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Research news

DUBLIN INSTITUTE OF TECHNOLOGY



DR FIONA LYNQ — ONE TO WATCH

SOUND QUALITY RESEARCH

CREST: KEEPING THE CUSTOMER SATISFIED

CASVA FUNDING FOR ART AND ARCHITECTURAL RESEARCH

The Center for Advanced Study in the Visual Arts, (CASVA) located in the East Building at the National Gallery of Art, in Washington, is a research institute that fosters study of the production, use and cultural meaning of art, artifacts, architecture and urbanism, from prehistoric times to the present. Founded in 1979, the Center encourages a variety of approaches by historians, critics and theorists of art, as well as by scholars in related disciplines of the humanities and social sciences.

CASVA offers a number of research scholarships to senior researchers and researchers at the early stages of their career. For example, the Predoctoral Fellowship Program offers nine different fellowships each with its own criteria. Many of the Fellowships require the researcher to spend a period of time abroad and could be used to fund a graduate student to spend time in the Dublin Institute of Technology.

The Andrew W. Mellon Fellowship is awarded annually for 24 months. The fellowship is intended for the advancement and completion of a doctoral dissertation in cross-cultural studies or in a field other than Western art through the twentieth century. Cross-cultural proposals should represent at least one culture outside the Western tradition. The Andrew W. Mellon Fellow is expected to spend the first year of the fellowship period in a specific city, locality, or region related to the dissertation. The second year is to be spent in residence at the Center to complete the dissertation.

The stipend for all predoctoral fellowships is \$20,000 per year. A housing allowance is available for fellows not in residence. Fellows in residence are provided with housing in apartments near the Gallery, subject to availability. In addition, predoctoral fellows receive allowances for photography and travel, depending on the terms of the fellowship.

Another Fellowship funded by the Mellon Foundation – the A. W. Mellon Postdoctoral Fellowship Program – funds a two-year stay in CASVA. During the first year the fellow will carry out research and writing related to the publication of a dissertation or appropriate articles or book(s). The fellow will also design and direct an intensive weeklong seminar for the seven predoctoral fellows at the Center, focusing on a topic related to the applicant's field of interest and with a special emphasis on methodological issues. In the second academic year, while continuing research and writing in residence, the A. W. Mellon Postdoctoral Fellow will be expected to teach one course (advanced undergraduate or graduate) by arrangement at a neighbouring university. This Fellowship programme is open to all suitable applicants of any age or nationality and is worth up to \$50,000 a year including travel allowances and allowances for photography. Closing date for this programme is usually November.

For more information on these and other Fellowship programmes in CASVA visit: www.nga.gov/casva

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Cover photograph from L to R: Dr Fiona Lyng, DIT, Sean Sherlock TD, Minister for Research and Innovation, Fergal O'Moráin, Director of Research, Innovation and Commercialisation, Enterprise Ireland.

EDITORIAL



Our cover story in this edition is an excellent example of what DIT research is about. It features Dr. Fiona Lyng who received the 2011 Enterprise Ireland "One to Watch" Award for her ground-breaking development of a new cervical cancer diagnostic system. Fiona and her colleagues in the Radiation and Environmental Science Centre (RESC) are part of the Focas Research Institute at DIT. Working in collaboration with the Coombe Women and Infants University hospital, they have developed what Enterprise Ireland describe as a 'gold standard' technology that will make a very significant impact in early and objective diagnosis of cervical cancer. Enterprise Ireland is now involved with the research team to establish a spin-out company, Raman Diagnostics, and anticipates that the technology will be used in hospitals across the world.

DIT research aims to be nationally relevant, internationally competitive and strategically important. We are strongly focused on problem-solving, on social and technological development and on innovation that advances human knowledge and makes a real impact on people's life experience. There is no doubt that by developing a diagnostic technology for cervical cancer, as Fiona has done, or for skin cancer as Professor Jonathan Blackledge has done with his MoleTest technology, DIT research is making an impact on people's life experience. These are two current success stories but among our 800-strong research community there are many more, in areas such as new materials and technologies; information and communications; food and health sciences; environmental sustainability; creative arts and media; social, business and economic research.

Recently Mr. Tom Boland, Chief Executive of the Higher Education Authority, challenged colleges to ensure that their graduates are not only highly employable but are also entrepreneurial in their outlook and have the capacity in the future to employ others. This is an area in which DIT is particularly strong. Entrepreneurial and commercial activity is part of our core mission and is embedded in educational and research programmes. Through our technology transfer office, DIT Hothouse, we continue to excel nationally and internationally in disclosures, new patents filed, technologies licensed and in the rate of spin-out companies established. In parallel, the Hothouse Venture Programme for knowledge-intensive start-ups has helped to launch more than 250 companies since 2001, many of which have leveraged DIT research, consultancy and training, and now employ DIT graduates. In all, some 1000 jobs have been created through such start-ups in the greater Dublin area. In a further initiative, DIT recently launched a new structured PhD programme comprising modules in commercialisation, entrepreneurship and workplace-based learning. Graduates of this programme will have a lot to offer employers but it is likely that they will also create jobs themselves.

Professor Ellen Hazelkorn, Director, Research and Enterprise and Dean of the Graduate Research School

[Projects]

Dr Charlie Cullen, Digital Media Centre, is leading an industry-led project designed to improve the transmission of 3D audio scenes and objects over narrow bandwidths to allow user interactivity. He was awarded Marie Curie funding for a researcher training and career development initiative under the Industry-Academia Partnerships and Pathways (IAPP) programme. The aim of this programme is to fund projects that boost skills exchange between commercial and non-commercial sectors. The project – ‘Codecs based on auditory scene analysis’ – is being led by Dr Charlie Cullen of the Digital Media Centre in collaboration with Professor Jonathan Blackledge from the Audio Research Group.

“So while DTS deliver the content to the user, Tamborine, who are a post production company in London, will produce that content. Getting Tamborine to provide content for DTS to deliver using our new codecs is a very exciting prospect – particularly with the new lab available for testing. In my strand of research, what we’re aiming to do is look at how people perceive surround sound,” says Charlie.

“There’s a huge generation of devices coming out now and everything is going mobile. So with devices like iPods, iPads and iPhones, the days of situated media are fast disappearing — everything is going to be carried around with you.”

DIT WORKING WITH PRODUCERS TO IMPROVE SOUND QUALITY

With a budget of over €680K, pre-financing of €395K and two key industry players on board, the project began in November 2010.

“DTS (Digital Theater Systems) and Tamborine Productions Ltd work with us on the initiative,” says project coordinator Dr Charlie Cullen. “The IAPP programme gets researchers to collaborate directly with industry, where a company interested in a specific line of research collaborates with academic researchers who in turn gain unique access to cutting edge commercial resources and technology”.

With a four year research plan in place the project will give DIT researchers an important opportunity for development.

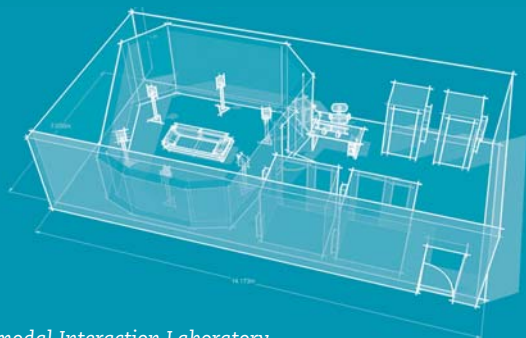
“This programme provides secondment for researchers, where those involved get to work within the participating companies,” says Charlie.

“The new Multimodal Interaction Laboratory here at DIT Aungier St was modelled on the same lab that project partner DTS has in four of their research locations throughout the world. It completely mirrors industrial audio listening spaces, so anything that they are doing we can do or vice versa. This idea of replicated testing and results is hugely significant and for an academic institution to be so closely linked with industry like this is an important step.”

“THIS REDUCES THE AVAILABLE BANDWIDTH SINCE MOBILE NETWORKS SUCH AS 3G DON’T CURRENTLY HAVE THE SAME CAPABILITIES AS HD CONNECTIVITY LIKE HDMI. SO ONCE WE HAVE A TEMPLATE FOR HOW BEST TO TRANSMIT MULTI-CHANNELS INTO CONSTRAINED BANDWIDTH, THE AUDIO RESEARCH GROUP WOULD THEN BUILD AN ALGORITHM TO IMPLEMENT IT.”

“We then give Tamborine an application using that algorithm and ask can they produce content with it. After that, we test that content to see whether it performs better than traditionally compressed content.”

Early adopters for the finished product are being sought as research continues. “We need to find ways to get something that will actually be adopted by the industry and see if DTS can get something they are happy to distribute. A lot of mobile devices are starting to carry the DTS codecs so they can reach a huge amount of devices. If the content isn’t designed for use with these new codecs then it won’t be as effective, so we are working on trying to connect all stages of the production process.”



Multimodal Interaction Laboratory
at DIT Aungmye Street

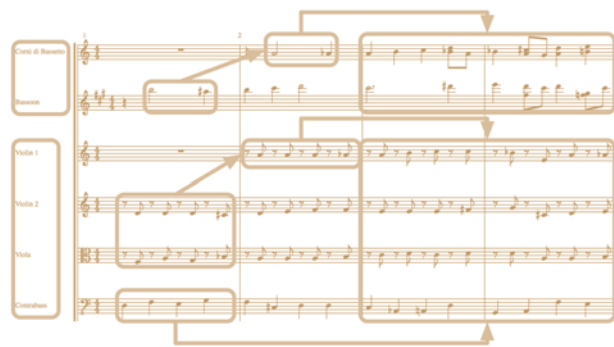
"The broad aim of the project is to come up with new methods for delivering surround sound content in constrained bandwidth conditions. We begin with a development schedule of the algorithms to build a prototype for use in post-production. The second stage is a production schedule using the algorithms to see how effectively they can be used to produce content. The third stage is a perception testing schedule where we go through that content to see how well it performs in constrained bandwidth scenarios." With the final product being aimed at distribution to the home consumer, an important aspect that DIT has taken into consideration is cost.

"An iPod is being used as the primary music source in the house, people plug it into their car stereo or just listen to it with earphones. If this is the primary storage mechanism, we need to write things for this. The boundaries for media are shrinking all the time and with cloud computing becoming a reality the user may require high quality content from a completely web based solution. With a completion date planned for November 2013, the current research work could lead to further research on 3D audio scene transmission, which the group hopes to continue with collaborators like Tamborine and DTS Audio.

For more information email charlie.cullen@dmc.dit.ie

AUDITORY SCENE ANALYSIS

Auditory scene analysis (ASA) studies the interactions of concurrently presented sounds and their perception by the listener. The human listener splits and fuses physical sounds into logical groups known as streams, where multiple streams containing similar sounds (such as a choir) can often be perceived as a single stream. ASA describes stream grouping using psychological terms such as familiarity (a well known song is easier to recognize), similarity (a group of singing voices) and proximity (sources that are close in pitch, intensity or location). These terms (and others) are often related to acoustic parameters such as pitch, intensity and timbre and help to define variations in an auditory scene over time. An example of this is given in the figure below which shows possible groups in grey within Mozart's Requiem using ASA. The score is of the first four bars of the Introitus Requiem Aeternam for contrabass, strings and wind instruments.



In this example, an initial rhythmic juxtaposition of bass and strings defines two streams in bar one. At the same time, the interplay between these streams also groups them at another level relative to the bassoon melody. The introduction of a violin part with the same rhythm as the other stringed instruments creates a single string group in bar two.

At the same time, the rhythm and pitch contour of the initial bassoon melody is repeated in the second bar by the basset horns. Although this provides a cue that is familiar and serves to group the bassoon and basset horns together, it also provides a harmonic relation to the bassoon part that separates them. Mozart provides two melodic voices that mimic and harmonize over an accompanying section, defining two overall streams that subdivide into more complex interactions at instrument level.

[Centres]

CREST

KEEPING THE CUSTOMER SATISFIED



DIT'S CENTRE FOR RESEARCH IN ENGINEERING AND SURFACE TECHNOLOGY (CREST) IS SUPPORTED BY ENTERPRISE IRELAND, SCIENCE FOUNDATION IRELAND (SFI) AND EU FRAMEWORK PROGRAMMES AND IS THE LEADING SURFACE COATINGS AND CORROSION CONTROL LABORATORY IN THE COUNTRY.

As the only dedicated coatings laboratory in Ireland, CREST's aim is to translate technology for its client companies and act as an extension for their in-house research and development facilities while building up their portfolio of internationally renowned academic research. Environmental health is at the top of the agenda and providing an excellent service for their company clients is an absolute priority. CREST has an average of one hundred clients a year and has already contributed to 16 licenses. "The customer drives everything," says Centre Director Dr John Colreavy. "All of the research we do at CREST has been initiated by one of our clients" says John.



"We have a consultancy service which attracts industry and feeds into our research programme. This allows us to develop our own knowledge while training students as we work on each project. It's getting busier despite the recession,"

says John. "Most of our clients are based in Ireland and we serve all manufacturing whether it is being done by multi-nationals or indigenous companies." The Centre's two senior research managers, Dr Brendan Duffy (pictured above left) and Dr Suresh Pillai, (pictured above right) play a vital role in carrying out the day-to-day running of CREST. "Our two main research groups are managed by Dr Brendan Duffy and Dr Suresh Pillai. While Brendan's work is in the area of nano-structured coatings for corrosion control and hygiene and Suresh specialises in semiconductor nanomaterials there is considerable crossover in their research fields."

Dr. Pillai is also involved with the US-Ireland R&D partnership with University of Cincinnati, International University of Florida and University of Ulster.

Dr. Pillai also delivered two trans-national projects (FP6-ERANET and FP7-MATERA) with VTT Finland in the areas of photocatalysis and anti-bacterial materials.

Both researchers are fully engaged in academic research and the quality of their work is internationally renowned. Three postgraduate students are currently researching their PhD in CREST and being supervised by Brendan and his team is completed by postdoctoral researcher Dr Rajath Varma. Their work is funded by national and international projects, including an EU FP7 project led by EADS (Germany) with industrial partners in SAAB, Dassault and universities in Limerick, Italy and Bulgaria.

"BRENDAN HAS BEEN INVITED INTO EUROPEAN PROJECTS BASED ON HIS RESEARCH AND HIS PATENTS AND SURESH HAS PUBLISHED THREE OF THE TOP FIVE PEER-REVIEWED PUBLICATIONS ON DIT'S DATABASE," says John.

Suresh supervised (with Dr. Michael Seery as co-supervisor) the work of best presentation award winner, Damian Synnott, for his work entitled 'A Novel Microwave Assisted Synthesis of Doped ZnS for the Development of Indoor Light Activated Anti-Bacterial Materials' at the Irish Chemistry colloquium. The presentation dealt with the development of self-sterilising fabrics and surfaces for use in hospitals to combat bacteria such as MRSA.

"NONE OF THE RESEARCH IS CURIOSITY DRIVEN BUT MARKET-DRIVEN AND THERE IS A GENUINE ACADEMIC INTEREST IN IT. WHAT WE WANT TO KNOW IS HOW WE GET SOMETHING TO DO WHAT WE WANT IT TO DO TO SOLVE A PARTICULAR PROBLEM."

With a total of €5.5m secured in funding since CREST was first established, the Centre has also managed to develop a startup company as a result of its research.

"We are doing our second start-up with Brendan this year which has yet to receive a title. Suresh has already set up 'Radical Coatings Ltd' and I can see a third one being established in three years time," says John.



Projects at CREST

"HyGen is an antimicrobial paint used for killing MRSA licensed to General Paints. It is a paint that sterilises by using very small concentrations of silver and it's very durable. General Paints have put it on the market and it is used in Beaumont Hospital and Our Lady of Lourdes in Drogheda where it has proven its effectiveness." says John.

"We also developed a solution for quietening the delivery of groceries from Musgraves into the inner city. By making the articulated vehicle process quieter, we were able to pull in 12 new companies. This LoNoise coating was licensed by General Paints. We did the initial research and then General Paints built on that considerably to develop a product that is being used by a leading premium car manufacturer."

