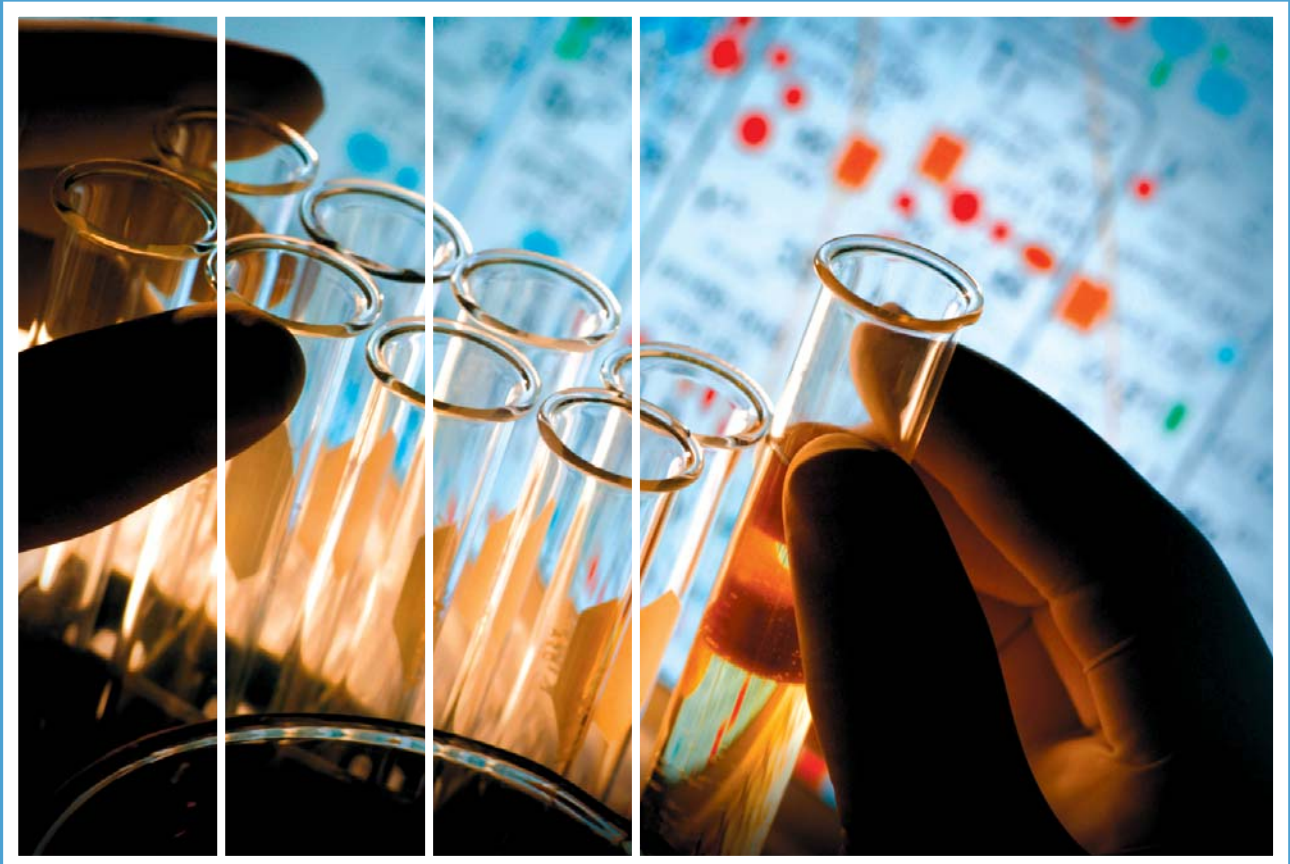


Dublin Institute of Technology

ResearchNews



Leaders in holography research
Solar energy application
To the forefront in functional food
Major European e-government project
Corrosion resistant coatings





Editorial

Dublin Institute of Technology is distinguished by the vitality of its diverse culture of discovery and innovation. That pervasive sense of 'Discovery' extends to both 3rd level students' personal discovery of existing knowledge and 4th level students' and colleagues' leading edge research whose outcomes include the discovery of new phenomena, designs, insights, perspectives and inventions.

Research is part of a seamless tapestry that includes scholarship and enterprise that underpins our excellence in learning and teaching.

This first issue of DIT's research magazine seeks to give illustration and insights into the range of research in DIT and the eclectic mix of outcomes both in form and concept. Is there a unifying theme? Certainly the research described has the potential to contribute to economic, social or cultural development. If you wish to know more please follow up with the contacts provided.

If you would like to receive a free subscription to future issues please email your details to: jean.cahill@dit.ie

Professor Brian Norton, President of DIT

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Intellectual property policy: Encourages research and discovery

DIT's ground-breaking Intellectual Property (IP) policy was recently announced by DIT. The new policy recognises that the inventor or author owns their own IP. The old IP policy, like that of most other universities, colleges and companies allowed DIT to claim the IP generated by its employees and students.

"At DIT we are leading the way with our new IP policy" said DIT President, Brian Norton. "It is unique in Ireland and most of Europe. The fact that the creator can own their own IP encourages staff and students to be innovative. It makes DIT an attractive place to work for leading researchers, authors and inventors, and enhances our reputation for excellence and industry relevance".

In addition to the new policy, DIT set up Hothouse – the Innovation and Technology Transfer Centre at DIT, to help inventors and authors protect and commercialise their IP. Tom Flanagan leads the Hothouse team and has successfully negotiated licences for DIT technologies with companies such as SONY, Sherman Williams, General Paints and ABB. Many more licences are in the pipeline.

"Last year Hothouse processed 22 invention disclosures, selected 12 for patent filing and won 4 commercial licences. This level of commercialisation is equivalent to other major universities who receive 4–5 times our research budget" Tom enthuses.

Last year Hothouse won the Shell Livewire Award for Services to Enterprise and since 2001 it has helped launch over 200 knowledge intensive companies. Hothouse helps entrepreneurs to set up and grow their businesses; it licenses technologies; helps business leaders find research partners and funding; matches investors with opportunities; and commercialises the intellectual property of DIT staff and students.

