic areas: future energy solutions; sustainable infrastructure and environment; information, communication and media technologies; and, bioengineering for health. Each thematic session began with an overview from a senior industry representative, identifying some of the key technological challenges facing their particular sector in the coming years. This was followed by brief presentations demonstrating how these challenges are being addressed through current engineering research within the Innovation Alliance.



ACAM-CECAM SimBioMa-ESF workshop: simulations and experiments on materials for hydrogen storage



ACAM hosted a three-day workshop from May 6-8 exploring developments and providing an overview of the state of the art in hydrate molecular simulation. The primary aim of the CECAM-ACAM meeting was to outline and discuss recent developments, exchange ideas and consider future directions in a number of areas, including: thermal conductivity and thermal energy transport; nucleation; hydrate growth and crystallisation; and, inhibition of growth and promotion of dissolution. The event was organised by Dr Niall English (UCD), Gillian Davis (ACAM, UCD), Professor Mark Rodger (University of Warwick, UK), and Professor John Tse (University of Saskatchewan, Canada).

The event also included a series of public lectures, including one by Professor John Tse entitled 'Burning ice – the good, the bad and the ugly', Professor Tse described how every carbon-based life form on earth will

ultimately become the simplest carbon-containing molecule, methane, but asked: where does all the methane end up? Believe it or not, it is 'frozen' in a spongy ice layer at the bottom of the ocean. This icy substance is called methane clathrate hydrate, and if you dig it up from the ocean floor, you get chunks of ice that will burn.

Methane clathrate hydrate could provide a valuable fuel supply for the future; it has been estimated that there is more fuel in these icy deposits than in all the oil reserves on the planet. However, methane is a greenhouse gas and is 30 times more dangerous than carbon dioxide.

During his presentation, Professor Tse tackled the difficult question of whether it was possible to safely access this substance and use it as a fuel supply.

To find out the answer, and for information on upcoming events, visit <http://acam.ucd.ie> ACAM/Home.html.

SFI RFP award winners

Congratulations to the following staff members at EMPS who received 10 of the 47 Research Frontiers Programme (RFP) awards recently announced by Science Foundation Ireland (SFI):

- Dr Kenneth Gavin, School of Architecture, Landscape and Civil Engineering
- Dr Niall English, School of Chemical and Bioprocess Engineering
- Professor Joe Carthy, School of Computer Science and Informatics
- Dr Gianluca Polastri, School of Computer Science and Informatics
- Dr Madeleine Lowery, School of Electrical, Electronic & Mechanical Engineering
- Professor Frank McDermott, School of Geological Sciences
- Professor Adrian Ottewill, School of Mathematical Sciences
- Dr Sander Zwegers, School of Mathematical Sciences
- Dr Ronan McNulty, School of Physics
- Dr John Quinn, School of Physics

Bertram Broberg Memorial Medal



At the Bertram Broberg Memorial Medal presentation (from left): Prof. Adrian Ottewill, UCD School of Mathematical Sciences; Medal recipient Dr Manuel Forego Rueda; Prof. Anne Buttmer-Broberg, Emeritus Professor of Geography at UCD; and, Prof. Michael Gilchrist, UCD School of Electrical, Electronic and Mechanical Engineering.

The College of Engineering, Mathematical and Physical Sciences is pleased to announce the Bertram Broberg Memorial Medal. The Medal is named after the eminent scientist, Professor Knut Bertram Broberg, whose research interests spanned a wide range of fields covered by the College. It aims to distinguish young researchers who have recently completed a PhD thesis on a topic overlapping with Professor Broberg's own research interests. Speaking at the establishment of the Medal, College Principal Professor Nick Quirke, said that it was "heartening to see the selfless leadership that such an eminent academic is continuing to provide to future generations of UCD researchers".

The Medal is supported by the Bertram Broberg Memorial Fund, which has been established through the generosity of his

widow, Professor Anne Buttmer-Broberg, Emeritus Professor of Geography at UCD. Professor Buttmer-Broberg explained that: "Bertram had always been passionately interested in encouraging young researchers and he was always stimulated by their scientific problems". The Fund has already facilitated the international and interdisciplinary Broberg Memorial Symposia, the first of which was held at UCD (May 2007) and the second at the Lund Institute of Technology (May 2009). Highlights of these events have been the specially commissioned Broberg Lectures by world-class scientists, and further such symposia and lectures are now being planned. UCD Vice-President for Development Áine Gibbons said that it was "particularly rewarding for UCD to receive this most generous endowment from one of our emeritus professors to establish this Fund".

UCD professor receives top US award

Professor Gerry Byrne was recently awarded the Society of Manufacturing Engineers (SME) Frederick W. Taylor Research Medal "for his significant and leading-edge published research, which has led to a better understanding of materials, principles, operations and their application to improve manufacturing processes".

The SME is the foremost professional society in

the US, serving the professional and technical needs of the manufacturing community for more than 75 years. The SME Frederick W. Taylor Research Medal is considered to be the most prestigious award in the field of manufacturing engineering. First presented in 1957, the award is given to individuals who are international leaders in the area of manufacturing engineering research.

MINTWELD

UCD is a major partner in the new EU FP7 project MINTWELD. The MINTWELD project was launched in October 2009. It is a four-year pan-European collaborative research project, with partners from both academic institutions and industry. The aim of the project is to develop an integrated model for the design of new materials and processes for welding applications. UCD's efforts are being spearheaded by Dr David Browne of the School of Electrical, Electronic and Mechanical Engineering. A major consortium meeting will take place in UCD in September. Details can be found on www.le.ac.uk/mintweld or by contacting Dr David Browne, Email: david.browne@ucd.ie.

Grad Ireland Awards

Congratulations to the UCD School of Computing and Informatics for the special mention that the MSc in Computer Science by Negotiated Learning received at the recent Grad Ireland Awards. The course came second in the 'Postgraduate course of the year – science & engineering' category, receiving a special mention from the judges. This augurs well for the course, which was only launched in September 2009.

Architecture Summer School

Following last year's successful event, the UniLife Architecture Summer School took place again this year in Richview on June 8. Students were given the opportunity to tour the facilities in Richview on the UCD campus, examine students' work, and take part in a masterclass in photography, and were assigned tasks in designing structures.

Engineering Summer School

The UniLife Engineering Summer School was held on June 9 and 10, targeted at fifth-year students studying higher-level maths. During the two days, over 30 students were given the opportunity to explore the diverse world of engineering through taster lectures and mini practicals. The event began with an innovation masterclass and explored the role that engineers play in the biomedical, communications, energy and environmental industries. Activities were supported by staff from all of the UCD engineering schools.