"Vitra Ireland is licensing Crest photocatalytic technology from our catalytic tiles project. We are producing a tile that is photoactive and sterilises. We compared our results with the best technology in Japan and we're better. It's a technology that only uses light and the moisture in the air to sterilise. It's environmentally very benign and cleans its own surface. Anything we have achieved commercially is due to the individuals in the centre who are passionate about what they are doing. Team building is a big part of what we try to do at CREST. Our mission is to focus on our people and invest in them." Current employment control restrictions present serious challenges to all research groups and not just CREST, however, DIT's Directorate of Research and Enterprise (DRE) is working hard with the stakeholders to build new models to sustain our hard-earned capability.

"Normally academic excellence and commercial excellence are very separate worlds, but in CREST they are in exactly the same place. It is this dove tailing of the understanding of excellence in science and the necessary commercial requirements that underpin our excellent research results"

For more information see www.crestdit.com

Best Presentation Award

Damian Synnott, a researcher at CREST and the School of Chemical and Pharmaceutical Sciences, DIT, won the best presentation award of the applied chemistry section of the Irish Chemistry colloquium. Damian's talk was titled 'A Novel Microwave Assisted Synthesis of Doped ZnS for the Development of Indoor Light Activated Anti-Bacterial Materials'. His research is part of the FP7-ERANET project 'Nano-vigil- Visible Light Induced Photo-degradation of Organic Matter Using Semiconductor Nanoparticles for Hygiene Applications'.



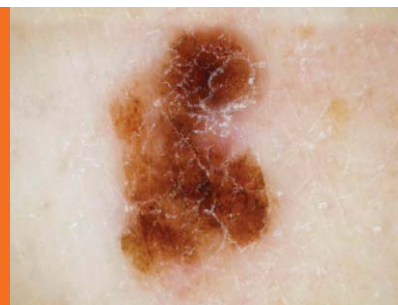
The work is focused on the development of novel materials and synthesis of these materials to create self sterilising environments in hospitals, nursing homes and other healthcare facilities to combat the rising number of cases of healthcare associated infections.

The colloquium is an annual meeting where young researchers can present their work, as both posters and oral presentations, to the chemistry and chemical engineering community in the island of Ireland. Damian is a researcher from north County Wicklow who studied Forensic and Environmental Sciences in DIT. He started his PhD studies in September 2007 and spent six months during his studies in Rice University, Houston, Texas as part of the FAS Science Challenge Program. He is supervised by Dr Suresh Pillai (CREST) and Dr Michael Seery (School of Chemical and Pharmaceutical Sciences).

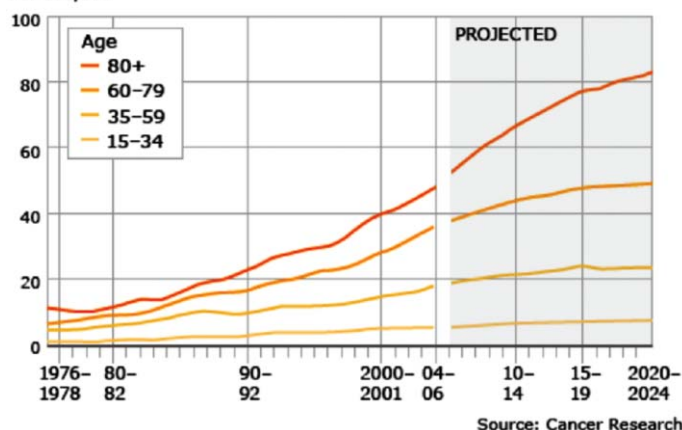
Above: The Hitachi SU-70, a high resolution field emission scanning electron microscope based in the CREST laboratory in the FOCAS Institute.

Photo: traversphoto.com

TEST FOR ONLINE SCREENING OF MOLES DEVELOPED IN DIT



Rising rates of melanoma in the UK, past and projected
Per 100,000



The majority of cases of skin cancer are caused by too much exposure to the sun. Wearing a proper sunscreen, avoiding getting sunburnt and reducing your exposure to the sun can all help reduce the risk of getting a melanoma. Over the last 30 years the incidence of malignant melanoma has quadrupled as more people travel to the sun due to the advent of cheap air travel and also because people are slow to get moles checked and may leave it until it's too late. Melanoma accounts for over 75% of skin cancer deaths, most of which could have been avoided with early detection.

Moletest is the only on-line skin cancer screening service available at all times to the public. Launched in September 2010, Moletest is an online system that uses technology developed by DIT to identify suspect moles. Customers upload a good quality photograph of their mole online and if anything is detected, they are advised to see a medical practitioner urgently.

"The mole checking service has been designed to empower consumers using a traffic light approach to screen for both non-melanoma and melanoma skin cancer," says Professor Jonathan Blackledge, who developed the technology. "Green is a 'normal' lesion, amber a 'borderline' lesion and red a 'cancerous' one. We aim to have an app on your iPhone that you can do the Moletest with," says Jonathan.

How Moletest works

1. The first step is to plot the mole position and enter information
2. Next the image of the mole has to be correctly uploaded
3. A review of the order is next
4. The customer is then asked to set up an account
5. Finally a payment of £19.95 is submitted

The trained computerised system, which is systematically supervised and audited by a panel of advisory dermatologists, then evaluates the customer's image against a bank of known results to see if there are any characteristics consistent with previous cases of cancer. "The main problem we have had with Moletest is with the image suitability. In order to get it to work, you have to do something sensible with it and you can't just submit anything. There is now an emphasis on the importance of doing things right. So before the image goes into the system for verification, it goes through an image suitability test to remove any unsuitable pictures."

"For the consumer, this means that we don't take people's money only to say that we can't do anything with the image when it's uploaded." There is a 90% accuracy of diagnosis due primarily to the application of fractal geometry for characterizing objects that are innately textural and are therefore not suitable for use in conventional machine vision systems.

"THE OVERALL RESPONSE TO MOLETEST HAS, TO DATE, BEEN POSITIVE," says Jonathan.

"WE ARE CONSIDERING FRANCHISE OPTIONS IN ISRAEL AS WELL AS WITH TESCO. WHILE THERE ARE A RANGE OF COMPETITIVE TECHNOLOGIES AVAILABLE, MOLETEST IS THE ONLY SYSTEM OF ITS TYPE THAT CAN PROVIDE ACCURATE REPORTS BASED SOLELY ON THE SUBMISSION OF HIGH FIDELITY DIGITAL IMAGES USING AN INTERNET RESOURCE."

For more information e: jonathan.blackledge@dit.ie
w: www.moletestuk.com

[Profile]

JENNIFER MCINTYRE

A WOMAN ON THE CREST OF A WAVE



A RESEARCHER SHOULD BE CURIOUS, KEEP FIGHTING FOR SOLUTIONS, BE DETERMINED, PATIENT AND STICK TO THE JOB AT HAND.

This sentence describes Jennifer McIntyre perfectly.

Jennifer has a great spirit of adventure and has brought this attitude of life into her job. At the moment Jennifer is undertaking an MPhil in Mechanical Engineering expecting to transfer to PhD shortly. She's researching magneto-rheological elastomers (MREs) as part of the SMART programme at the Centre for Elastomer Research at DIT. The project involves the design of mechanical components for testing, devising experiments in order to characterize the fatigue behaviour of MREs and of course, a lot of self-directed reading. However, her life has now taken a dramatic turn with an invite to complete her research studies in the German Institute for Rubber Technology, Hanover. Jenny recently went to Germany and is loving life in one of the world's top research institutes. She uses state-of-the-art facilities to compound novel elastomers and carry out numerous physical tests.

Jennifer feels very confident in this research, even though she's studying in a male dominated field.

"IT FEELS GREAT, YOU REALLY STAND OUT AND EVERYBODY KNOWS YOU. I GUESS A LOT DEPENDS ON YOUR PERSONAL APPROACH TO THE JOB. I'M IN WEEKLY CONTACT WITH MY DIT SUPERVISOR BY SKYPE AND THINGS HAVE WORKED OUT BETTER THAN I COULD HAVE EVER IMAGINED."



Jennifer's interest in the field of science goes back to her time in secondary school.

"IF I THINK ABOUT THE PEOPLE THAT ENCOURAGED ME ALONG THE SCIENTIFIC PATH, I REMEMBER MY PHYSICS TEACHER AT SCHOOL. TO BEGIN WITH, I DIDN'T HAVE A CLEAR IDEA OF WHAT TO DO. BUT CERTAINLY I CAN SAY THAT WOMEN NEED MORE ENCOURAGEMENT IN SCIENCE, FOR EXAMPLE NOT MANY WOMEN CHOOSE TO DO HONOURS MATHEMATICS AT SECOND LEVEL. NEITHER DID I AT THE TIME."

Jennifer's passion for science manifested itself more fully in her twenties, not only because her friends and brother chose to study Mechanical Engineering at DIT, but she also developed an interest in aircraft.

"I REMEMBER THAT MY BROTHER POINTED OUT THAT THERE WAS AN OPEN DAY IN THE LOCAL AIRCRAFT CLUB IN BIRR, CO. OFFALY, WHERE I AM FROM. EVERYONE COULD TRY TO FLY A SMALL AIRCRAFT AND FROM THAT MOMENT I REALLY LOVED IT." Now Jennifer flies a Cessna 150!

Before coming to DIT, Jennifer was working in computer animation and 3D modelling and the skills and experience she developed during that time proved to be very useful for her research project. The project is interdisciplinary and incorporates mechanical and manufacturing engineering, physics and biomedical science.

As soon as Jennifer started the project she went to Germany for the Tire Technology Expo 2010 along with fellow PhD student Dave Gorman,

"DAVE AND I WENT A COUPLE OF DAYS EARLY TO ATTEND A SHORT COURSE ON RUBBER MATERIALS, WE ALSO SPOKE AT A CONFERENCE ABOUT OUR RESEARCH AND ATTENDED THE GALA DINNER, WHERE AWARDS WERE PRESENTED FOR OUTSTANDING ACHIEVEMENTS IN TYRE TECHNOLOGY INNOVATION."

She is looking forward to more experiences like this and to making a successful transfer to PhD research.

[Technology Transfer]

INNOVATION PARTNERSHIP TO IMPROVE MUSHROOM QUALITY

DIT, UCD AND ONE OF THE WORLD'S LEADING MUSHROOM COMPANIES ARE COLLABORATING ON AN ENTERPRISE IRELAND INNOVATION PARTNERSHIP PROJECT DESIGNED TO INCREASE SHELF—LIFE AND IMPROVE QUALITY WITHIN THE DISTRIBUTION CHAIN. THE INNOVATION PARTNERSHIP PROGRAMME SUPPORTS COLLABORATIVE RESEARCH PROJECTS BETWEEN IRISH HIGHER EDUCATION INSTITUTES AND COMPANIES.

The three partners are Monaghan Mushrooms, DIT and UCD. The research will combine DIT expertise in cold-chain and fresh produce analysis with UCD expertise in the sensing of key food characteristics to provide Monaghan Mushrooms with a better understanding of their critical mushroom distribution chains and allow them to increase mushroom shelf-life and quality via predictive distribution chain analysis software. Dr Jesus Frias, School of Food Science and Environmental Health is leading the project in DIT.

There are four key objectives in the project:

- The analysis of the mushroom farm—to—consumer chain between the production unit site in Ireland and consumer displays in retail locations. A study of temperature and relative humidity under farm, packhouse, depot, transport and retail store conditions will be performed. The data will be analysed and the implications in terms of potential quality gains assessed.
- The development of sensing technologies for the mushrooms industry based on Thermal Imaging (TI) and Hyperspectral Imaging (HSI). These will be applied to facilitate the real-time monitoring of mushroom quality (using HSI) during processing and packaging and the acquisition of information on the spatial distribution of storage temperature conditions (using TI).
- The experimental validation of the results from the farm—to—consumer chains on a laboratory scale. This will simulate distribution chain conditions and assess the effect of improved conditions on the quality of the mushroom as it arrives at the display point using conventional quality assessment together with HIS and TI techniques.
- The development of software tools that will enable the evaluation and management of future farm—to—consumer chain processes by assessing the impact of farming, packaging, transportation and distribution on the quality attributes of the mushrooms.



The delivery of these objectives will increase mushroom shelf life and reduce producer costs and losses by improving quality control.

Mushrooms are Ireland's largest horticultural export and Monaghan Mushrooms Ltd is Europe's largest and most progressive fresh mushroom company. The company employs more than 2000 people worldwide and has developed a €12 million plant in Co. Monaghan with a dedicated Research and Development Centre with 30 research staff.

Andy Gray, Senior Licensing Executive at DIT Hothouse stated that 'strategic partnerships like this are great both in the short and long term. Integrating our research into such a forward thinking company is mutually beneficial and allows us to stay on top of our game too'.

Dr John Collier, (pictured above) Group Research and Development Manager at Monaghan Mushrooms, added 'the opportunity to avail of cutting—edge research allows us to gain a competitive edge and deliver more quality produce with greater efficiency. This is very good for any business and will help us to expand into new markets. We are very happy with the progress so far and we are delighted to be working with DIT Hothouse'.

For more information email: jesus.frias@dit.ie

DIT TO HOST TWO INTERNATIONAL CONFERENCES COMING TO DUBLIN

In September 2011 DIT will host two international conferences will be held in Dublin, both in the Raddisson Blu hotel, Golden Lane, Dublin 8. The 7th International Conference on Predictive Modelling of Food Quality and Safety (ICPMF7) is on from the 12th to the 15th September and is being organised by DIT, UCD and Teagasc. This conference will bring together leading academics, research scientists and food professionals who are currently developing and using simulation and optimisation tools to enhance the quality and safety of food. This event also aims at attracting various stakeholders throughout the food chain, including policy makers and international authorities. It will highlight the diversities, commonalities and future challenges for predictive modellers in food.

The topics being showcased at the conference include: predictive microbiology; individual based modelling; stochastic modelling; and systems biology. The plenary speaker is Emeritus Professor Tom A. McMeekin, School of Agricultural Science, Tasmanian Institute of Agricultural Research, University of Tasmania (Australia). Acknowledged as one of the world's leading food microbiologists whose proven expertise has impacted on the enhancement of food safety internationally, he pioneered the development of predictive microbiology and established the University of Tasmania as the world leader in predictive modelling of microbial behaviour in foods. Four prestigious international keynote speakers will also be delivering presentations at the conference: Dr. Marta Hugas, Unit on Biological Hazards, European Food Safety Authority – EFSA (Italy); Dr. Shigenobu Koseki, National Food Research Institute (Japan); Dr. Isabelle Souchon, UMR 782 AgroParisTech, French National Institute of Agricultural Research (INRA) (France); and David Vose, Vose Software BVBA (Belgium).

There will be paper presentations, poster sessions and an opportunity to interact with international experts in food and microbiological sciences, engineering, computer science and mathematics.

On the 16th September 2011 an associated collaborative EU Framework Project Seminar will also be held in the Food Research Centre, Ashtown. This event will bring together speakers from four EU projects (Baseline, Biotracer, Prosafebeef, Q pork chains and Symbiosis) to present their activities and recent research outputs in the area of predictive modelling and microbial risk assessment.

For more information email 7icpmf@dit.ie

The following week DIT will deliver another international conference when the Centre for Elastomer Research (CER) will host the 7th European Conference on Constitutive Models for Rubber (ECCMR). This conference will bring together the leading researchers in elastomer research from Europe and beyond. Held every two years, previously the conference has been hosted in some of Europe's most beautiful cities and it is fitting and timely that it is now on its way to Ireland's capital. Some groundbreaking research into rubber materials is underway in Ireland's institutes and universities and the conference will be an excellent opportunity for Ireland to reinforce its position as a knowledge-driven economy and a leading player in polymer science research.

ECCMR will showcase state-of-the-art research in: experimental characterisation; comparison of constitutive models; FEM implementation and application; micro-structural theories of rubber; lifetime prediction; statistical approaches; stress softening; dynamic mechanical properties; ageing; visco-elastic and hyperelastic models; filler reinforcement; design issues of rubber components; industrial applications; biomechanics of soft tissue.

Leading researchers in the field will make keynote addresses at the conference and in particular Professor Ray Ogden from the University of Glasgow, world renowned applied mathematician in the field of continuum mechanics and engineering mathematics will make an opening address. The conference organisers are equally delighted that Dr Manfred Klüppel, Head of the Department of Material Concepts and Modelling in the German Institute for Rubber Technology, Hannover, will also take on this role.