DIT IP policy in a nutshell

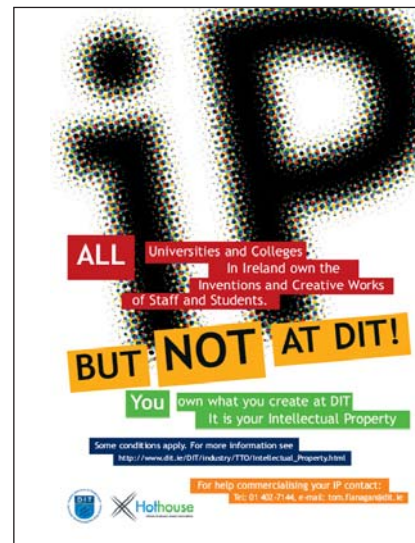
At DIT, everything created or invented by a student or staff member belongs to them if three conditions are met:

- They weren't required by a sponsor to assign the IP.
- They didn't use substantial DIT resources creating it.
- It wasn't something requested for normal DIT operations.

Under the new policy, lecture notes belong to the lecturer who developed them and they can be commercialised by, for example, writing a book. DIT retains the right to use the material for academic purposes. In addition, DIT will give an inventor Hothouse support to help launch and grow a business – including facilities, mentoring, and access to networks of funders, investors and entrepreneurs.

Where the IP is assigned to DIT it has also made its offer to the inventor more lucrative than other universities. Inventors can receive up to 75% of net revenue on a licence and DIT will sign over the IP to an inventor to start a company for just 15% of equity. Recently, for example, a student needed DIT to guarantee that it would not claim ownership of his IP, so that he could get angel investment for a business that he developed as part of his MBA. DIT waived all claims and his web business is now flourishing. Also:

- Where the owner assigns their IP to DIT to commercialise, DIT will return 65% of net proceeds to the inventor, whereas most IP firms will only return 10–20%.
- Where IP was developed using substantial DIT resources and is commercialised by the inventor or author, only 10% of net revenues will be claimed by DIT.



- Inventors can also ask Hothouse to assign back IP that was originally assigned to DIT and in these cases DIT will only claim 10% of any net revenues received.

Eavan Murphy, lecturer in media law, agrees with Tom. "DIT's radical change of approach to the issue of intellectual property in an academic institution is hugely beneficial to students. In teaching media law to postgraduate students, I regularly hear reports from students about other colleges which routinely claim ownership of student work. Works which have taken months to create are owned and stored by some colleges rather than being displayed or promoted. DIT's new policy to actively protect and promote staff and student IP in their work is an innovative and important change for everyone concerned".

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Fermentation foods of the future

Dr Nissreen Abu-Ghannam was recently awarded almost €350,000 under the Department of Education and Science's Technological Sector Research funding scheme to investigate plant products and seaweed as a new source of functional ingredients. Her Strand III project will use probiotic fermentation to develop new ingredients and foods and she aims to mine nutraceuticals and metabolites from plant products while characterising their bioactivity and bio-availability.

The project is a collaboration between DIT's School of Food Science and Environmental Health, where Nissreen is based, UCD's School of Agriculture, Food Science and Veterinary Medicine and the division of Applied Nutrition & Food Chemistry at Lund University in Sweden.

Functional foods are foods that promote human health over and above the provision of basic nutrition by improving the state of health and well being and/or reducing the risk of disease. There is a significant and growing global market for these foods – estimated to be around \$50 billion. The Irish market is already worth €25 million and is growing by 15% annually. The largest segment of this market comprises foods containing probiotics, prebiotics and synbiotics.

Probiotics are defined as “live” microorganisms which, when consumed in adequate numbers, confer a health benefit on the host such as control of gastrointestinal infections, suppression of cancer, reduction of serum cholesterol and immune stimulation. Common probiotics come from the *Lactobacillus* (L.) and *Bifidobacterium* (B.) species, *L. casei* and *B. lactis* are two examples.

Prebiotics are non-digestible food ingredients that stimulate growth and/or activity of one or a limited number of bacteria in the colon. Specific forms of dietary fibre can be classified as prebiotics.

For example, certain polysaccharides and oligosaccharides are fermentable by bifidobacteria and lactobacilli species, thus enhancing their cell population in the colon. The term synbiotic is used when referring to a product that uses a prebiotic and probiotic in combination. Microorganisms can also indirectly impart health-promoting characteristics in food through the production of bioactive metabolites (referred to as biogenics) during fermentation. The dairy sector is leading in functional food innovation in Ireland producing a wide variety of functionalised milk, yogurt and spreads. However, recent trends predict a move towards the development of plant based functional foods. There are three strands to Nissreen's project:

- Probiotic fermentation and functional food product development;
- Nutraceutical mining and bioactivity characterisation;
- Mathematical modelling of probiotic fermentation bio-kinetics.

The interaction between probiotics, plant dietary fibre and prebiotics, plant bioactive phenolic and phytosterol compounds and non-starch polysaccharides of seaweed will provide key information for delivering new nutraceutical platforms. “Recent Government and EU sponsored reports such as Agri-Vision 2015 and the European Technology Platform on Food for Life recommend the development of core competencies in the Agri-Food Industry” says Nissreen. “This research project could help Irish manufacturers develop innovative functional foods and nutraceutical ingredients and increase their competitiveness in the global market.”

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Pictured above: Dr Nissreen Abu-Ghannam (centre) with two doctoral students, Sabrina Cox (left) and Sapna Chitlapilly (right).

Food and Health

The Tromped: prophylaxis for deep vein thrombosis?

Research studies have shown there is a link between flight travel and deep vein thrombosis (DVT) – stasis of blood flow due to immobility during long flights can lead to the development of thrombus formation. The process of blood flow in the leg towards the heart and against gravity is instigated by compression of the veins in the foot and contraction of the calf muscles. Carolyn Collins a postgraduate student in DIT, has designed and assessed an in-flight exercise device (the Tromped) to promote venous return in the seated position during long haul travel.

A prototype design of her in-flight exercise device created to stimulate blood flow in the seated position was haemodynamically assessed by the technique of Air Plethysmography (APG) in ten healthy volunteers. Carolyn carried out the assessment in the Non-Invasive Vascular Unit, Beaumont Hospital. Ejection Volume Fractions (EVF) and Residual Volume Fractions (RVF) were determined in the standing position (control) and compared to those achieved by compression of the device in the seated position.

Another assessment was conducted by Carolyn to determine if any of the in-flight exercises (advised by airlines) conducted in the seated position were efficient at creating venous return. This study consisted of two parts. Volunteers first conducted the standard APG assessment, followed by walking, compression of the Tromped and the three foot exercises in the seated position on a level examination couch.

The second part of the study was conducted in the same manner, however all participants wore Mediven® Travel Compression Stockings. The device was effective at creating venous return, however, the in-flight exercises did not achieve the required ejection volumes, in the



seated position. The Tromped was integrated into an aircraft footrest and an assessment was conducted with 18 volunteers. Four alternative footrest prototypes were compared to tiptoe (control) in the standing position and used in an aircraft seat. None of the footrests achieved the required EVF or RVF values. The Tromped was only efficient in an obese group. The aircraft seat had an incline of approximately 40mm at the rear of the cushion which restricted venous return to the heart. Following on from this, the research concludes that exercise procedures designed to help prevent DVT formation during long haul flights are rendered ineffective by poor seat design.

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Food anxiety when eating out:

Does the food allergic/intolerant guest have cause for concern?

Denise Kelly is a postgraduate student in DIT's School of Culinary Arts and Food Technology. She is supervised by Dr Karen Casey, a lecturer in the school. At the Research Chefs Association (RCA) Annual Conference and Culinology Expo held in Seattle her conference poster was awarded first prize for scientific research. Here she provides us with an interesting insight into her research which evaluates chefs' understanding of food allergy and intolerance, their knowledge of ingredients and their ability to meet the special dietary needs of the food allergic/intolerant restaurant guest.

Introduction

Dining out is fraught with anxiety for food allergic and intolerant consumers. These hypersensitive individuals must protect themselves against accidental exposure to food allergens or suffer the consequences. For some the repercussions can be fatal. Irish food labelling legislation requires food manufacturers to declare the presence of 14 allergens and their

Previous research has shown that a considerable number of unintentional exposures are as a result of eating out in restaurants (Sicherer et al., 2001; Bock et al., 2001). Leitch et al. (2005) found that, in Northern Ireland, one in five peanut allergic consumers are putting their life at risk when they visit a takeaway.

Ahuja & Sicherer (2006) found that while restaurant staff expressed a relatively high comfort level in providing safe meals to allergic consumers, there were deficits in their knowledge base indicating a need for more training and consumer caution. Furlong et al. (2001) identified several pitfalls regarding the provision of safe food in restaurants for peanut/tree nut allergic guests. These included poor communication about the allergy, cross-contamination and hidden ingredients.

Karajeh et al. (2005) and Towers and Pratten (2004) highlighted the very limited knowledge of coeliac disease and food allergies in the

and questionnaires explored their attitude to food allergens and the situation in relation to training and food allergen control systems in food service establishments.

Data analysis included descriptive statistics such as frequencies, percentages, means and standard deviations for quantitative variables. Simple associations between dependent and independent variables were assessed using non-parametric, one-way analysis of variance (the Kruskal-Wallis test). $P < 0.05$ was considered statistically significant. The interview and survey questionnaire data were integrated during the interpretation stage of the study.

Results

Of the 250 food service establishments contacted, 58 returned completed questionnaires ($n=166$). The response rate was 23%. The respondents were predominantly male (75%) with a mean age category of 26-35 years (49%). Twenty-two nationalities were represented

“Findings suggest a lack of knowledge of basic food ingredients and commodities.”

derivatives in food. However, this legislation does not extend to the restaurant menu so food allergic/intolerant diners do not receive sufficient information to ensure their safety when eating out. Consequently these individuals must relinquish control of their special dietary needs to chefs who may not be familiar with food allergy and intolerance.

With a faster pace of life, longer working hours and increased disposable income, 4 out of 5 Irish adults now eat out in restaurants (Amárach, 2007) and research suggests that the prevalence of food allergy and intolerance is increasing steadily (Royal College of Physicians, 2003). Therefore, the food service sector in Ireland has to cater for an increasing number of food allergic/intolerant consumers with special dietary needs.

UK catering industry. This study is the first to evaluate Irish chefs' understanding of food allergy and intolerance.

Methodology

The research was conducted in two phases and converged qualitative and quantitative data in a mixed methods approach. During the first phase, semi-structured exploratory telephone interviews were conducted with 50 head chefs. In the second phase, survey questionnaires were distributed by post to 250 licensed food service establishments nationwide. The survey design was informed by the literature review and exploratory interviews and used elements of Mandabach et al.'s (2005) instrument. Head chefs completed more comprehensive questionnaires than their staff. However, both questionnaires were intentionally brief to promote successful completion. The interviews

and 84% were Irish or European. The majority of chefs who reported their qualifications had a Certificate in Professional Cookery (54%) or a City & Guilds 706/1 and 706/2 (29%) qualification. Fourteen percent had a Degree in Culinary Arts and 10% had no formal training. Respondents included head chefs, sous chefs, chefs de partie and commis chefs in all sections of the kitchen.

Completed questionnaires were received from 54 head chefs and 112 sous, chef de partie and commis chefs. Ninety-three percent of head chefs believe that their kitchen brigade is equipped to meet the special dietary needs of the food allergic/intolerant guest. However, only 21% of head chefs and 46% of the rest could recall hazard analysis training in the control of food allergens or indeed any specific training in relation to food allergy/intolerance



during the course of their careers. Furthermore, while 67% of head chefs reported having a plan in place to provide a safe meal only 33% include food allergen control in their HACCP plan. Just 32% of head chefs ask for accurate written ingredients and notification of changes in ingredients from their suppliers. Just 53% of head chefs reported that food allergens are kept in closed containers and only 32% reported that food allergens are identified by clear labelling at all stages while on the premises. Only 26% of head chefs reported using separate utensils and equipment when preparing allergen free meals and 15% have special instructions in their cleaning schedules about cleaning equipment used to prepare allergenic foods.