For more information email eccmr@dit.ie

[Profile]



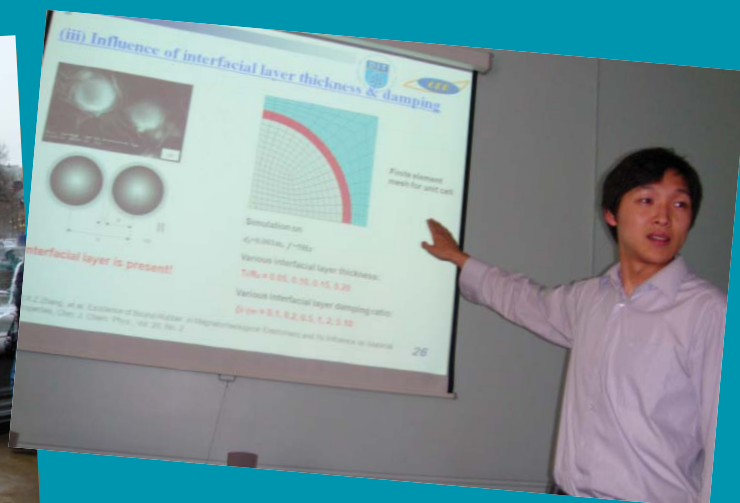
LIN'S 'SMART' PRESENTATION IN PHILADELPHIA

POSTDOCTORAL RESEARCHER DR LIN CHEN JOINED DIT'S CENTRE FOR ELASTOMER RESEARCH (CER) IN JULY 2010 FROM ONE OF CHINA'S LEADING UNIVERSITIES — THE UNIVERSITY OF SCIENCE AND TECHNOLOGY OF CHINA. HIS RESEARCH FOCUSES ON THE FABRICATION AND CHARACTERIZATION OF MAGNETORHEOLOGICAL ELASTOMERS (MRES) WHICH CAN HAVE THEIR MECHANICAL PROPERTIES REVERSIBLY AND INSTANTANEOUSLY VARIED AND CONTROLLED BY EXTERNAL MAGNETIC FIELDS.

MRES HAVE POTENTIALLY PROMISING APPLICATIONS IN AUTOMOTIVE, AEROSPACE, BIOMEDICAL AND CIVIL APPLICATIONS, PARTICULARLY IN THE AREA OF VIBRATION CONTROL. IN THE PAST FOUR YEARS DR CHEN HAS PUBLISHED 9 PAPERS IN HIGHLY RATED INTERNATIONAL JOURNALS THAT HAVE ALREADY BEEN CITED OVER 70 TIMES.

Lin is a key member of CER's CAPRICE project team. The Enterprise Ireland funded project has the objective of commercialising a unique test facility for determining the dynamic properties of MREs and other 'smart' elastomers. The CER is an interdisciplinary centre researching the characterisation of hyperelastic and viscoelastic properties of elastomers. It has the unique capability of producing reliable viscoelastic (time—dependent) data for characterising the multi—axial physical properties of rubber. Recently the CER turned its interest to new kinds of adaptive rubbers, principally (MREs).

In April Lin was awarded an IRCSET Empower postdoctoral research fellowship. IRCSET's EMPOWER scheme is designed to give researchers at an early stage of their research career the opportunity to build upon and broaden their research and professional skills, contributing them to established leading research teams in Ireland. Announcing the posts, Martin Hynes, Director of IRCSET commented:



"Now in its ninth year, the EMPOWER Scheme continues to assist in building the strong Irish research system by facilitating talented young researchers to develop their careers in Ireland. These individuals both contribute to and gain from the experience of established research teams, developing the necessary skills to equip them for successful careers in a wide range of employment sectors. The scheme also facilitates international mobility within the research community by attracting researchers from other countries to Ireland. Each year it attracts a large number of applications from very high-quality candidates worldwide and the scheme's international assessment committee continue to be impressed by the exceptionally high calibre of the successful candidates."

The ERMF conference experience

Last summer Lin presented his research at the 12th International Conference on Electrorheological Fluids and Magnetorheological Suspensions (ERMF) in Philadelphia. About 150 scientists and engineers from over 20 countries attended and 80 presentations in multi-disciplinary topics were delivered in fields such as physics, mechanical engineering and materials science.

One of the exciting research themes to emerge was the use of electrorheological technology to deliver crude oil. The topic was presented by Temple University who informed the audience that BP had purchased the subsequent research patent for several million dollars.

In an entirely different discipline, the Lord Corporation has designed and implemented a magnetorheological suspension in their High Mobility Multipurpose Wheeled Vehicle, the Humvee, which we see almost daily in news footage. Dr Chen found the conference "a mind broadening experience" and it generated many new ideas. He had an opportunity to talk with Dr David Carlson who is the originator of magnetorheological research and whose papers have been cited more than 1500 times.

Lin Chen gave a presentation on Numerical Analysis of the Damping Properties of Magnetorheological Elastomers which conveyed new CER research results. The presentation was met with great interest and critical acclaim from the conference audience and a paper emanating from the presentation is due to be published in the International Journal of Modern Physics; in fact after Lin's talk he was invited to become a reviewer for Smart Materials & Structures by the journal's associate editor.

During the conference, Dr Chen visited his friend Dafeng Chen who is working as a postdoctoral researcher in the prestigious University of Pennsylvania (UPenn). Dafeng showed Lin their Microfluid Lab and presented research results, some of which had been published in Nano Letters and Physical Review Letters. Dr Chen enthused that visiting UPenn had given him a greater sense of the fascination to be found in science and technology research.

At the end of the conference, a banquet was held for all the attendees in a local Chinese restaurant. This allowed Lin to demonstrate expertise outside his discipline: since most of the attendees were from Europe and America, they were having limited success with chopsticks! The memorable evening began with some interesting accounts of Chinese culture and legends before all the guests added their own stories from around the world. Friendships were forged that go beyond sharing a research interest. Lin Chen concluded that "It was a fantastic conference with huge benefits from an exchange of current research ideas. We know what others are doing and what our next steps in adaptive elastomer research should be".

For information on smart elastomers and determining dynamic properties of rubber, contact Dr Lin Chen or Dr Steve Jerrams at the Centre for Elastomer Research.

Email: lin.chen@dit.ie/stephen.jerrams@dit.ie



THE MERITS OF UNIVERSITY RANKINGS

With universities across the globe vying for the best students, both in their own countries and through international recruitment, where an institution is placed in world rankings has become an increasingly important factor shaping quality and reputation.

There are now 10 different global rankings while national rankings exist in over 50 countries. While their popularity, visibility and influence varies, so also does what they measure and how reliable they are. Making choices based on rankings can lead to both positive and perverse outcomes – for individuals, institutions and countries.

Now, a new book offers the first comprehensive study of the impact and influence of rankings on higher education from a global perspective. The book is entitled **“Rankings and the Reshaping of higher Education: the Battle for World—class Excellence”** and is published by Palgrave Macmillan. The author is Professor Ellen Hazelkorn, Director of Research and Enterprise at Dublin Institute of Technology. She is a consultant to the OECD programme on Institutional Management of Higher Education and also heads up the Higher Education Policy Research Unit at DIT. In her book, Hazelkorn asks a number of very pertinent questions, such as how rankings are influencing not only students making a choice of institution but how they influence key decision—makers and policymakers.

Speaking at the launch, Professor Hazelkorn said;

“GOVERNMENTS, EMPLOYERS, PHILANTHROPISTS AND STUDENTS ALL USE RANKINGS TO INFORM THEIR DECISIONS ABOUT RESOURCE ALLOCATION, EMPLOYMENT OF GRADUATES, INVESTMENT OPPORTUNITIES AND PROGRAMME CHOICES. WE NEED TO ASK — AND I HAVE TRIED TO DO THIS IN MY BOOK — ARE RANKINGS RE—SHAPING HIGHER EDUCATION AND IF SO, ARE THEY MEASURING THE RIGHT THINGS?”

This timely study will play an important part in providing the answer and in informing the higher education debate in Ireland and elsewhere. The book was launched in Dublin Institute of Technology by Dr. Jamil Salmi, higher education policy advisor to the World Bank. Before formally launching the book, Dr. Salmi gave a lecture to an invited audience on the topic of “Higher Education in the 21st Century: The Accountability Challenge”.

Above: Eric Byrne TD, Professor Ellen Hazelkorn, Tom Boland, HEA and Dr Jamil Salmi

[Partnerships]

NEW PARTNERSHIP WITH INDIAN INSTITUTE

Dublin Institute of Technology (DIT) and the Indian Institute of Technology (IIT) Madras have been awarded €1,165,440 funding for a two year joint research project to develop new biomedical sensors, based on polymer optical fibres. The collaboration is supported by the Programme of Co-operation on Science and Technology, signed by the Irish and Indian Governments in April 2009 and represents a significant step forward in collaboration between the two countries in the field of research. The programme of research will be coordinated by Professor Gerry Farrell (DIT) and Professor Balaji Srinivasan (IIT Madras).

Optical sensors based on what are called fibre Bragg gratings (FBGs) have been demonstrated to be quite useful in several bio-medical applications. However, conventional FBGs are based on glass fibres and such glass fibres are not bio-compatible. On the other hand, polymer optical fibres (POF) which were originally developed for telecommunication applications are much better suited for bio-medical applications due to the following reasons:

- Bio-compatibility — does not pose health hazards
- Handling is relatively easy
- Drawing of fiber requires relatively inexpensive infrastructure
- High transmission in visible region — ease of use

The group at IIT-Madras is one of the strongest photonics-related research groups in India, especially in the area of fibre optic sensors. A key infrastructure that is relevant to this proposal is their state-of-the-art laser-based grating fabrication facility. The facility is currently used to fabricate FBGs in silica optical fibers using diffractive optical elements, known as phase masks. A portable, fully automated grating interrogation system has been developed by IIT Madras.

The mutual exchange of ideas that is envisaged during the proposed research work should immensely benefit both groups, especially since it involves a new, exciting research area of Bragg grating sensors in polymer optical fibres.

The Photonics Research Centre at DIT is one of the leading research groups in Ireland in the area of optical fibre sensors. Professor Farrell is its Principal Investigator and group leader. The Centre's work concentrates on the research and development of optical sensors for a wide range of engineering applications, modelling and simulation of fibre sensors and integrated waveguides and Liquid Crystal tunable filters for FBG sensor arrays.

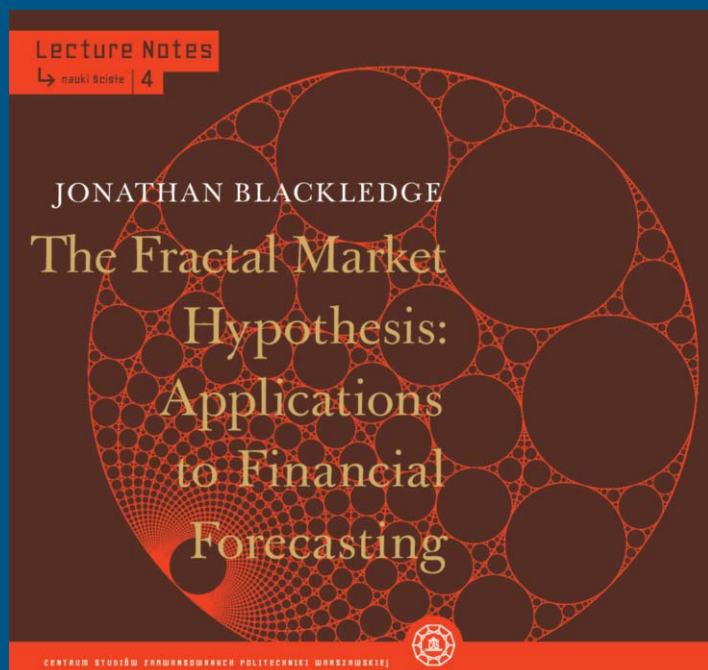
"BY COMBINING THE FABRICATION EXPERTISE AVAILABLE IN IIT MADRAS WITH OUR OWN EXPERTISE IN SIMULATION AND MODELLING OF FBG'S THE PARTNERSHIP WILL FACILITATE THE DEVELOPMENT OF A WHOLE NEW CLASS OF MEDICAL DEVICES WITH SIGNIFICANT COMMERCIAL POTENTIAL IN INDIA AND IN IRELAND"
says Professor Farrell.

For more information email: gerald.farrell@dit.ie

[Technology Transfer]

NEW FINANCIAL RISK MANAGEMENT MODEL BECOMES A TRADING REALITY

RESEARCH ON ECONOMIC TIME SERIES ANALYSIS UNDERTAKEN IN THE INFORMATION AND COMMUNICATIONS SECURITY RESEARCH GROUP (ICSRG) [HTTP://ELECENG.DIT.IE/ICSRG](http://eleceng.dit.ie/icsrg) HAS LED TO THE LAUNCH OF A NEW SME THROUGH HOTHOUSE. FUNDED BY ENTERPRISE IRELAND, CURRENCY TRADERS IRELAND LIMITED, HAS BEEN PROVIDED WITH AN EXCLUSIVE 50 YEAR LICENSE TO USE A NEW ALGORITHM DEVELOPED AT DIT FOR ANALYSING CURRENCY EXCHANGE MARKETS AND FOREX TRADING.



Currency Traders Ireland Limited

SFI Stokes Professor Jonathan Blackledge has been researching into the applications of the Fractal Market Hypothesis since coming to DIT in September 2008, having formally undertaken research for the Systemic Risk Analysis Division in the Bank of England in 2008 and for Bank of America in 2009. Earlier in 2010, he was asked to investigate the application of the Hypothesis for currency trading by General Asset Managers, work which led to a publication on the Application of the Fractional Diffusion Equation for Predicting Market Behaviour, IAENG International Journal of Applied Mathematics, 40:3, IJAM_40_3_04, 2010.

On the basis of this work a new Technology to License in ICT was filed by Hothouse, the Institutes' award winning Innovation & Technology Transfer Centre. The technology has applications in financial modeling and risk management and is based on a generic theory of econometrics which takes into account long tail distributions. However, the application of this technology to currency exchange trading is of particular interest as the FOREX markets trade over \$4 Billion each and every day.

Working with Mr Kieran Murphy, CEO of Currency Traders Ireland Limited (www.tradersnow.com), Professor Blackledge has integrated a new and unique set of indicators into MetaTrader 4, a financial analysis package that provides real time on-line access to all major currency exchange rates and is used world wide. The indicators compliment those that have already been implement by Kieran (a former engineering graduate from DIT) who has many years experience as a FOREX trader and, in addition to his companies growing portfolio of market indicators, provides on-line training to a world-wide network of currency traders. An integral part of currency trading is managing risk and hence, Kieran runs a free FOREX training programme delivered via Webinar's every month, registration details being available from www.tradersnow.com.

The Problem with Current Economic Models

The principal aim of a financial trader is to attempt to obtain information that can provide some confidence in the immediate future of a stock. This is often based on repeating patterns from the past, patterns that are ultimately based on the interplay between greed and fear. One of the principal components of this aim is based on the observation that there are 'waves within waves' known as Elliot Waves after Ralph Elliot who was among the first to observe this phenomenon on a qualitative basis in 1938. Elliot Waves permeate financial signals when studied with sufficient detail and imagination. It is these repeating patterns that occupy both the financial investor and the financial systems modeller alike and it is clear that although economies have undergone many changes in the last one hundred years, ignoring scale, the dynamics of market behaviour does not appear to have changed significantly.

In modern economies, the distribution of stock returns and anomalies like market crashes emerge as a result of considerable complex interaction. In the analysis of financial time series it is inevitable that assumptions need to be made with regard to developing a suitable model. This is the most vulnerable stage of the process with regard to developing a risk management model as over simplistic assumptions lead to unrealistic solutions. However, by considering the global behaviour of the financial markets, they can be modelled statistically provided the 'macroeconomic system' is complex enough in terms of its network of interconnection and interacting components.

Market behaviour results from either a strong theoretical reasoning or from compelling experimental evidence or both. In econometrics, the processes that create time series have many component parts and the interaction of those components is so complex that a deterministic description is simply not possible. When creating models of complex systems, there is a trade-off between simplifying and deriving the statistics we want to compare with reality and simulation. Stochastic simulation allows us to investigate the effect of various traders' behaviour with regard to the global statistics of the market, an approach that provides for a natural interpretation and an understanding of how the amalgamation of certain concepts leads to these statistics and correlations in time over different scales.