Milk (63%), nuts (59%), shellfish (57%) and gluten (52%) were the most recognised major allergens among all the chefs. When asked to list major food allergens 2% listed soy, 10% egg, 17% fish and 18% of them mentioned wheat.

The questionnaire contained seven true/false questions to assess the chefs' knowledge of food allergy and intolerance. They obtained a 75% knowledge score in relation to food allergy and an 18% knowledge score in relation to food intolerance. The chefs' knowledge scores did not differ significantly according to gender, age, position, reported qualifications or nationality.

Four survey questions asked the chef respondents to identify commodities/ingredients that should be avoided when preparing safe meals for dairy allergic, gluten intolerant, egg allergic and nut allergic consumers. The findings suggest a lack of knowledge of basic food ingredients and commodities. For example 48% of chefs do not recognise 'whey' as a dairy protein and 55% of respondents believed 'couscous' to be gluten free.

Conclusions

This research has found that while head chefs throughout the country think their kitchen brigades are well equipped to provide safe meals, there is significant evidence that they lack understanding in relation to food allergy and intolerance. Their lack of knowledge in relation to core ingredients poses a significant risk to the food allergic/intolerant diner.

The reasons for this deficit have not been explored in this study. However, the results suggest a lack of formal training in relation to food allergy and intolerance. The food service sector must work in partnership with legislators, regulatory agencies and culinary educators to address the issues highlighted in this research and to promote food allergy and intolerance education to increase consumer safety. Knowledge is the key to ensuring chefs meet the special dietary needs of their customers and provide them with an enjoyable, safe, anxiety-free meal experience.

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Food and Health

Part-time postgraduate research: an innovative option

Since 2002, Dr Pat Goodman, Faculty of Science, along with his colleagues Professor Matt Hussey and Dr James Walsh have been engaged in a research initiative to provide former graduates with an opportunity to undertake research towards a postgraduate qualification. The graduates all of whom are working in the health service in the field of Clinical Measurement are mostly employed in hospitals. Dr Goodman explains how the process works.

The main points to note about the students are:

- they all work in a hospital or related industry
- they are highly motivated towards obtaining their postgraduate qualification
- their daily work inputs directly into their research so there are benefits to their employers as well as to the research process
- they have the support of managers or senior staff in their organisation who recognise postgraduate research as a valuable continuing professional development option
- they are almost all former graduates of DIT.

“The group has grown to about 12 students but there are many others interested in following the same route”, says Pat. “By April 2008 2 PhDs and 7 MPhils had completed. Later this year another three students (PhD, MPhil and PGDip) are due to complete and one is due to transfer to the PhD register”.

Now that some of the students have graduated, new students are starting to take their places including graduates from DIT’s BSc in Clinical Measurement. “Because the students are professionals, in jobs, and with home and family commitments, they are not able to research full-time. However, they have shown a strong desire to add to the knowledge base and practice within their professions and an admirable persistence and commitment to the task.



Pictured Professor Matt Hussey, left; Dr Pat Goodman, right and Dr Stephen McNally, middle—one of the part-time postgrads who then went on to obtain a doctorate

The quality of their work has been reflected in their research publications in leading peer-reviewed journals and in the awards some of them have received for excellence in medical research” adds Dr Goodman.

“For this part-time research model to be successful we have found it essential that the student’s work is directly related to their research project and serves as a source of data for the research. It is important that the research proposal is designed to maximise the input from their routine work”.

Some of the students are not based in Dublin but provided they have reasonable internet access and are proficient in its use this should not act as a barrier. Group meetings are normally scheduled for a Saturday (about 2 – 4 times each year) so everyone can attend and it doesn’t interfere with their work schedule. Bringing the students together as a group also provides an opportunity to support and encourage each other. “We insist that each student has a work based supervisor – a senior person in their organisation who can assist them and be available locally and routinely”

says Pat. While most full-time students take more than 2 years to complete an MPhil, he finds that the part-time students are more focussed and better at managing their time and tend to complete the MPhil in about 3 years. The students do most of their research in the workplace and have access to the facilities they need. They don’t usually need laboratory space or specialised equipment in DIT.

“Our experience with this group has been extremely successful and rewarding and we plan to continue growing it. We believe this model can easily be replicated in other Faculties, providing graduates of all disciplines with continuing professional development opportunities in postgraduate research”.

**For more information on this programme contact: Dr Pat Goodman
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Food and Health

To the forefront in functional food research



The Functional Ingredient Food Unit (FiFu) and the Postharvest Technology Unit (PTU) have experts in postharvest and nutraceutical research. They are co-ordinated by Dr Catherine Barry-Ryan, Dr Ana Belen Martin-Diana and Dr Daniel Rico who collaborate with researchers in multidisciplinary fields from: Teagasc; University of Limerick; Limerick Institute of Technology; Consejo Superior de Investigaciones Científicas; University Polytechnic Valencia; National University of Ireland Galway; University College Cork; University College Dublin; Trinity College Dublin; and national and multinational food companies. The group has considerable expertise in functional foods and postharvest technology (chemistry, biochemistry and sensory analysis). It is focused on the development of new products fortified with nutraceuticals extracted from natural waste sources and the development of environment-friendly and healthy alternatives to chlorine to extend the shelf-life of fresh-cut products. The main objectives are the analysis of bioactivity and the effect on the quality of the final product and consumer attitudes to these products. The units have successfully obtained an important number of research grants: TSR Strand III (2003-2006

and 2007-2010), FIRM (2006-2009), more than 6 TSR Strand I's (2003–2011) and recently a collaborative network (FIRM, 2007-2013) was granted €1.8 million funding. FiFu and PTU will enhance existing research strength by building critical mass in an area of emerging importance and establishing a research network of excellence. FiFu and PTU researchers publish widely in peer-reviewed journals and participate in national and international congresses. They also address DIT's strategic objectives by providing expertise and information to and supporting innovation in the food and pharmaceutical sectors. They have collaborated with a number of companies including Glanbia, Nature's Best, Bord Iascaigh Mhara, Forlana and Fermo, and plan to maintain and increase their links with industry.

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Dublin Energy Lab

The Dublin Energy Laboratory (DEL) is a leader in science and engineering energy research in Ireland with an associated staff of eleven academics, four full time researchers, eleven full and part time PhD researchers and three MPhil researchers. DEL conducts research across a range of disciplines with key efforts organised into themes of;

- electrical power
- energy policy
- low carbon buildings
- solar energy

DELs mission is to maintain our position as a foremost resource for energy related research and development in Ireland, serving the islands institutional, industrial and academic needs. This is achieved through basic and applied research collaborations closely linked with national and international targets for carbon reduction and growth of a knowledge economy.

The Electrical Power Research Group led by Dr Michael Conlon (michael.conlon@dit.ie) has academic and industrial expertise and is working on a range of projects such as Power Quality Issues in Relation to Wind Energy Integration; Unified Power Quality Conditioner; Intelligent Electronic Transformer; Grid-tie Inverters; Power Quality Monitoring and

Analysis; Wavelet Based Control; Anti-islanding and Distributed Generation; Network Constraints in Transmission Networks; Network Integration of Micro Generation Technologies; Analysis of Network Unbalance with High Wind Energy Penetration; Power Signature Analysis.

Energy policy research led by Dr Aidan Duffy (aidan.duffy@dit.ie) is undertaken by a multi-disciplinary group of engineers, physicists, marketing professionals and architects and is focused on the development of evidence-based policies to: reduce greenhouse gas emissions; increase security of supply; and enhance national competitiveness. The team draws on research carried out by others in DEL as well on national and international developments in the area. Current projects include commercial sector wood fuel supply chain and quality; EFONET energy network foresight; embodied energy research in Irish buildings; energy policy in domestic buildings; and greenhouse gas emissions and land use planning.

Research in Low Carbon Buildings led by Dr Kirk Shanks (kirk.shanks@dit.ie) is being undertaken at both the individual building and building stock scale. Activity at the individual building scale encompasses demand-side and supply-side sustainable energy design strategy, fabric, system, construction and operational issues. This work is supported by physical testing and monitoring suites and computer modelling tools. Activity at the building stock

scale focuses on energy profiling, technology deployment, policy and environmental and socio-economic externalities. Current projects include energy performance survey of Irish housing; feasibility study of large scale solar water heating in hotel; national study on alternative energy systems to meet the requirements of the energy performance of buildings directive.

Solar Energy research led by Dr Sarah McCormack (sarah.mccormack@dit.ie) is working on a range of solar energy related areas with a focus on Photovoltaics (PV). Activities include: investigation of novel designs for solar energy concentration using PV; incorporation of PV into current state of the art devices adding autonomous power functionality; investigation of issues relating to building integrated photovoltaic applications; and feasibility studies of PV and Irish industry for Government based organisations and private companies. Current projects include autonomous lighting systems for buildings; combined PV and cellular antenna panel for building façade integration; PV control system investigation into total and partial shading and non-ideal insolation conditions; quantum dot solar concentrator; use of phase change materials for thermal control in building integrated PV systems. The group holds the Chair of the Solar Energy Society of Ireland and national representative on the European PV technology platform mirror group.

Sustainability

Photovoltaic applications research

The Government's White Paper on Energy has set a series of challenging targets for the energy sector for 2020, with 33% of electricity to be generated from renewable sources. While the focus has been on wind energy and biomass, solar energy and photovoltaics (the conversion of solar energy directly into electricity) can play a contributing part. For Ireland where over 90% of our energy is imported, Photovoltaics (PV) offers the prospect of local electricity supply security. In the short-term, the installation of PV on household, commercial and light industrial buildings can reduce peak electricity demand and improve energy supply security. In the long-term, PV can contribute to energy supply security by reducing reliance on depleting fossil fuels, by increasing the use of indigenous resources and by diversifying fuel sources. In Ireland, due to our climate, there is the misconception that PV technology does not work. However as long as there is sunlight, electricity will be produced and while the output is reduced in cloudy conditions the

technology still produces electricity. There is no detailed monitoring of PV installations in Ireland, therefore there is no reliable data to illustrate the technology's performance in Irish conditions. A project recently funded by TSR Strand III funding proposes to address this using the expertise in DIT in the Dublin Energy Lab and by collaborating with the International Centre of Excellence, the European Commission Director General Joint Research Centre, (JRC), Ispra, Italy. A test facility will be established to determine the performance of different types of PV systems and to optimise system design.

Another main reason cited for the lack of uptake of PV in Ireland is cost. This project will address cost reduction in PV, reducing the unit area required by investigating novel concentrating direct and diffuse solar energy techniques and increasing system efficiency. Collaboration with Imperial College London and University of Ulster will help DIT to develop expert research capabilities in these areas. True costs for PV will be assessed in a financial model which will include total life cycle analysis of the system taking into account as environmental and social aspects. Further institutional and regulatory barriers

to uptake will be examined with reference to specifiers such as architects through questionnaires and industry workshops for industry stakeholders and practitioners.

The project is unique in its multidisciplinary span and breadth of research. It draws together a team of research – and teaching-active academics from the Faculties of Science, Engineering, Built Environment and Business in DIT with knowledge transfer enhanced through collaboration with International solar energy experts. The project will help to realise DIT's strategies to advance research and scholarship through the promotion of world-class inter-disciplinary teams related to teaching. Project research outputs are directly related to many undergraduate and postgraduate modules and project work. Moreover, the work is directly relevant to the proposed BSc in Electrical Services and Energy Management (Faculty of Engineering), MSc in Sustainable Development (Faculty of the Built Environment) and the MSc in Energy Management (Faculty of Engineering).