One cause of correlations in market price changes (and volatility) is mimetic behaviour, known as herding. In general, market crashes happen when large numbers of agents place sell orders simultaneously creating an imbalance to the extent that market makers are unable to absorb the other side without lowering prices substantially. Most of these agents do not communicate with each other, nor do they take orders from a leader. In fact, most of the time they are in disagreement and submit roughly the same amount of buy and sell orders. This provides a diffusive economy which underlies the Efficient Market Hypothesis (EMH) and financial portfolio rationalization. The EMH is the basis for the Black-Scholes model developed for the Pricing of Options and Corporate Liabilities for which Scholes won the Nobel Prize for economics in 1997.

However, there is a fundamental flaw with this model which is that it is based on a hypothesis (the EMH) that assumes price movements, in particular, the log-derivate of a price, is normally distributed and this is simply not the case. Indeed, all economic time series are characterized by long tail distributions which do not conform to Gaussian statistics thereby making risk management models such as the Black-Scholes equation redundant.

What is the Fractal Market Hypothesis?

The Fractal Market Hypothesis (FMH) is compounded in a fractional dynamic model that is non-stationary and describes diffusive processes that have a directional bias leading to long tail distributions.

The economic basis for the FMH is as follows:

- the market is stable when it consists of investors covering a large number of investment horizons which ensures that there is ample liquidity for traders
- information is more related to market sentiment and technical factors in the short term than in the long term — as investment horizons increase and longer term fundamental information dominates
- if an event occurs that puts the validity of fundamental information in question, long-term investors either withdraw completely or invest on shorter terms (i.e. when the overall investment horizon of the market shrinks to a uniform level, the market becomes unstable)



- prices reflect a combination of short-term technical and long-term fundamental valuation and thus, short-term price movements are likely to be more volatile than long-term trades — they are more likely to be the result of crowd behaviour
- if a security has no tie to the economic cycle, then there will be no long-term trend and short-term technical information will dominate.

Unlike the EMH, the FMH states that information is valued according to the investment horizon of the investor. Because the different investment horizons value information differently, the diffusion of information is uneven. Unlike most complex physical systems, the agents of an economy and perhaps to some extent the economy itself, have an extra ingredient, an extra degree of complexity. This ingredient is consciousness which is at the heart of all risk management strategies and is, indirectly, a governing issue with regard to the fractional dynamic model used to develop the algorithm now being used by Currency Traders Ireland Limited.

By accurately computing a parameter called the Levy index, the directional bias associated with a future trend can be forecast, in principle, for any financial time series, providing the algorithm has been finely tuned with regard to the interpretation of a particular data stream. Currency Traders Ireland Limited is now undertaking this task for the FOREX markets, the aim being to develop the platform to commercial level working along side financial industry partners. Kieran has over twenty years experience in market trading having headed up the equity desk at BCP stock brokers in Dublin. 'The addition of the Levy index indicator will be instrumental in determining entry and exit points when trading currency pairs' says Kieran. 'This is particularly important when deciding when to stay out of the market'.

New Book on Financial Mathematics

In 2010, Professor Blackledge was appointed to the position of Distinguished Professor in the Centre for Advanced Studies at Warsaw University of Technology, Poland. The position includes giving a series of seminars and in 2010 he delivered a set of lectures on financial mathematics which have been published as a book entitled: The Fractal Market Hypothesis: Application to Financial Forecasting, ISBN: 978-83-61993-01-8, 2010.

For more information email: jonathan.blackledge@dit.ie

[Technology Transfer]

DR FIONA LYNNG ONE TO WATCH!

In July the Minister for Research and Innovation Mr Sean Sherlock T.D. named DIT's Dr Fiona Lyng as this year's winner of the Enterprise Ireland 'One to Watch' award. Dr Lyng is developing a new system to diagnose cervical cancer together with her colleagues at the Radiation and Environmental Science Centre at the Focas Institute in DIT and collaborators at the Coombe Women and Infants University Hospital with support from Enterprise Ireland.

Minister Sherlock presented the award to Dr. Lyng at the Enterprise Ireland Applied Research Forum in front of 250 academic researchers gathered to look at ways to increase the amount of commercially valuable research that is transferred from third level institutions into Irish industry.

Presenting the award, Minister Sherlock said:

"THE GOVERNMENT'S AMBITION TO CONVERT KNOWLEDGE AND RESEARCH INTO JOBS RELIES ON THE CONVERSION OF PUBLICLY FUNDED RESEARCH INTO COMMERCIAL TECHNOLOGIES AND SPIN—OUT COMPANIES".

Enterprise Ireland's 'One to Watch' award recognises the commercial potential of Government—supported projects, through Enterprise Ireland, that have the capacity to make a major social or economic impact once brought to the market—place.

"DR. LYNNG'S SYSTEM HAS THE POTENTIAL TO REVOLUTIONISE THE DIAGNOSIS OF CERVICAL CANCER. WITH THE SUPPORT OF ENTERPRISE IRELAND AND DIT HOTHOUSE, PLANS ARE IN PLACE TO COMMERCIALISE THIS IMPORTANT TECHNOLOGY THROUGH A SPIN—OUT COMPANY. THE WORK IS AN EXCELLENT EXAMPLE OF THE POSITIVE SOCIAL AND ECONOMIC IMPACT OF RESEARCH OUTPUTS."



Accepting the award, Dr. Lyng, who is currently Centre Manager of the Radiation and Environmental Science Centre, DIT said:

"I AM DELIGHTED TO ACCEPT THIS AWARD ON BEHALF OF THE TEAM AT DIT WHO ARE DEVELOPING THIS NEW SYSTEM TO DIAGNOSE CERVICAL CANCER AND OUR COLLEAGUES AT THE COOMBE WOMEN AND INFANTS UNIVERSITY HOSPITAL. WITH THE SUPPORT OF ENTERPRISE IRELAND, DIT HOTHOUSE AND OUR BUSINESS PARTNER PAUL HANDS I LOOK FORWARD TO MAKING THIS SYSTEM AVAILABLE TO HELP THE DIAGNOSIS AND TREATMENT OF CERVICAL CANCER WORLDWIDE."

Enterprise Ireland has funded the development of this technology for five years. Enterprise Ireland is now working closely with DIT and the team who, together with business partner Paul Hands, are planning to establish a spin—out company, Raman Diagnostics, to commercialise the technology.

*Dr Fiona Lyng pictured with Dr Keith O'Neill and Dr Noel Daly, Enterprise Ireland and Tom Flanagan and Dr Sinéad McCluskey, DIT Hothouse.
Cover Photograph: Gary O'Neill, Enterprise Ireland.*



ENTREPRENEURS TAKE FIRST STEPS TO SUCCESS WITH DIT HOTHOUSE

16 IRISH ENTREPRENEURS HAVE TAKEN THE FIRST STEPS TO BUSINESS SUCCESS BY EMBARKING ON THE LATEST DIT HOTHOUSE INCUBATION PROGRAMME FOR KNOWLEDGE INTENSIVE START—UPS.

The year long DIT Hothouse Venture Programme is an award winning programme that provides entrepreneurs with professional expertise, incubation facilities and mentoring to develop successful companies for the global market.

The Venture Programme's latest intake includes a broad range of ventures from engineering, software and wireless security technology, to smartphone applications and web-based service professional services solutions. Commenting at the launch of the latest programme Tom Flanagan, Head of DIT Hothouse said, "This is the 21st Venture Programme we've run and it includes some exciting ideas that have the potential to become highly profitable businesses. Developing new, innovative Irish companies, particularly those capable of achieving international sales, is absolutely critical to Ireland's economic recovery and the Hothouse Venture Programme can make the difference in helping turn a great idea into a viable business " he said.

Entrepreneurs must present a viable business proposal, meeting strict entry criteria, to gain a place on the programme which provides an unrivalled development platform for start—ups. According to Tom Flanagan, acceptance onto the DIT Hothouse Venture Programme provides entrepreneurs with a unique opportunity.

"Participants receive expert advice on key business areas such as strategic planning, marketing and business development and financial management to help them grow their business. We also hold regular industry events that are an ideal vehicle to showcase businesses to the investment community. In addition, the DIT Hothouse incubation space in the Docklands Innovation Park provides a stimulating environment of fellow entrepreneurs and experts in which start—up companies can thrive."

Since its establishment in 2001, the DIT Hothouse Venture Programme has helped launch over 300 companies that are now responsible for well over 1,000 jobs in the Dublin region. Previous participants include highly successful businesses such as music sharing site Muzu.TV, mobile multi-media technology developer Movidius, online retailer **mick'sgarage.ie** and semi-conductor producer Decawave, amongst many others.

DIT Hothouse is the Innovation and Technology Transfer Centre at Dublin Institute of Technology. For further information on DIT Hothouse and the range of services and supports it offers for entrepreneurs and researchers visit www.dithothouse.ie

Pictured at the launch of the DIT Hothouse Venture Programme are (l to r) Dermot Tierney, DIT Hothouse; Catherine Keane, Entrepreneurshipnet.com; Dominic Mullan, DIT Hothouse; Hilary Kenna, SeeSearch; and Mark Dunne — 2SaaS

EI'S VOUCHER SCHEME PRODUCING THE GOODS

ENTERPRISE IRELAND'S (EI) INNOVATION VOUCHER SCHEME CAN BE USED BY COMPANIES TO FUND SHORT-TERM RESEARCH PROJECTS IN DIT. THE SCHEME WAS DEVELOPED FOR COMPANIES WITH A BUSINESS OPPORTUNITY OR ISSUE TO EXPLORE TO ENABLE THEM TO ACCESS THE EXPERTISE AVAILABLE IN HIGHER EDUCATION INSTITUTES TO FIND SOLUTIONS TO THEIR PROBLEMS. ONE SUCH COMPANY IS CUPRIGHT INTERNATIONAL WHICH IS WORKING WITH DIT ACADEMIC ROBERT MORRIS TO DEVELOP INNOVATIVE ANTI-MICROBIAL PRODUCTS.

In 2007 Southampton University reported that ions on the surface of copper killed bacteria, viruses and fungal spores. As a result DIT and Cupright both started working independently on the development of copper-based products to prevent the spread of infection. When Robert Morris, assistant lecturer in the Department of Metal Fabrication and Welding, DIT Bolton St, approached Hothouse to discuss the commercialisation potential of his research he found out that Cupright was working in a similar capacity.

He explained how this discovery led to a collaborative research project. "Selly Oak hospital in the UK which treated injured soldiers from the war in Afghanistan found that soldiers were being infected with MRSA, complicating their injuries. Professor Tom Elliot, Consultant Microbiologist and Deputy Medical Director of the hospital conducted a clinical research trial which evaluated the level of infection in two comparative wards – one with copper contact points and the other with stainless steel. The trial showed a marked reduction in infections in the ward which had certain contact points fitted with copper such as door handles, over-bed tables, taps and toilet seats. The trial showed that after a busy day on the ward there was a marked reduction in the infections found on the copper contact points compared with the control ward. During the annual winter vomiting bug outbreak the copperised ward was one of only two in the entire hospital to not get an infection.

"I THOUGHT IT WOULD BE AN EXCELLENT IDEA TO USE COPPER ON DOOR HANDLES TO PREVENT THE TRANSFER OF DISEASES AND I DIDN'T THINK THERE WAS ANYONE SELLING COPPER PRODUCTS AT THE TIME. I THEN BOUGHT SOME HANDLES, LIGHT SWITCHES AND A TOILET FLUSH HANDLE AND SENT THEM TO THE UK TO HAVE THEM COPPER PLATED. ANDY GRAY, SENIOR LICENSING EXECUTIVE, DIT HOTHOUSE, DISCOVERED THAT CUPRIGHT WAS ALREADY PRODUCING SIMILAR ITEMS BUT USING SOLID COPPER. THE COMPANY HADN'T CONSIDERED COPPER PLATING BECAUSE IT IS A SOFT METAL AND THEY DIDN'T EXPECT IT TO LAST LONG ENOUGH. CUPRIGHT HAS SINCE BEEN MARKETING THE IDEA THAT THEY MAY BE ABLE TO PROVIDE A RANGE FOR THE DOMESTIC MARKET WHICH WOULD HAVE A LIMITED LIFESPAN. WHAT WE'RE TRYING TO ESTABLISH WITH OUR RESEARCH IS WHAT THE LIFE SPAN WILL BE".

Entitled CUPID (Copper Preventing the spread of Infectious Diseases), the project was funded under the EI Innovation Voucher scheme. The €5,000 is being used for breakthrough research on the abrasive effect of skin on copper plated objects. Most of the funding was used to build a wear testing machine designed by Robert Morris. "The wear testing technology that currently exists wasn't really suitable for this application because we wanted to replicate the skin and see how long it would take for the skin to wear the metal," says Robert.

"WITH THE FUNDING, I DESIGNED AND HAD THIS MACHINE MANUFACTURED BY BERTCRAFT LTD IN CLONDALKIN. THERE WAS ALSO SOME EXPENDITURE ON SYNTHETIC SKIN MATERIAL AND SOME INSTRUMENTS."

"WHAT I ATTEMPTED TO DO WAS TO REPLICATE AS CLOSELY AS POSSIBLE THE WEAR EFFECT OF SKIN ON COPPER PLATED SURFACES TO ESTABLISH HOW LONG THE COPPER PLATING WOULD STAND UP AND HOW LONG IT WOULD TAKE FOR THE ACTUAL PLATING TO WEAR OFF. ENTERPRISE IRELAND'S VALUES FOR USAGE OR ACTIONS ON INDUSTRIAL EQUIPMENT FOR ONE YEAR IS 200,000 CYCLES. SO FOR AN INDUSTRIAL APPLICATION, A DOOR SHOULD BE CAPABLE OF HAVING AN ACTION OF 200,000 CYCLES PER YEAR. THROUGH A SERIES OF TESTS, I ESTABLISHED THE TIME SPAN IN WHICH THE COPPER PLATING WOULD BE WORN OFF OVER A NUMBER OF YEARS AND MEASURES THAT COULD BE TAKEN TO SLOW DOWN THE WEARING AWAY OF THE COPPER PLATING. THIS CYCLE WAS THEN REPEATED 200,000 TIMES"

"A number of the people involved in research, mechanical engineering and education of product design are now interested in using this machine for student's final year projects. This is the first research of its kind and it offers possible scope for further research. It is also a noble pursuit," says Robert.

"IN FUTURE, THE AIM WOULD BE TO EXPLORE THE USE OF COPPER ALLOYS TO REDUCE COSTS. WE COULD MEASURE THE EFFECT ON MICROBIAL PROPERTIES OF ADDING DIFFERENT METALS TO THE COPPER AND TEST THE WEARABILITY OF THE NEW MATERIAL."

**For more information email: Robert.morris@dit.ie
www.cuprightinternational.com**



Close-up of a copper plated surface being used for hygiene products by DIT and Cupright International.

COMMERCIALISING APPLIED INTELLIGENCE

DIT's Applied Intelligence Research Centre (AIRC) is working hard to commercialise its research findings. In particular the partnership between the group and the National Digital Research Centre (NDRC) continues to flourish. Two major research projects are ongoing: Comenius 2.0 and Sentinel.

The Comenius 2.0 project has developed an online tool, called Lingle, which helps English—as-a-second-language teachers, source relevant authentic text (such as newspaper or magazine articles) for their classes. This is done using techniques from machine learning and computational linguistics coupled with best practice from computer-aided-language-learning. Brian Mac Namee and John Kelleher (AIRC) together with Noel Fitzpatrick (DIT School of Art, Design and Printing) lead this project. Comenius 2.0 is entering an exciting phase with a beta test version currently online (www.lingleonline.com) and an official full product launch planned in the coming months.

Sentinel is a collaboration project between DIT, NDRC and AdaptiveMobile. It is combining industry knowledge with research expertise to provide a more sophisticated approach to detecting SMS spam, which is a major problem throughout Asia in particular. Sarah-Jane Delany, from the Digital Media Centre and Applied Intelligence Research Centre is the DIT lead on this project.