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Silent nights: transporting goods in city centres

The Department of Transport Engineering at DIT is the only one of its kind in Ireland and has been unique in nurturing powerful links with industry, government and with international bodies.

With its economic growth over the last decade there has been a corresponding increase in the number of night-time deliveries in Dublin city centre. Distributors have had to keep up with demand, be more efficient and avoid traffic congestion and this has led to residents being affected by increasing noise levels. The Department therefore led an Innovation Partnership project to tackle unwanted noise generated by night deliveries. Funded by Enterprise Ireland and a consortium of Irish companies, 'Low

Noise Solutions for Night Deliveries' (2005–2007) developed new and innovative low noise, low cost products and materials for HGVs, ancillaries and delivery sites. A combination of the application of an innovative acoustic coating on the floor of the HGV trailer and tailgate platform in conjunction with the retrofitting of a "hush kit" to the steel roll-cages resulted in a significant reduction in noise levels of approximately 10 dB(A). During field trials it was discovered that there was a significant difference in the noise levels recorded in narrow canyon streets compared with wider streets having lower building heights and wider footpaths. The Dublin Transportation Office also funded a complementary project, 'Silent Nights' (2007) which focused on the perception of noise by residents living in the vicinity of delivery sites. In terms of sustainable surface transport and international research, the Department has been a

partner in FP6 projects such as SILENCE (2005–2008) (dealing with the control of surface transport noise), Bestufs (2005–2008) (Best urban freight solutions) and NICHES (New and Innovative Concepts for sustainable transport at night). SILENCE, which is due for completion in August 2008, has developed technologies for efficient control of surface transport noise, innovative strategies for action plans for urban transport noise abatement and practical tools for their implementation. Partners include Volvo, Alstom and the City of Paris. Bestufs has developed best practices, success criteria and strategies to avoid bottlenecks using City Logistics Solutions (CLS) with partners including PTV Traffic Mobility Logistics (Germany), Rapp Trans (Switzerland) and the University of Westminster.

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Sustainability

Sustainable business

The Faculty of Business and DIT's Sustainability Group recently hosted a symposium on sustainability and business at DIT's Aungier Street campus. 'A Demand-oriented Perspective on Sustainability' sought to encourage research and thinking on issues such as sustainable consumption, corporate citizenship, responsible trade practices and adaptation barriers (economic, behavioural and informational). The half-day symposium was addressed by three leading international speakers and attracted over 80 participants from DIT, universities, business and NGO community.

Thrust of the Symposium

Although sustainability is now a mainstream concern much of its agenda is supply-oriented, driven by perspectives from technology, engineering and science. There is, however, an acknowledged need for a complementary demand-oriented perspective. The Stern Review (2007) and the EU Commission (Towards a 'Post-Carbon Society', 2007) are among a number of bodies calling for greater input into sustainability research from business and humanities faculties. The symposium was a 'first' to respond to such calls on the island of Ireland.

The chief organiser of the symposium, Dr Aidan O'Driscoll, senior lecturer in the Faculty of Business, points out: "Most sustainability research is, understandably, about new technology. But technology and sustainability

are enveloped in people, organisations and society. We in the Business Faculty can help drive the agenda here." He adds: "Sustainability research is fundamentally interdisciplinary – and the funding agencies are starting to appreciate this by ensuring that all research funding applications in the area of sustainability have a business and humanities type input."

International Speakers

Professor Gerard Hastings is founder and director and Ross Gordon a researcher and consultant, at the Institute for Social Marketing – a collaboration between the University of Stirling, Scotland and the Open University, UK. Their jointly developed paper presented by Ross Gordon, examined how companies can apply sustainable thinking to each part of their marketing effort from production to post-purchase service and how behavioural change techniques can be applied in a broader societal context.

Dr Aileen Ionescu-Somers is deputy director of the Forum for Corporate Sustainability Management at IMD, the world renowned business school at Lausanne, Switzerland. The forum is an important research and mentoring body that brings together a significant group of European and global firms committed to implementing sustainable economic, environmental and social policies. Ian Thomson is a Reader at the University of Strathclyde,

Scotland and a chartered management accountant with considerable senior management experience in the public sector. His paper considered the challenges involved in sustainability reporting, triple bottom line practices, and the 'metrics' involved in managing environmental and social accountability.

Future Research

Feedback from the symposium attendees has been very positive. Participants included not only DIT staff but others from the business and NGO community. Business in the Community Ireland (BITC), IBEC, Dublin Chamber of Commerce, Comhar, Accenture, Sustainable Tourism Ireland and Partas were all represented.

It is hoped that the symposium will galvanise further effort in the Faculty of Business and beyond in progressing a relevant research agenda, developing mentoring and advisory expertise and preparing teaching modules and programmes. The papers from the symposium and a podcast will shortly be available on the 'sustainability and business' section of the DIT Sustainability Group website.

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Highlighting key issues
for freight transport

A major report on the freight transport industry on the island of Ireland was published recently by InterTradeIreland. The National Institute of Transport and Logistics (NITL), an integral part of the Faculty of Engineering, was part of the consortium which carried out the research. The purpose of this research was to provide policy makers and industry stakeholders with an increased understanding of the role of the freight industry and therefore influence

policies that act to increase the competitiveness of the sector on the island of Ireland, enabling it to compete more effectively in an ever more competitive global market. The report sets out the key issues for freight movements in both jurisdictions over the next 10–15 years. The genesis of this research was a submission to InterTradeIreland from the IBEC-CBI Joint Business Council on behalf of its North South transport group members. The research examined current freight flows throughout Ireland and how freight moves between both jurisdictions and Britain, the rest of the EU and the wider global economy. It involved:

– **Development of a baseline of current freight characteristics and projections for the future.** Through review and analysis, a baseline was established in order to understand the existing and future demand for freight movement. The assessment of future demand takes account of economic, demographic, land use and logistical developments.

– **Identification of the opportunities, constraints and key issues for improving and developing freight transport in the island of Ireland.** Stakeholders from different economic sectors, geographical regions and all freight

Sustainability

transport modes were consulted on current policy measures and initiatives and on future opportunities and constraints.

Based on this work, the report sets out a number of policy options for consideration in improving the provision of freight and logistics services across both jurisdictions. The most critical of these are:

- to improve data collection and forecasting of freight transport;
- to increase port capacity and target bottlenecks in the road network;
- to co-operate North-South and East-West to regulate and support the freight industry;
- to involve hauliers in transport planning.

NITL is involved in a wide range of academic

and applied research – the freight transport study outlined above is just one example. The concept of supply chain management (SCM) is central to all of this work. A recent book 'Perspectives on Supply Chain Management and Logistics: Creating Competitive Organisations in the 21st Century' (edited by Edward Sweeney and published by Blackhall Publishing), explores SCM in terms of its strategic and financial dimensions, from customer and supplier perspectives, and examines new challenges as a result of recent developments in information and communications technology (ICT). Speaking at the book launch recently Edward Sweeney, noted that, 'against a background of increasingly rapid and at times discontinuous change, companies need

to consider the broader value of SCM in creating a differentiated business model that determines competitive advantage in the judgement of customers. Recent economic developments have sharpened the focus on the need for innovative thinking in this area'. Professor Brian Norton, President of DIT commented that, 'this new work is based on the unrivalled experience of NITL in the supply chain logistics field. If Ireland's aspiration of becoming a true knowledge economy is to be realised the management of global supply chains needs to be a key focus.

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Bringing the very best to DIT

The Science Foundation Ireland Stokes Professorship and Lectureship Programme is designed to support strategic planning to increase the number of research active faculty members in Irish third level institutions. The Programme is named after Sir George Gabriel Stokes (1819-1903) the Irish mathematician and physicist who was born in Skreen, Co. Sligo. Under the first Science Foundation Ireland Stokes Programme competition, DIT's School of Electronic and Communications Engineering at the DIT was successful in being awarded a Stokes lectureship in the area of photonics. The successful appointee is Dr Qiang Wu, who is currently at Heriot-Watt University in Scotland. The Stokes Lectureship is funded by SFI for a period of five years, to a total value of €450,000. Dr Wu will work within the Photonics Group in the Applied Optoelectronics Centre at the School. The Group has developed significant expertise in a range of areas, in particular in optical fibre sensing. Dr Wu's research will focus on multi-axial sensing using fibre Bragg gratings (FBGs). FBG's are one of the most successful optical fibre sensing technologies for sensing strain and temperature. It offers a range of advantages compared to electrical counterparts such as operation over long distances and immunity from electro-

magnetic interference. To date, a large amount of research has been carried out worldwide on sensing using FBGs in civil structures and other applications. However, typically strain is sensed along one axis only. In this research, a number of techniques for multi-axial strain sensing will be investigated. Dr Wu undertook his PhD research on multi-channel dispersion compensation with FBGs, after which he undertook postdoctoral research at City University, Hong Kong, before taking up his present post at the School of Engineering and Physical Sciences at Heriot-Watt University. In total DIT was awarded two professorships and three lectureships in a grant worth €3.3m

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Long term research partnership pays off when the bubble bursts

The Non-Linear Materials Research Group (NLMRG) under the direction of Dr Steve Jerrams, Head of Research, is going from strength to strength by bursting bubbles to predict the dynamic properties of elastomers.

The group are commercialising their unique DYNAMET test facility following Proof of Concept support from Enterprise Ireland. The facility delivers accurate multi-axial dynamic data for rubber compounds in diverse loading conditions and over stress ranges that cannot be matched anywhere else worldwide. In a joint programme with Warsaw University of Technology, the team are enhancing the capability of DYNAMET to include fatigue testing of magnetorheological elastomers (MREs) to be incorporated into helicopter landing gear for Swidnik PLZ, the leading Polish aircraft manufacturer. These tests will be carried out over a temperature range of -50°C to 150°C. In another spin-off from the elastomer test programme, postdoctoral researchers will provide dynamic characterisation of biomaterials and soft tissue mimics in a scheme funded by a DIT Capacity Building Scheme (CaBS) and managed by Dr Jacinta Browne who leads the Medical Ultrasound Group (MUG) in the School of Physics. All of this research stems from the strong relationship DIT has with DIK, Hannover, the German Institute for Rubber Technology, that stretches back to 1995. The German Institute is widely regarded as the best in its field in the world. DIT bucks the trend; when bubbles burst good things happen!

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Materials and Engineering

Leaders in holography research

The Industrial and Engineering Optics (IEO) Centre has been active for almost a decade in holography research. New photopolymer materials for making holograms and the sensing and measurement applications of those holograms have been key areas of activity.

Exciting opportunities have recently arisen to develop the commercial potential of several lines of IEO's research. The first is a photopolymer hologram fabricated so that the holographic image changes colour as the humidity of the environment changes. This means that the internal environment of a package can be monitored by observing the colour of a hologram 'sticker' applied to a transparent cover, lid or container. The hologram, which can display the company logo, text, and/or numerical data, can serve a security/authentication function as frequently seen with regular security holograms. However this hologram has a novel way of proving its authenticity; it's the only hologram that changes colour when you breathe on it!

Applications are expected to be in packaging of pharmaceuticals, consumer electronic goods, software and disk packaging where brand protection is essential. A patent application was filed in November 2005 and a commercial prototype has been prepared and will shortly be tested by a major UK supplier of security holograms. The work was funded by Enterprise Ireland's commercialisation fund. Drs Izabela Naydenova and Raghavendra Jallapuram are the key researchers on the project and the Principal Investigator is Dr Suzanne Martin.

Another line of research with significant commercial potential is a low cost alternative to Laser Doppler Vibrometry (LDV), also funded by EI, which is being developed with Dr Michael Connelly of the University of Limerick, and Dr Maurice Whelan of the European Commission Joint Research Centre at Ispra in Italy. The DIT partners are co-ordinating the project and have responsibility for the design of the novel optical head which has



Researchers in the IEO Centre

significant advantages in terms of cost and function over commercially available systems. In early 2007 Dr Vincent Toal was awarded a three-year Technology Development grant to pursue this work further and to file a patent application.