For more information: www.comp.dit.ie/aigroup

[Projects]

STIRLING IDEAS ENERGY TECHNOLOGY RESEARCH IN DIT

'HYBRID ENGINE CONCEPT FOR CONVENTIONAL AND SUSTAINABLE ENERGY APPLICATIONS' IS A PROJECT BEING RUN BY PHD RESEARCHER BARRY CULLEN. IT IS AN EXPLORATORY RESEARCH PROJECT AIMED AT ASSESSING THE VIABILITY OF A NOVEL HIGH—EFFICIENCY COMBINED—CYCLE ENGINE SYSTEM FOR USE IN SMALL— AND MEDIUM—SCALE POWER GENERATION SITUATIONS.

Currently, small and medium scale (< 5 MW) power generators find widespread use for Distributed Generation situations such as Combined Heat and Power (CHP) generation and Waste to Energy (WTE) scenarios. The engines that are used as the prime movers are larger, high—efficiency, high—power versions of the engines that most people would be familiar with under the bonnet of their car. Although highly—engineered and highly—efficient, these engines still lose significant quantities of energy, particularly as high temperature heat through the exhaust. Recovering some of this energy for additional power generation is the goal of the current work.

The concept under investigation in DIT is the use of a Stirling—cycle engine to recover waste heat from the exhaust of an Otto—cycle internal combustion engine. Such a setup would allow high grade waste heat, which would otherwise be lost to the atmosphere, to be recovered and converted to usable electrical power. The project has focused on advanced thermodynamic simulation of the engines and techno—economic appraisal of the hybrid unit. The research indicates that there is a considerable efficiency gain to be had, as well as an increase in the long term profitability of the plant over its useful lifetime.

"From the economic point of view, there are a number of potential advantages to using such a system," reports Barry. "For Waste to Energy situations the increase in plant efficiency would translate directly into emissions savings and revenue for the operator." CHP situations are more subtle though, as they already make use of the waste heat from the plant for space or process heating. "What we are seeing, is that CHP units would benefit from the increased electrical power production, as this is the more economically—valuable of the two energy types — it costs more to buy electricity than a comparable amount of fuel energy or heat from a local utility. Therefore, producing more electricity on—site would allow greater savings in the annual energy—consumption costs for the site."

THE DEPARTMENT OF MECHANICAL ENGINEERING HAS BECOME A HUB OF EXPERTISE AND INNOVATION IN NOVEL ENERGY TECHNOLOGY RESEARCH, WITH CUTTING EDGE WORK BEING DONE ON A VARIETY OF NEW CONCEPTS. AMONG THESE IS AN ONGOING PROJECT THAT IS INVESTIGATING A METHOD FOR BOOSTING ENGINE EFFICIENCY FOR POWER GENERATION SYSTEMS.

From the thermodynamic point of view, the project has allowed DIT to generate considerable expertise in the study and simulation of Stirling engines, a technology that is very much at the cutting edge of power generation technology. Although they were invented back in 1816, these engines have traditionally struggled to compete against the more familiar Otto and diesel cycle engines for a variety of reasons. Recent advances in thermodynamics, materials and computer simulation techniques, as well as the growing emphasis on renewable and sustainable energy technologies, have all meant that the time is very much here to capitalise on the capabilities of these novel engines.

"The Stirling engine is an external—combustion engine, meaning that it can basically operate on any heat source" continues Barry. "For instance, they are currently being heavily invested in for solar power generation, particularly in the United States. Our work here in DIT is aimed at using this omnivorous heat—consuming capability to recover heat from the exhaust stream and thereby boost the potential of an already ubiquitous engine technology, the Otto cycle internal combustion engine."

The research has allowed DIT to collaborate with top international universities and preliminary discussions with major international research companies and OEMs have been very positive. The work has been presented at a number of high—profile international conferences, further enabling DIT to strengthen links with companies and institutions worldwide.

As the Otto cycle engines which form the basis of the plant can run with natural gas or renewable gas as fuel, successful development of such a combined—cycle generator has wide—ranging potential applications. There is growing interest in both Europe and the US in the recovery of renewable gases from biodegradable waste sources. A high efficiency power generator that could successfully operate on such a fuel supply could therefore find widespread international use and could make a significant contribution to emissions—reduction and energy security worldwide.

For more information email barry.cullen@dit.ie



MICROGRAVITY ROCKET LAUNCH

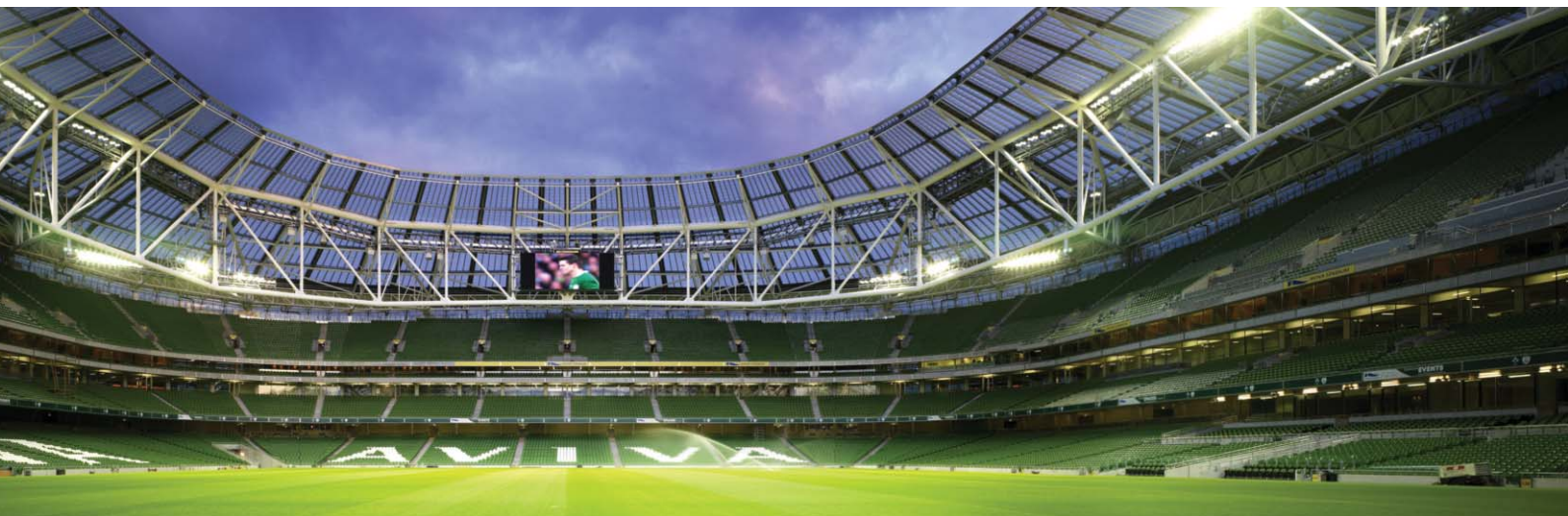
DIT lecturer in the Department of Transport Engineering, Dr Shaun Mc Fadden, was in Sweden to witness his research being launched 700 km into space on a sounding rocket. The MAXUS 8 sounding rocket was launched last year by the Swedish Space Corporation from their ESRANGE launching facility in Kiruna, Sweden. It is the largest sounding rocket launched from a European base and it gave the researchers microgravity conditions for 12 minutes.

As Dr Mc Fadden explains; "MICROGRAVITY IS ACHIEVED WHEN AN OBJECT IS IN FREEFALL WITH LITTLE OR NO EXTERNAL FORCES ACTING UPON IT. DURING MICROGRAVITY, OR FREEFALL, THE EFFECTS OF GRAVITY ARE GREATLY SUPPRESSED TO LEVELS BELOW 10⁻⁶ G OR ONE MILLIONTH OF THE LEVEL OF NORMAL GRAVITY".

Dr Mc Fadden, who has been involved with the European Space Agency (ESA) microgravity program since 2004, uses microgravity to learn more about solidification and casting behaviour of metal alloys. He works closely with European partners (in particular Dr. David Browne of UCD) to design unique microgravity solidification experiments and to validate numerical models of solidification. The MAXUS 8 experiment was part of the IMPRESS integrated project, which is studying Titanium–Aluminide, intermetallic alloys for use as a light–weight turbine blade material in aircraft engines. Dr McFadden is supervising a postgraduate research student (Robin Mooney) in this research area. His student is funded by ESA–PRODEX, which is managed by Enterprise Ireland and is supported by the Irish Government.

More information on the launch is available on www.ssc.se
Photos Swedish Space Corporation

[Events]



SUSTAINABILITY LEADS THE WAY AT AVIVA STADIUM

Environment, society and economy – the three fundamentals of sustainability, were central to the creation and ongoing management of Aviva Stadium on Lansdowne Road. These and other issues were discussed at a case study seminar organised in the stadium as part of DIT's Corporate Partnership Programme.



L to R: Les McLindon, Community Liaison Officer, Aviva Stadium Ltd, Deirdre O' Sullivan, Operations Assistant, Aviva Stadium Ltd, Dr Sheila Flanagan, DIT, David Kirk, DIT

Speaking at the seminar, Deirdre O'Sullivan, Operations Assistant at Aviva Stadium said they were 'positioning Aviva Stadium as a 'Best Practice' case study of operating a sustainable venue and becoming a voice for progressing the sustainable agenda in Irish and sporting realms.'

Les McLindon, Aviva Stadium's Community Liaison Officer outlined the approaches adopted by the team in successfully working with local residents and the wider community. The scale and location of the stadium within a residential area presented its own particular challenges but through a process of communication, acknowledgement, response and engagement, the Stadium's community liaison programme has proven to be highly successful.

The importance of sustainable, locally sourced produce in delivering hospitality services was highlighted by Felan Hennigan, Senior Sous Chef with the Compass Group at Aviva Stadium. In his presentation, he stressed the commitment to providing a healthy product while still producing what clients would expect on a visit to a stadium.

The event was chaired by Dr John Donovan, Head of Research at Dublin Institute of Technology. The Corporate Partnership Programme is a DIT initiative which provides an organised framework for proactive dialogue with industry and the professions. It creates a trusting and supportive environment within which mutually beneficial interactions can be progressed. These interactions may include research collaboration, student placements, targeted CPD programmes, professional post graduate programmes, sponsorship/awards, recruitment, staff placements, staff/student mentoring and advisory board participation.

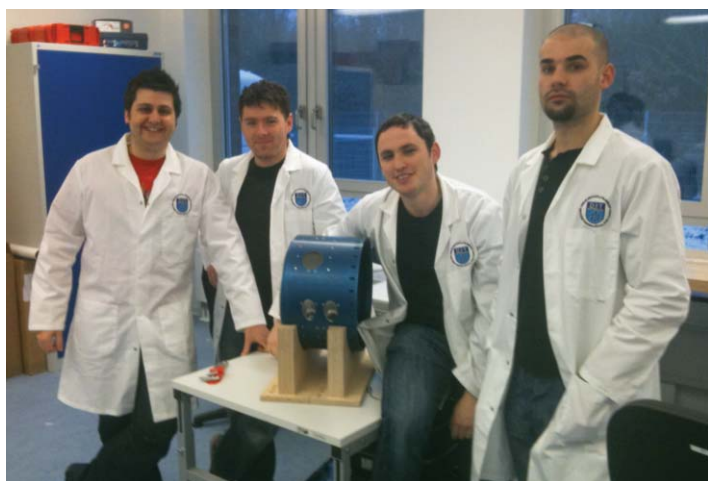
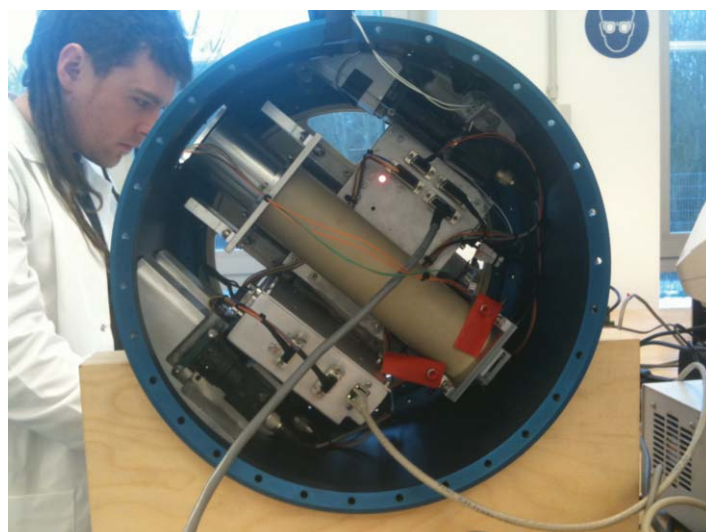
For further information on the Corporate Partnership Programme, please contact David Kirk, email david.kirk@dit.ie

[Projects]

DIT POSTGRADS ARE FIRST TO LAUNCH INTO SPACE

A team of postgraduate students from Dublin Institute of Technology launched an experiment on a sub-orbital space flight from the Arctic Circle earlier this year. 'Team Telescope' are the first Irish team to launch an experiment as part of the REXUS programme, run by some of Europe's leading space agencies.

They were given the opportunity by the European Space Agency and their launch and training costs were awarded as part of the REXUS programme. DIT provided the majority of funding and facilities for the team to design, build and test their experiment. Enterprise Ireland and Acra Control Ltd. also provided financial assistance. The launch took place from Esrange, a rocket range in northern Sweden. The students shared space on the rocket with other teams from around Europe. Their experiment aims to demonstrate a new probe deployment mechanism for use in upper atmosphere research.



Currently, probes used for this kind of research are deployed using booms which extend in much the same fashion as an opening umbrella. Although this method is well proven, it requires a considerable amount of payload space within a rocket. The telescopic design devised by the DIT team needs much less payload space. The multi-section boom collapses to a very compact size similar to the way an internal television aerial collapses.

The whole experiment fitted into a module that was only 25cm high. The telescopic boom is capable of being deployed by a spring loaded system for non-spin stabilized flights (as was the case with the experimental flight) or by centrifugal force for spin stabilized flights. The compact design and simple operation should lead to a more cost effective and reliable method for probe deployment.

The rocket is a converted cold war era surface to air missile. The six minute flight peaked at an altitude of 100km. The rocket then re-entered the earth's atmosphere and returned for a safe landing via parachute. The experiments on board were then retrieved for testing. A three camera monitoring system was used to gather data about the boom deployment system's performance such as deployment length, deflection and vibration. This data will be used in a comparative analysis with other boom designs.

For 12 months before the launch the team members travelled to various space centres around Europe for design reviews, training weeks and experiment tests. They travelled to Esrange one week before the launch to complete the integration of the experiment into the rocket. The team will analyse the data obtained and present their findings at a number of aerospace conferences in Europe.

[Profile]



DR ELAINE WARD ESTEEMED SCHOLAR ARRIVES IN DIT

DR ELAINE WARD IS A POSTDOCTORAL ARNOLD GRAVES SCHOLAR AFFILIATED TO THE HIGHER EDUCATION POLICY RESEARCH UNIT IN DIT'S CENTRE FOR SOCIAL AND EDUCATIONAL RESEARCH.

IN THIS INTERVIEW SHE TELLS US ABOUT HER EXPERIENCE TO DATE IN THE US AND WHAT SHE HAS LEARNED FROM HER RESEARCH.

Q. Can you tell me a little about your experience at the University of Massachusetts, Boston?

A. I worked at the University of Massachusetts, Boston (UMass) in the College of Public and Community Service for more than 10 years. During that time I served in a number of roles first as a student advisor, then as the coordinator of a University-wide student leadership development program, thirdly as the director of the Center for Immigrant and Refugee Community Leadership and Development and finally as a lecturer, Director of Student Services and member of the College's senior management team.

Working for one of the University's smaller colleges afforded me the opportunity to become quite familiar with all three areas of an institution's operations related to the student, the academic and the administrative. It was interesting negotiating all three perspectives and attempting to bring them together to work in the best interest of the student and the institution as a whole. But it wasn't until I actually studied Higher Education Administration formally in my doctoral studies, that I began to take a more holistic approach to my work with students, administrators and academic staff. My formal studies allowed me to see the larger context within which we were all operating as well as value the significance of the forces outside of the academy (for example the local and national economic situation) that impacted the work we did inside the institution. I really value the diverse array of professional experiences UMass afforded me, particularly the opportunity to work in multiple roles.

Q. What have you learned about student experience and diversity and what are the lessons for Ireland?

A. UMass is an urban, public university on the edge the city of Boston. It is a commuter campus that extends into the local communities. It has many similarities to DIT in terms of commitment to excellence in teaching, research and innovation. Other similarities include the community engagement mission and commitment to extending access to higher education locally and regionally. This public mission and commitment to access greatly influences the profile of students served at UMass. Along with traditional students (recent high school graduates) there is a large population of non-traditional students at the University. These non-traditional students represent diversity in terms of age, ability, socio-economic background and many are first-generation college students. Diversity in terms of race and ethnicity is reflective of the local communities of Boston and is reflected in both the traditional and non-traditional student population.

I have three questions to ask when considering student experience, diversity and institutional responsibility to provide a positive learning environment for all students. The first is that, commitment to diversity needs to go beyond rhetoric and become part of the policy and accepted day to day practice of an institution. An institution can claim a commitment to diversity and encourage diversity in terms of access, but if there is little attention paid to the lived experiences of the various populations of students on the campus and in the classrooms then what an institutions says and what is actually happening might be two very different realities.

It is therefore crucial for an institution to constantly and honestly assess itself in terms of its commitment to diversity through a critical assessment of its daily practices. To ask itself – what would it be like to be X student on this campus, in this classroom, talking to this lecturer, trying to get X service? Often a place to start is to give voice to students who are currently enrolled – ask them what their experiences are and what might be done (from their perspective) to improve their experiences on campus. The student experience is quite varied and represents a coming together of individual and collective experiences in a particular context, so it is imperative to gain an understanding of as much of the variety of diverse experiences as possible.

Secondly and more importantly in terms of an authentic commitment to diversity of student body we cannot merely talk about access. We must and in unison speak of access and success. There is nothing more demoralizing to a student who has been recruited to an institution with the message that you will be welcome here and you will have a great experience because we are committed to diversity. The student has no reason not to believe this message and so enrolls. Yet when she gets to campus the reality is starkly different – she doesn't feel as welcomed because lecturers don't understand her culture or her disability. She feels isolated when there is no art on the walls that speaks to her experience. She feels betrayed when she receives the message over and over again, in both overt and subtle ways – that she will not succeed, that she does not belong.

It is imperative for institutions to pay attention that marketing messages are not mere rhetoric but that the student – in all of her or his variety – will actually succeed because the institution has ensured that the systems in place privilege all and not just a few. Administrators and HEI leadership needs to pay attention to not only access but also the success of a diverse student population, particularly for typically underserved student populations and in the coming years this will mean an increasing migrant or children of migrant student population in Irish higher education institutions. We will need to learn about this population's experiences with education in their home countries and what that means for their learning in the Irish context. Administrators also will need to pay attention to the new and future academics in Irish higher education and how they are representative of the changing student population. If we purport a commitment to recruitment and retention of a diverse student population we need to mirror this in our staff hiring practices.

And thirdly, when welcoming a diverse student population and creating an environment where each student may succeed it is imperative to adopt an asset over a deficit model. By this I mean, that we look at the strengths, knowledge and skills a student brings with her or him to an institution and not to look at diverse students as needy students. It is through recognition of students' assets that they too will see the value in all that they bring and be more inclined to succeed.

We really need to be aware of the scope and breadth of the variation in student experience so that our approach to the delivery of education is not one dimensional pre-supposing that one model or approach fits all. Pedagogical practice needs to recognize the diversity of the learner and flexibility is needed on the part of the institution, the administrator and the academic staff in terms of working with a diverse student body.

Q. DIT has recently appointed a Director of Student Services as part of its re-organisation. From your time in this role at the University of Massachusetts, Boston, do you have any words of advice?

A. I also have a professional background in social services and mental health counselling. I draw heavily on what I have learned in this field in my work with students. I believe strongly in a student-centred approach not only to teaching but also to providing students with the services they need outside of the classroom. It was really important to me to conduct all of my work with students from a place where they and their needs where the focus. And this can sometimes be a difficult place to operate from as an administrator – with all of the external constraints that come with being director of an administrative office. Constraints a given, I operated out of a set of principles that helped me with the difficulties of navigating and negotiating the sometimes conflicting needs of academics, administrators and students. I grounded my work in the importance again of an assets based approach, a student-centred perspective and the importance of establishing strong and positive relationships.

For me, working with students is about relationships – building strong relationships with students so they know you and trust you enough to come to you (and your staff) for the services you provide. I was able to place the student at the centre of my approach to my work through developing relationships with them – talking to them, getting to know them and learning about their experiences (both positive and negative) on campus, identifying student leaders and encouraging them to become involved in the work of the office. It was important for me to cultivate a student-centred office where my staff, academics and college administrators were all on the same page regarding the importance of a student-centred approach to our work.

I have to say it was helpful that the Chancellor took his commitment to students so seriously that he began to re-envision the University as the New Student-Centered Urban Public Research University. This approach required me and my staff to recognize the assets that the students bring to the relationship with the office of student services and for us to not just see them as “in need” of services and support, but to also recognize the contributions they could make to creating a community of students and staff working together to contribute to the health and vitality of the office.

This manifested in establishing a peer mentoring program where advanced students helped newer students navigate the system and a leadership program where students organized forums on topics of importance to them and their communities. It also manifested in the recruitment of students to serve on the College governance committee as a student representative as a voice for other students. I saw it as part of my job not only to provide needed services for students, but to cultivate leadership wherever the opportunity presented itself. My staff and I engaged with students in such a way that they in turn engaged with and became active participants (not merely passive recipients of) their own education.

Strong relationships with academic staff were as crucial to the success of my office of student services as were my relationships with senior management and students. I needed to have a strong understanding of the academic expectations and regulations for students as well as have a good rapport with academic staff so that we could discuss student related issues with ease. It was very helpful for me to attend academic staff meetings where students learning outcomes and expectations or new curriculum development were discussed. While it may not be the norm for an administrator to attend such meetings, once the benefit of my participation was mutually established, it was found to be invaluable to bring the student perspective into such decision making.

For me, the role of Director of Student Services required the ability to establish strong relationship with all staff at all levels within the college and indeed in the University, for the ultimate need was for me to be able to advocate as strategically as possible for the rights of the student. I could only accomplish this if I maintained positive constructive relationships at all levels.

Q. You have conducted a lot of research in the field of the community engaged scholarship, what have you discovered?

A. My work in this field grew out of my practice in the academy. Prior to my role as Director of Student Services I headed up an access and success program for adult, immigrant and refugee students – The Center for Immigrant and Refugee Community Leadership and Empowerment (CIRCLE). In this role, I worked with students and their communities in the area of leadership development and community capacity building. I was off campus in community organizations learning about the issues faced by the immigrant and refugee community – particularly the barriers faced in terms of access to and success in higher education.

Many of the students I worked with already had third level degrees from their home countries and were interested in helping advance themselves and their community in Boston. I taught classes on adult learning theory and leadership development. The pedagogical model I used was based in a participatory, action learner-centred approach to teaching and learning where the classroom curriculum was developed based on the lived experiences of the learner and therefore was directly relevant to them. Thus the classroom often extended into the community and vice versa issues from the community often became the content of theoretical discussions in the classroom.

It was through my doctoral research into the scholarship of engagement that I discovered the theoretical frame for the work that I was doing as educator/community activist. I discovered that there was an emerging field of study in the area of public scholarship that integrated the three faculty roles of teaching, research and service. While I had a working knowledge of the community contexts and the individual and collective student experiences that comprised the community engaged work I was doing with my students, it was the frame provided by the scholarship of engagement that helped me understand the institutional contexts within which public or engaged academic work takes place. I had experienced the tensions between the academic and community-based paradigms while doing this work and I was curious to tease pieces of this out through my own research. I wanted to understand more about why academics do this work that can be so messy. I was curious about what institutions were saying about the value of publicly focused academic work and even more curious to explore the indicators of institutional support for this work. So it was my personal experience and curiosities that ultimately led me to my dissertation.

Q. Your doctorate dissertation – Women's Ways of Engagement: An Exploration of Gender, the Scholarship of Engagement and Institutional Reward Policy and Practice, has been widely lauded. Can you summarize some of your findings for our readers.

A. Yes, I am honoured that my research has been recognized both regionally and internationally. I conducted a qualitative study of female faculty who carry out community engaged work. I was curious initially about two things (I say initially, because my early findings brought me much deeper into an area of my study than I had anticipated). First, I wanted to know more about what motivated these women faculty to do community engaged research and if gender had any significant role to play in their motivation. Secondly, I was interested in how these women experienced support or resistance from their institution as they carried out their work.

My study revealed a lot about the lived experiences of female academics progressing through the ranks of the academy and the hurdles faced trying to do this as a community engaged scholar. The majority of the women in my study spoke about the outright resistance they faced to the direction of their public scholarship, particularly when the time came for them to go up for promotion and tenure. Some of the women talked about the strategies they put in place to secure promotion, for example one woman talked about having two research agendas – one for the academy and one for herself. Another talked about reducing the focus on her community engagement in her tenure portfolio when she received negative feedback about this work in her previous review. Still others talked about how they received mixed messages about the value of their work – where they were lauded at an institutional level yet still within their department her tenure case was not being supported.

This speaks to a strong finding in my research about the lack of support at a department level for the women going up for promotion where a number talked about how they needed to go outside of their department and surround themselves with a network of support of people from outside their own discipline. There was a strong sense of a lack of institutional support for community engaged scholarship when it really comes down to the core values of the academy such as what is recognized and rewarded for promotion and tenure.

More significantly were my findings around the motivations for faculty community engaged scholarship. This is where I was led more deeply into the area of faculty identity than I had anticipated. When I asked the question – What role does gender have to play in your work? I soon realized how one dimensional my approach was to my study. When the participants answered that “yes, gender mattered. But so does...”

Through the interviews with the women, I learned the multidimensional nature of the influences on faculty motivation for their work. When I explored these dimensions further and began to categorize them, I began to see a pattern. The women who expressed strong and lasting commitment to the work of engagement all spoke of motivators in terms of three aspects of their identity – their personal, professional, civic identities and it is the coming together of these aspects of one's identity that forms the foundation for one's community engaged scholarly identity.

Upon deeper analysis, I concluded that it is not only about who the academic is and what motivates her, but also the context within which she does her work and the connections she experiences within her environment. Through the interviews with the women in my study, I learned that community engaged scholars are connected to Place, with People and to Political Action. They are connected to place through a sense of Rootedness and deep belonging. They are connected with others through a strong commitment to real and reciprocal Relationships that enhance that sense of belonging. And they are connected to the need for political action through a powerful sense of Responsibility to act on behalf of self and others to ensure equity, fairness and justice for all those who belong. Their connections in these three realms depict where they are engaged – people, place and political action.

Their motivation for relationship, their sense of rootedness and an overpowering sense of responsibility to others tells us why they are engaged. How the women are engaged is demonstrated through their rich narratives. My study highlights the need for us to further explore the individual work of faculty within varying institutional contexts to discover ways in which we can further support the public mission of the academy, if that is what we so choose.

DIT RESEARCHERS

Technologies to Licence



RESEARCH VIDEO SERIES

Working closely with our industry partners, **DIT research** is making a significant economic impact here in Ireland and internationally. **DIT Hothouse** currently has more than 50 technologies to license in ICT, Life Sciences, Clean Technology and Industrial Technology, and we are ready to fast-track entrepreneurs and businesses to commercial success.

To find out more, take a look at our series of 2-minute Research Videos which showcase the technologies currently available – www.dit.ie/hothouse

Contact DIT Hothouse for more details

T: +353 (0) 1 402 7144 or visit

W: www.dit.ie/hothouse



Hothouse
where business meets innovation

SPIN OUT SPOTLIGHT

DIT SPIN OUT ARIES SELECTED FOR HOTHOUSE PROGRAMME

ARIES (Advanced Research and Innovation Engineering Solutions) Technology Innovation Ltd, a spin out company set up by four engineering post graduates from DIT Bolton Street, is one of the companies currently undertaking The Hothouse Venture Programme.

It was accepted onto the twelve month DIT Hothouse Venture Programme in September 2010. The Venture Programme is designed to provide knowledge-intensive high potential companies with the expertise, networks and tools they need to develop highly successful global businesses.

ARIES specialises in the development of novel energy management systems which are significant in the international green technology market. All four company directors, Colm Carey, Barry Cullen, Fergal O'Rourke and Kevin O'Toole, have strong ties with DIT having studied and researched at both undergraduate and postgraduate level in DIT Bolton Street.

"WE ARE DELIGHTED WITH THIS OPPORTUNITY TO BE PART OF THE PROGRAMME BECAUSE WE WILL BE DEVELOPING OUR BUSINESS SKILLS AS WELL AS TAKING OUR TECHNICAL IDEAS TO THE NEXT COMMERCIAL LEVEL" says company Director, Kevin O'Toole.

"WE WILL SPEND MOST OF THE YEAR FINE TUNING OUR ADVANCED TECHNOLOGICAL CONCEPTS BEFORE ENTERING AN INITIAL TRIAL STAGE TOWARDS THE END OF THE HOTHOUSE PROGRAMME IN SEPTEMBER 2011".

For more information visit www.aries.ie

NATIONAL EVENT

FOR ENERGY EFFICIENCY PRACTITIONERS



DIT is participating in a major European energy efficiency project titled "Universities and Students for Energy Efficiency" www.useefficiency.eu. The project has ten European partners including nine universities. A National event was held in July to facilitate the exchange of best practice among partners and key energy efficiency practitioners in Ireland. "Improving Energy Efficiency in University Buildings" was held in DIT Aungier St and it was opened by the President of DIT, Professor Brian Norton. The Chairman was Dr Aidan Duffy, DIT and visiting USE Efficiency partners included Brunel University, London and IWU (Institute for Housing and Environment), Germany who were represented by Dr Peter Warren and Dr Jens Knissel respectively.

Photograph includes (L—R): Brendan Swords Independent Energy Consultants; Dr. Aidan Duffy, DIT; Richard Smyth, DIT; Dr Peter Warren, Brunel University; Dr Jens Knissel, IWU, Germany; Derek Kearney, DIT; Professor Brian Norton, DIT.

[Events]



INSPIRING INTERVIEWS

The 'Be Inspired, Be an Entrepreneur' series of live interviews with leading business figures, developed by DIT Hothouse and sponsored by Dublin City Enterprise Board is due to return this autumn.

The lunchtime talks are designed to inspire and encourage students who may be considering setting up their own business. Previous speakers have included Dennis O'Brien, Bill Cullen, Chris Horn and Bobby Kerr, alongside graduates from the DIT Hothouse Venture Programme who have achieved success with their own business ventures.

Bobby Kerr, CEO Insomnia Coffee and Dragons Den judge, pictured at 'Be Inspired, Be an Entrepreneur' in DIT

DIT AND TRINITY TO CO-HOST NATIONAL RESEARCH CONFERENCE

Bridge and Concrete Research in Ireland (BCRI), www.bcri.ie is a joint symposium of Concrete Research in Ireland (CRI) which has been running since the early 1990s and Bridge Research in Ireland (BRI) which was established in 2002. The conference is held every two years and its main aim is to provide an opportunity for postgraduate students in Ireland, both north and south, to present and discuss their work. The joint symposium series has gone from strength to strength in recent years with all stakeholders represented. Engineering consultancies, asset owners and research bodies all attend and sponsor the event. Areas such as geotechnical and materials engineering strands have also been introduced and it has become the prime national event in structural engineering research.

At the recent BCRI conference — hosted by UCC and CIT — the organizing committee decided that DIT and TCD would co-host the event in 2012. This coincides with the 10 year anniversary of Bridge Research in Ireland and with the Dublin City of Science event.

Hosting this conference gives DIT the opportunity to showcase its many facilities and key civil engineering research outputs.

For more information contact Colin Caprani
e: colin.caprani@dit.ie

[Events]

ROUX SCHOLARS GO TO GERMANY



The Roux Scholarship competition is a prestigious event in the culinary year for young chefs. It is the premier competition in the UK and ranks among the most prestigious in the world. The winning Scholar is offered a career-changing three month stage, all expenses paid, at virtually any Michelin three starred restaurant worldwide so even the competition for a place in the final is tough. Each winner also becomes part of an elite club and is on a fast track to the top of their profession.

The Roux Scholarship was founded by the Roux brothers of the Waterside Inn, to enable the winner 'to realise their culinary dreams'. So far 26 winners have travelled the globe as ambassadors of culinary excellence and gone on to great success. In 2010 DIT graduate Kenneth Culhane won the award. Kenneth trained in DIT under James Carberry, lecturer in Culinary Arts, who is himself a former winner of the Roux Scholarship. James was present at the Awards ceremony to see his protégé succeed him.

"KENNETH MAJORED IN HOT KITCHEN COOKING AS PART OF HIS TRAINING AND HAD TO PRACTICE ESCOFFIER DISHES EVERY WEEK. HE WAS A FIRST CLASS HONOURS STUDENT AT COLLEGE AND I KNEW HE WAS GOOD THEN SO IT IS FANTASTIC THAT KENNETH HAS WON THIS."

Every two years Michel Roux organizes an educational trip for the Roux Scholars Club focusing on regional food and wine also including farming and ingredients. The members usually meet up with top hoteliers, restaurateurs and chefs along the way.

Last year's competition was completed in time for Kenneth to join James on Michel Roux's organised trip to Germany. The Scholars were hosted by Johann Lafer from Stromberg.

"We visited a white asparagus farm, a wild fallow deer farmer, an organic chicken farm, micro brewery, wine producer and of course a schnapps producer and a manufacturer of vinegar and mustard." said James. "We stayed there for two nights and the Lafers also provided us with a seven course dinner in their Michelin starred restaurant".

"WE THEN WENT SOUTH AND WERE GUESTS OF HERMANN BAREISS AT HIS FIVE STAR RESORT HOTEL (BAREISS) WHICH INCORPORATES A THREE STAR MICHELIN RESTAURANT. IT WAS A FANTASTIC EXPERIENCE AND WE WERE SHOWN GREAT HOSPITALITY ALONG THE WAY"

"I was very lucky that winning almost coincided with the study trip to Germany that Michel organises every two years." says Ken.

"THAT WAS A WONDERFUL TRIP AND ENABLED ME TO SEE FIRST HAND WHAT THE SCHOLARS CLUB IS ALL ABOUT. I ENJOYED TALKING TO THE OTHER SCHOLARS AND LEARNING FROM THEM HOW THEY APPROACHED THE STAGE AND WHAT LESSONS THEY LEARNT".

Kenneth chose the world renowned Jean Georges restaurant in New York for his stage.

MIXED METHODS RESEARCH SERIES



The School of Social Sciences and Law and the Centre for Social and Educational Research (CSER) recently delivered a popular seminar series on mixed methods research. They attracted considerable interest from academic colleagues across the Institute and outside, with participants attending from DCU, TCD, NUIM and UCD.

The series commenced with a session on 'Quality Issues in Mixed Methods Research' facilitated by Professor Alan Bryman, Professor of Organisational and Social Research at the University of Leicester and one of the leading world experts in the field of research methodology. Professor Bryman began by addressing why quality criteria are important in quantitative and qualitative research before exploring the issue with specific reference to mixed methods research. A number of approaches to mixed methods criteria were discussed drawing on empirical evidence and examples. He concluded by presenting some very practical lessons and tips for managing the integration of data in a mixed methods framework.

The title of the second seminar in the series was 'Innovating in Data Integration with Qualitative Software'. Delivered by Professor Nigel Fielding, Professor of Sociology and Associate Dean of Research from the University of Surrey, the first part of the session focused on the place that data integration holds in mixed methods research. Professor Fielding demonstrated a number of innovations for data integration using qualitative data software including the integration of multi-stream visual data in qualitative and mixed methods research; the integration of geo-referencing technologies with qualitative software; and the integration of data from qualitative and quantitative methods. The seminar provided an exciting insight into the potential use of advanced technological approaches for data analysis in a mixed methods design.

Professor Max Bergman, Professor in Methodology and Political Sociology at the University of Basel, Switzerland delivered the final session of the series on the topic of 'Mixed Methods Research: Methodological Muddle, Alternative Research Design, or the Beginning of a New Research Era?'. As co-editor of the Journal of Mixed Methods Research (Sage Publications) and editor of the book 'Advances in Mixed Methods Research: Theories and Applications' (Sage Publications), Professor Bergman brought considerable expertise that challenged conventional thinking on mixed methods research and offered promising alternatives and flexibility when blending qualitative and quantitative frameworks. After the seminar, he delivered a two hour workshop for staff and students.

Pictured: l to r Professor Noirin Hayes, CSER, Professor Max Bergman, University of Basel, Dr Mairead Seymour, CSER,

This impromptu event combined teaching, discussion and practical exercises and provided participants with an opportunity for small group tuition with one of the leading scholars in the mixed methods field.

Following another successful seminar series on Academic Writing, Writing for Publication and Writing Groups facilitated by Dr Rowena Murray (Reader at the Educational and Professional Studies Department at Strathclyde University) staff established an academic writing group. These scheduled writing events create writing time within the academic week and also provide a forum to develop research ideas and receive peer feedback within a collegial environment.

For further information email mairead.seymour@dit.ie



RESEARCHING CHANGE IN ORGANISATIONS

For his doctoral research Dr Kevin Kelly, School of Electrical Engineering Systems, investigated academic change in his Faculty (now the College of Engineering and Built Environment). His research findings fall into three main categories:

- The substantive issue: where he investigated the type of university DIT needed to become for the institute to be able to respond adequately and change academically in a fast changing environment.
- The evolving story about DIT and the people working in it.
- The identification of the main barriers and enablers to academic change.

The substantive issue of the research is published in a book titled 'European Continuing Engineering Education – Conceptualizing the Lessons Learned' published by SEFI (the Société Européenne pour la Formation des Ingénieurs – European Society for Engineering Education). This is part of the chapter on the changing role of universities and is available to download from DIT's research repository Arrow: arrow.dit.ie.

His research findings in the other two categories are presented in a series of papers including one delivered at the IGIP conference in Graz, Austria in September 2009. To some extent this tells a story about what students and staff think about DIT whilst identifying and examining the main barriers and enablers to academic change that these stakeholders helped identify in the engineering faculty of DIT. The papers also attempt to address the concerns that many engineers and scientists have using a qualitative methodology by examining the strategies undertaken to ensure adequacy. It is argued that qualitative studies can provide data that is rich and insightful and sometimes allow extrapolation into broader contexts.

The collaborative approach undertaken in this research allowed significant input from every academic level within DIT, students and teachers union representatives as well as input from international academics at conferences and workshops. In this regard interim presentations of this research were made at ASEE (American Society for Engineering Education) conferences in the USA and Istanbul in 2007 and at SEFI workshops in Norway in 2006 and Finland in 2007. He delivered a final presentation of his research at the ASEE colloquium in Budapest in October 2009.

For more information email: kevin.kelly@dit.ie

[Projects]

EXTRACTING NUTRIENTS FROM THE SEA



Marine algae, due to their extreme biodiversity are an excellent source of novel healthy food ingredients and biologically active compounds. Despite having so many health benefits, seaweeds have been relatively unexploited for food applications. In her research project funded by the Department of Agriculture and Food under its FIRM funding programme, Dr Nissreen Abu-Ghanaam, School of Food Science and Environmental Health, is studying the potential exploitation of seaweed as a source of ingredients for novel functional foods. First of all herself and her team screened six species of edible Irish seaweeds for antioxidant and antimicrobial activity: *Laminaria digitata*, *Laminaria saccharina*, *Himanthalia elongata*, *Palmaria palmata*, *Chondrus crispus* and *Enteromorpha spirulina*. She then evaluated the effects of various food processing methods in terms of antioxidant activity on the most bioactive seaweed, *H. elongata*.

Dr Abu-Ghanaam discovered that drying reduced cooking time and therefore there was less leaching of nutrients when the seaweed was blanched. The drying kinetics of *H. elongata* were then evaluated at varying temperatures to analyse the effect of drying temperatures and time on the phytochemical constituents of seaweed. This kinetic study was complemented with the modelling of terms of Fick's diffusion equation, to estimate the diffusion coefficients. The experimental data was also fitted to different empirical kinetic models. The findings are promising as there may be potential to utilize both seaweed extracts and optimized whole seaweeds in a wide range of products to develop new functional foods.

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ROYAL IRISH ACADEMY FUNDING

Founded in 1785, the Royal Irish Academy (RIA) was the first society to promote research in sciences, humanities and social sciences in Ireland. It acknowledges academic excellence in the areas of astronomy, space, chemistry, physics, engineering, life sciences, mathematics, communications, archaeology, Irish, literature, history, philosophy and social sciences. The RIA offers a number of different opportunities to researchers and graduate students some of which are described below.

The Royal Irish Academy and Royal Society Joint Project Grants Programme provides seed funding for postdoctoral researchers to facilitate collaboration with colleagues in the UK. The maximum funding is €7,500 which can be used for travel, subsistence and research expenses. This funding only applies to natural and applied sciences research. Closing date is usually around November.

Royal Irish Academy Postdoctoral Mobility grants support short visits to any country to support primary research in any subject area. The duration of visits is generally between one week and six weeks in length. The funding should be used to initiate one-to-one collaborations, explore opportunities to build lasting networks and gain access to ideas, research facilities and complementary equipment. Funds are available to facilitate initial project planning and development; to support the direct costs of research; or for visits by or to partner scholars.

The RIA Annual ICT Dissertation Award rewards exceptional dissertations that make a noteworthy contribution to the subject; reach a high standard of exposition; result in publication(s) in reputable publication venues; place its results clearly in the context of ICT as a whole; and enable a computer scientist or electrical engineer with significantly different interests to grasp its essentials. The award is combined with a cash prize of €1500. Submissions are generally accepted between March and May.

For more information visit www.ria.ie

[Education]

FOOD INNOVATION KEY TO SUCCESS

Funding for a new MSc in Food Innovation and Product Design is now in place and the first cohort of students will be arriving into DIT at the end of January 2012. The two-year Masters programme has been funded under the Erasmus Mundus Joint Masters Degree Programme which will provide students with a grant for two years. It will cover fees and accommodation costs.

Dr Roisin Burke, lecturer in Culinary Science and Food Product Development and Erasmus Mundus Co-ordinator, first became aware of the programme during a trip to Paris.

"WHILE ATTENDING A CONFERENCE WITH A POSTGRADUATE STUDENT IN PARIS, WE WENT TO A SEMINAR ON MOLECULAR GASTRONOMY WHICH COMBINES THE STUDY OF SCIENCE AND CULINARY ARTS. THE SEMINAR GAVE ME SOME GREAT IDEAS AND WHEN WE RETURNED HOME I INVITED THE CO-FOUNDER OF MOLECULAR GASTRONOMY, DR. HERVÉ THIS, TO DIT TO DELIVER A SEMINAR ON THE TOPIC. AFTER THE EVENT HE ASKED IF I WOULD BE INTERESTED IN JOINING A CONSORTIUM WHICH WAS PUTTING TOGETHER AN APPLICATION FOR FUNDING UNDER THE ERASMUS PROGRAMME."

DIT is collaborating with universities in France, Italy and Sweden to deliver the Masters programme. DIT staff will concentrate mainly on innovation management and culinary approaches to innovation and product design. AgroParisTech will focus on food science and technology with an emphasis on the development and processing of food products and engineering skills. The University of Naples will deliver modules on the formulation of health-related functional foods and x-omics in relation to food quality. In Sweden, Lund University will concentrate on food packaging development and design in relation to sustainability and logistics.

"It is a 2-year programme with four semesters and the students have an opportunity to spend time in at least two of the Institutes over the course of their studies. In year one, the students will spend the first semester in Paris and the second semester in DIT. In year two they can choose to go to Naples, Sweden or Paris for semester three and then they will work on their thesis throughout semester four."

Teagasc, the Irish Agriculture and Food Development Authority, Universities in Lebanon, Algeria, Tunisia, Argentina, Brazil, Venezuela and Korea and two research institutes – INRA in France and ISA-CNR in Italy – will contribute to the curricula as associate members. There are also industry partners involved with the programme e.g. Diageo and Tetrapak.

The course is open to graduates from anywhere in the world. The first twenty-five places have already been filled – six of the students are from within the EU and the other nineteen are from outside.

"We had a selection meeting in Dublin with all the consortium partners in January where we spent two full days looking at all the applications," says Roisin. "We then picked 25 candidates with a few reserve candidates. Non-EU students will receive €24,000 for two years while those within the EU will receive €12,000 for two years. There was an allowance for people from Balkan countries such as Croatia and Turkey. The grant will go towards the payment of fees, accommodation and living costs in each country."

"THE FACT THAT STUDENTS ARE FROM ALL OVER THE WORLD INCREASES THE CULTURAL LEARNING OPPORTUNITIES AS WELL AS THOSE RELATED TO FOOD PRODUCT DEVELOPMENT."

Applicants must have a BSc or relevant degree in food technology, biotechnology, process engineering, biochemistry or related fields. All students are required to pass a TOEFL or IELTS exam. Successful applicants will obtain a triple degree, consisting of National Master Degree certificates with a Joint Diploma Supplement from the four colleges. The two-year Masters programme will provide the students with an education in food research and development that will prepare them for a career in the agri-food and drink sectors.

"More than ever, innovation is critical in these sectors and there is a need to develop new food products throughout the industry," says Roisin. "The students will learn the technical skills that will enable them to do this but they will also build links with other participants that could ultimately lead to future international research opportunities"

For more information email roisin.burke@dit.ie
www.FIPDes.eu

[Profile]

DIT WELCOMES NASA EXPERT TO BOLTON STREET CAMPUS



As part of the ongoing series of lectures organised by DIT's Space Research Group the College of Engineering and Built Environment invited Ms. Laurie Peterson from the National Aeronautics and Space Administration (NASA) to present a lecture to staff and students in DIT.

Laurie boasts an impressive CV having worked with NASA for eleven years in the Crew and Thermal Systems Division located at the Johnson Space Centre. During this time she has been involved in the development of systems for the International Space Station (ISS). She served as a project engineer for the ISS Habitation Module Outfitting Project co-ordinating the development of the galley for this module. Following this she served as subsystem manager for the ISS Crew Health Care System (CHeCS) and ISS Environmental Control & Life Support Systems (ECLSS), with responsibility for the systems vital to the well being of the space station crew on orbit.

She alternated between the role of subsystem manager and project manager for ISS Extravehicular Activities (EVA) leading a team responsible for troubleshooting problematic station hardware. These problems were successfully fixed on shuttle missions STS-114 and STS-116.

Laurie then moved to the role of ECLSS subsystem manager for the Crew Exploration Vehicle (CEV). This was part of the Orion Exploration program with the goal of returning man to the moon and ultimately to Mars. Since then Laurie has been working in the area of process improvement within NASA implementing Lean Six Sigma through task groups and training programs at JSC.

A large audience of DIT staff and students, as well as students and guests from other universities, attended the lecture which was held in the Bolton Street campus. Laurie gave an interesting and lively presentation including some fun insights into working at NASA. She began by explaining how her career began and progressed with NASA and moved on to detail each of the main projects she worked on. She described some of NASA's process improvement techniques and gave examples of how they could be implemented in an organisation such as DIT. She also discussed the future of NASA and their intended space missions and suggested how Irish engineers could participate in NASA projects.

The DIT Space Research Group recently completed their work on a sounding rocket experiment with the European Space Agency (ESA), the German Space Agency (DLR) and the Swedish National Space Board (SNSB). The project known as "Telescope" was launched in March (see page 25 for more details).

For more information email spacersearch@dit.ie

[Institutes]

NEW FACILITY FOR ENVIRONMENTAL HEALTH SCIENCES RESEARCH

The Environmental Health Sciences Institute (EHSI) is a dedicated research institute for inter-disciplinary environmental health science research at DIT. Focusing on children, the elderly and vulnerable populations, it integrates scientific and technical expertise with policy and regulatory capability to improve quality of life for everyone.

EHSI researchers are based in DIT's Colleges of Sciences and Health, Engineering & the Built Environment and Applied Arts and Tourism. The new DIT campus at Grangegorman will offer a new facility for EHSI later this year. In the meantime research is ongoing and is open to all researchers.

"WE WERE AWARDED €11.6MILLION IN FUNDING LAST JULY TO FUND THE BUILDING OF A NEW FACILITY IN GRANGEGORMAN," says Dr Mary McNamara, Head of Research, College of Sciences and Health.

"WHILE WE WAIT FOR THE NEW FACILITY, WE MUST CONTINUE WITH OUR RESEARCH TO KEEP UP MOMENTUM. A BOARD OF GOVERNORS HAS BEEN ESTABLISHED AND THE POSITION OF HEAD OF EHSI HAS BEEN ADVERTISED AND WILL HOPEFULLY BE FILLED BY SEPTEMBER. SO IN THE MEANTIME, PEOPLE WILL CONTINUE WITH THEIR RESEARCH IN THE CURRENT FACILITIES ON CAMPUS."

EHSI is concerned with all parts of the environment that impact human health such as food, air, water, land and buildings as well as other stress-causing factors including biological chemical and physical.

"THESE ARE THE MAIN RESEARCH AREAS SO WE WILL FOCUS ON ISSUES SUCH AS HOW POOR AIR QUALITY AFFECTS ASTHMA SUFFERERS OR PEOPLE WITH FOOD ALLERGIES."

"THE COST OF HEALTH CARE IS A BURDEN TO ANY ECONOMY. IN EHSI, WE STRIVE TO ASSESS THE FACTORS THAT AFFECT THE ENVIRONMENT AND OUR HEALTH IF YOU CAN CORRECT OR PREVENT THESE STRESSORS IN THE FIRST PLACE, THEN YOU REDUCE THE BURDEN ON SOCIETY."



One of our PhD students in EHSI has developed a community dietetic intervention to improve oral nutritional supplement(ONS) prescription practices. Healthcare professionals do not always prescribe ONS according to best practise guidelines. Sharon Kennelly, a PhD student at EHSI and the school of Biological Sciences has developed a community dietetic intervention. Post-intervention Sharon has found that fewer patients were being prescribed ONS and that there was a 3% reduction in expenditure by participating GPs despite a 28% increase nationally.

"EHSI LINKS ACADEMIC RESEARCHERS WITH ENVIRONMENTAL HEALTH PRACTITIONERS TO IMPROVE QUALITY OF LIFE. THE OVERALL FOCUS OF THEIR RESEARCH IS TO IDENTIFY ISSUES OF CONCERN TO SOCIETY AND TO BUILD THEIR RESEARCH PROGRAMME AROUND FINDING SOLUTIONS TO THESE PROBLEMS"

For information on activities at EHSI, e: mary.mcnamara@dit.ie

[Funding Opportunities]

APPLYING FOR COST FUNDING



The European Cooperation in Science and Technology (COST) programme is one of the longest-running European instruments supporting cooperation among scientists and researchers across Europe. The programme pays for the establishment and management of networks of researchers known as Actions and focuses in particular on young researchers. On average each Action receives €100,000 a year for 4 years and this is used to pay for activities such as meetings travel, subsistence, local organiser support, conferences, workshops, short-term scientific exchanges, training schools, publications and dissemination activities.

Proposals are assessed by a domain committee for each of nine domains. Members of the committee meet regularly to review proposed Actions and monitor Actions that are in progress. Normally a member of the COST domain committee is appointed rapporteur to an Action for monitoring purposes.

"Application is very simple," says vice chair of the transport and urban development domain committee, DIT's Hendrik van der Kamp. "If you don't get it first time around you can just apply again. Every domain committee has representatives from different countries screening proposals for COST."

There are two ways to participate in a COST funded network. You can either propose or be part of a new network proposal or you can join an existing network. You can submit a new proposal at any time of the year but there are two collection days in March and September, when all applications are collated for review.

What people should think about when applying for a COST Action

1. Is it appropriate for COST
2. Be aware that it is not funded already
3. Check existing COST Actions to prevent overlapping
4. Choose the correct domain in COST
5. Be careful to get the proposal in before the deadline

"COST is a particularly good opportunity for young researchers. Youth and mobility are important, allowing young researchers to get involved and meet other young researchers. They also get the chance to present their experiences and papers to a conference. If the Action has no evidence that young people will get into it, the Action is weakened."

"The reason that COST does not finance the research is to encourage the teaming up of people involved in an Action. Very often, the better written Actions for COST exist where there is a defragmentation of research efforts. So you may have existing research initiatives that are both very good but are not actually hitting on the problem. In these cases, we propose to take a bit from each, which could be something from social research and something else from technical research and combine the two to form an Action."

"All that COST finances is the travel and subsistence so an Action is proposed by a researcher and it has to be proposed by a minimum of five countries. The remainder of funding comes from the proposer themselves which means they require financial support from their organisation or sponsor. It is also important that the proposed network makes a significant difference in terms of knowledge or social impact. So that if the Action takes place, it is likely that it will have a positive impact."

"I was recently involved with a COST Action that looked at minority communities in deprived rural areas. An example of this would be communities living on the Aran Islands. They are people who have a degree of deprivation and are a minority group as a result of their location, language or employment situation. By making it an Action, they were able to combine such diverse areas as the Midlands of Spain with people in Turkey and Scandinavia. So this idea of linking people in different countries is very important."

"ALSO, YOU LEARN FROM BEST PRACTICE. SO WHEN YOU SEE ONE COUNTRY DOING SOMETHING PARTICULARLY WELL, YOU CAN THEN REPLICATE IT SOMEWHERE ELSE AND IF THAT CAN BE DESCRIBED AS A FEATURE OF THE ACTION, YOU HAVE A CHANCE OF GETTING THROUGH. A COST ACTION IS VERY OPEN AT ANY TIME. WHEN AN ACTION HAS BEEN APPROVED, OTHER COUNTRIES CAN LATCH ONTO THEM THROUGH THEIR NATIONAL COORDINATOR. THIS ALLOWS YOU TO BE ATTACHED TO THE ACTION AND YOU THEN HAVE ACCESS TO THE MEETINGS."

For more information visit www.cost.eu or email Hendrik van der Kamp at henk.vanderkamp@dit.ie

OFFICIAL PUBLICATIONS

Arrow@DIT

Archiving Research Resources on the Web is a digital collection of research publications produced by researchers at DIT. All items in this collection are full text. This collection is being developed and is not currently a full listing. The term publication is used in the broadest sense as to encompass all forms of scholarly communication. The following publications are a selection of those that have been added in the first few months of the year, visit ARROW@DIT to download any of them or to read more from the collection. <http://arrow.dit.ie>

Health Sciences

Radiobiological Dosimetry – **Aidan Meade, C. Clarke, Hugh Byrne and Fiona Lyng**

Preparation of Tissues and Cells for Infrared and Raman Spectroscopy and Imaging – **Fiona Lyng, Ehsan Gazi and Peter Gardner**

Synthesis and Spectroscopic Analysis of Therapeutic Ru(II) Complexes – **Samar Moqadasi, Laura Perdisatt, Christine O'Connor and Luke O'Neill**

Folate–cyclodextrin conjugates for targeted chemotherapy – **Zlata**

Tofzikovskaya, Orla Howe, Mary McNamara and Christine O'Connor

Targeted Drug Delivery Systems for Cancer Therapy – **Antonio Clementi, C. O'Connor, M. Mc. Namara, A. Mazzaglia, M. C. Aversa and A. Giuffrida**

The Effect of Physiological Cyclic Stretch on the Cell Morphology, Cell Orientation and Protein Expression of Endothelial Cells – **V. Barron, Claire M. Brougham, K. Coghlan, C. Stenson—Cox, D. O'Mahoney and P.E. McHugh**

Estimation of 3D shape in the Patellofemoral Joint using Statistical Shape Models and 2D Data – **Colm O'Kane**

Photochemical studies of Nutraceuticals in the presence of Cyclodextrins – **Zlata Tofzikovskaya, Christine O'Connor and Mary McNamara**

Food Sciences

Quantitative Assessment of the Shelf–Life of Ozonated Apple Juice – **S. Patil, Vasilis Valdramidis, Brijesh Tiwari, P. J. Cullen and Paula Bourke**

Growth and kinetics of *Lactobacillus plantarum* in the fermentation of edible Irish brown seaweeds – **Shilpi Gupta, Nissreen Abu–Ghannam and Amalia G.M. Scannell**

An Assessment of the Antioxidant and Antimicrobial Activity of Six Species of Edible Irish Seaweeds – **Sabrina Cox, Nissreen Abu-Ghannam and Shilpi Gupta**

Ecology and Molecular Typing of *L. Monocytogenes* in a Processing Plant for Cold–smoked Salmon in the Republic of Ireland – **Sapna Chitlapilly Dass and Nissreen Abu-Ghannam**

Effect of barley flour and freeze–thaw cycles on textural nutritional and functional properties of cookies – **Mahesh Gupta, Amarinder Singh Bawa and Nissreen Abu-Ghannam**

Effect of hydrothermal processing on colour, antioxidant and free radical scavenging capacities of edible Irish brown seaweeds – **Gaurav Rajauria, Amit Kumar Jaiswal, Nissreen Abu-Ghannam and Shilpi Gupta**

Barley for Brewing: Characteristic Changes during Malting, Brewing and Applications of its By–Products – **Mahesh Gupta, Nissreen Abu-Ghannam and Eimear Gallagher**

Growth Inhibition of Common Food Spoilage and Pathogenic Microorganisms in the Presence of Brown Seaweed Extracts – **Shilpi Gupta, Sabrina Cox, Gaurav Rajauria, Amit Kumar Jaiswal and Nissreen Abu-Ghannam**

Effect of Different Drying Temperatures on the Moisture and Phytochemical Constituents of Edible Irish Brown Seaweed – **Shilpi Gupta, Sabrina Cox and Nissreen Abu-Ghannam**

Characteristics of cooked chickpeas and soybeans during combined microwave–convective hot air drying – **Aoife Gowan, Nissreen Abu-Ghannam, Jesus Maria Frias and Jorge Oliveira**

Attitudes Towards and Beliefs about Nutrition and Health Among a Random Sample of Adults in the Republic of Ireland and Northern Ireland – **John M. Kearney, Michael Gibney, Barbara Livingstone, Paula Robson, Mairead Kiely and Karen Harrington**

OFFICIAL PUBLICATIONS

ICT

Application of the Fractal Market Hypothesis for Modelling Macroeconomic Time Series — **Jonathan M. Blackledge**

Inverse Scattering Solutions with Applications to Electromagnetic Signal Processing — **Jonathan M. Blackledge, Timo Hamalainen and Jyrki Joutsensalo**

Scattering from a Tenuous Random Medium with Applications in Optics — **Jonathan M. Blackledge**

Diffusion and Fractional Diffusion Based Image Processing — **Jonathan M. Blackledge**

Diffusion and Fractional Diffusion based Models for Multiple Light Scattering and Image Analysis — **Jonathan M. Blackledge**

Modelling and Computer Simulation of Radar Screening using Plasma Clouds — **Jonathan M. Blackledge**

Digital Watermarking and Self-Authentication using Chirp Coding — **Jonathan M. Blackledge**

Multi-algorithmic Cryptography using Deterministic Chaos with Applications to Mobile Communications — **Jonathan M. Blackledge**

Audio Data Verification and Authentication using Frequency Modulation based Watermarking — **Jonathan M. Blackledge and Omar Farooq**

A Surface Inspection Machine Vision System that Includes Fractal Texture Analysis — **Jonathan M. Blackledge and Dmitry A. Dubovitskiy**

A Covert Encryption Method for Applications in Electronic Data Interchange — **Jonathan M. Blackledge and Dmitry Dubovitskiy**

Sustainability

Protection of UPOC Against the Load Side Short Circuits — **Iurie Axente, Malabika Basu, Michael F. Conlon and Kevin Gaughan**

Stochastic Hybrid Embodied CO₂-eq Analysis: An Application to the Irish Apartment Building Sector — **Adolf Acquaye, Aidan Duffy and Biswajit Basu**

A practical Photoelectrochemical Cell Using Nonprecious Metal Electrodes — **Patrick Enright, Tony Betts and John F. Cassidy**

Engineering of a Single Alkaline Fuel Cell Part II: Long Term Operation in Air — **Jonathan M. Blackledge, Eugene Coyle, David Kennedy, Heinz Schmidt-Walter, Hans J. Kohnke, Gerhard Sauer, Steffen Schudt, James Hamilton and James Brunton**

Policy

Building a World-Class System not World-Class Universities — **Ellen Hazelkorn**

Do University Rankings Measure What Counts? — **Ellen Hazelkorn**

Vocational Education and Universities: Building Collaboration and Pathways for Local/Regional Development — **Ellen Hazelkorn**

The discursive construction of 'children' and 'rights' in Irish Early Childhood Policy — **Rachel Kiersey and Nóirín Hayes**

Exploring early childhood education and care policy in Ireland: critical discourse analysis as a methodological tool — **Rachel Kiersey**

Criteria Based Case Review: The Parent Child Psychological Support Program — **Pilar Bujía-Couso, Anita O'Rourke and M. Ángeles Cerezo**

Ireland's Chance To Sway Security Policy In The EU — **Tom Clonan**

Mission Impossible: The US Military Cannot Provide Security In Iraq — **Tom Clonan**

The Forgotten Role of Women Insurgents in the 1916 Rising — **Tom Clonan**

Waging A Private War: US Security Contractors In Iraq — **Tom Clonan**

The Falklands War: Closer Fought Than Commonly Understood — **Tom Clonan**

Executions At Guantanamo Bay Would Mock US Democracy — **Tom Clonan**

US Missile Shield Plan Heightens European Insecurities — **Tom Clonan**

Operation Armageddon: Doomsday For Irish Armed Forces — **Tom Clonan**

Crossing Borders in Anne Tyler's Fiction — **Susan Norton**

The Treaty of Lisbon and the Reformed Jurisdictional Powers of the European Court of Justice in the Field of Justice and Home Affairs — **Stephen Carruthers**

Prison Policy in Ireland: Politics, Penal-Welfarism and Political Imprisonment — **Mary Rogan**

Arts festivals, urban tourism and cultural policy — **Bernadette Quinn**

The Inter-Organisational Relationships in Irish Tourism: the Example of Lough Derg — **Kevin Griffin**

ENTERPRISE SCHEME TO FUND INDUSTRY RESEARCH PROJECT

DIT's Department of Transport Engineering has been awarded funding for a postgraduate research project in collaboration with an Irish firm. Timoney Technology Ltd are world leaders in the design of mobility platforms for off-road applications such as heavy-duty construction plant equipment and airport rapid intervention vehicles. The project is co-funded by IRCSET under an Enterprise Partnership Scheme. Postgraduate student John Grimes made the successful application for masters funding under the IRCSET Enterprise Partnership Scheme. Under this scheme IRCSET funds two-thirds of the research project and the company funds the rest.

John has now started his research into the analysis of fatigue data for off-road mobility platforms. The project will be supervised by Dr Shaun Mc Fadden, DIT's Department of Transport Engineering. Professor David Taylor MRIA, Trinity College Dublin is advisor supervisor.

For more information contact Dr Shaun McFadden
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COUNTING THE COST OF LAND DISPUTES

Land ownership rights of citizens are one of the bedrocks of western democracies with a range of land administration systems existing worldwide to secure those rights.

Evidence from both surveyors and solicitors' court records has indicated that there has been a significant increase in boundary disputes in Ireland in recent years. With possible sources including the new Property Registration Authority (PRA), digital mapping, or high land values over the last decade, disputes may also be due to unclear boundary information in PRA mapping as a result of Ireland's non-conclusive boundary system. Whatever the reasons, there is a need to quantify boundaries more precisely to inform decision making for the future. Daragh O'Brien, an ABBEST PhD scholar in DIT Bolton St is currently researching the incidence and types of boundary disputes in Ireland under the supervision of Dr Patrick Prendergast, College of Engineering and Built Environment.



He is categorising disputes to focus on actions arising from boundary dispute issues, adverse possession, rights of way (easement), prescription and prescriptive easements (similar to AP).

He then plans to examine both reported and unreported cases over a period of 5 years with the aim of developing recommendations for improvement as well as solutions to law reform while examining codes of practice for surveying. A secondary objective of the research is to attempt to quantify the financial cost of boundary disputes by analysing the cost of fees and compensation.

O'Brien has already completed a survey of landowners in rural and urban areas to identify how much they know about their own property boundaries. He intends to complete his research by 2013.

For more information visit www.boundarydisputesireland.com



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