More recently the IEO has begun to explore entirely new techniques in hologram fabrication which have great potential for environmental and biosensing as well as optical data storage. Some of these techniques can be adapted to fabrication of optical components and complete optical systems and subsystems.

The IEO centre aims to maintain a balance of strategic academic research with more commercially focused research projects, so that there is a constant source of new ideas for development as well as successful commercialisation. The input from the School of Physics is crucial to this balance. Other projects currently running include an SFI Research Frontiers Programme grant held by Drs Toal and Naydenova, four Strand 1 grants and two DIT Faculty of Science funded Scholarships. Strategic research results will continue to be published regularly at international conferences and in reviewed journal

papers, while the intellectual property associated with the centre's commercial projects will be protected through patenting. The patenting office at Enterprise Ireland and DIT's own Technology Transfer Office provide support. Between 2004 and 2007 IEO published 14 papers in peer reviewed journals and filed three separate patent applications. Three more are in preparation. In the same period three IEO postgraduate students graduated with their PhDs (Sridhar Reddy Guntaka, Raghavendra Jallapuram and Michael O'Hora) and two obtained MPhil degrees (Carol Armstrong and Hosam Sherif). Over half a million Euro was obtained in external funding in 2006 alone, allowing the centre to recruit six new postgraduate students, as well as retaining current postdoctoral fellows. A new SFI-funded postdoc, Dr Tzvetanka Babeva joined the centre in 2007 and Dr Emilia Mihaylova returned from the Agricultural University of Plovdiv in Bulgaria. The IEO centre is also part of an established COST Action "Optical Micro-Manipulation by Nonlinear Nanophotonics".

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Materials and Engineering

New temperature sensor

The Photonics Group in the Applied Opto-electronics Centre have developed a new type of wide range temperature sensor. The sensor is based on a singlemode optical fibre and is disposable with a wide measurement range and a competitive resolution.

The inventors are Mr Ginu Rajan, who is completing his PhD with the group, Dr Yuliya Semenova and Dr Gerald Farrell, the group leader. A patent for the invention has recently been applied for (Patent pending, UK Patent Application No 0803583.4). Additionally the group have just secured funding of over €88,000 from Enterprise Ireland's Proof-of-Concept Commercialisation Scheme to help commercialise the invention.

Optical fibre sensing (OFS) of temperature offers a range of advantages by comparison to electrical counterparts, e.g. immunity from electrical interference, chemical resistance

and wide range. The sensor's key specifications are a temperature range up to 700°C and a resolution 0.5°C.

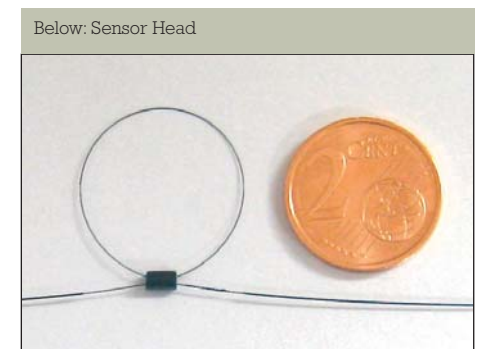
Disposable sensors based on singlemode fibre are very rare and this has meant that optical fibre temperature sensors, even with their accepted advantages, have still not been able to compete with low cost electrical temperature sensing such as thermocouples. Disposability opens up new temperature sensing applications for optical fibre.

A good example is the ability to embed the sensor in a thermosetting resin based component as it cures. By virtue of their superior properties, advanced composite materials are currently attracting considerable attention for use in a variety of load-bearing structures such as helicopter rotor blades, aircraft wing structures and other high-performance applications. The manufacture of high quality

composite structures can benefit significantly from the integration of sensors into the material to measure the internal temperature while the component cures.

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Antennas that will see through walls

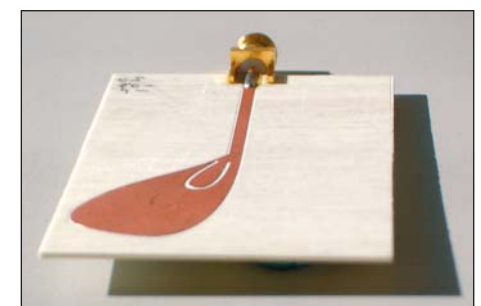
Enterprise Ireland's Commercialisation Fund has backed a new antenna research project at the Dublin Institute of Technology. The Antenna and High Frequency Research group have created an advanced approach to designing Ultra Wideband (UWB) antennas that will allow exploratory vision systems to search for cancerous tumours or disaster victims trapped within collapsed buildings. UWB precision radar imaging technology – 'see-through-the-wall' radar – can be used in an emerging range of new civil applications.

The research team has developed new antenna designs that increase the levels of accuracy of UWB radar systems. In turn, improved accuracy of UWB radar will ultimately allow developers to create devices that will be widely promoted in the US and EU within a few years. Dr Max Ammann, Senior Lecturer, School of Electronic and Communications Engineering, anticipates "that this work will build on our strong record of helping to bring

new technologies to the market place. This is just the latest stage in that process".

The UWB technology that is being developed may also have extensive application in the communications arena, in terms of allowing laptops to connect wirelessly to office networks, delivering wireless connections between consumer electronics devices or facilitating data streaming from a camcorder to the hard drive of a PC.

The AHFR team at DIT has carried out extensive research in the application of UWB technology for communications purposes. Last year, the team developed new antenna designs to allow for high speed links between communication devices. They have advanced analysis and optimisation techniques that allow them to tailor designs specific to the required application. In addition, vehicular or automotive radar systems are currently being promoted as another possible use for UWB



The prototype spline-shaped directive antenna

technology. These systems can potentially be used to improve automotive safety through collision avoidance systems, safer use of airbags, restraint system arming, and parking assistance.

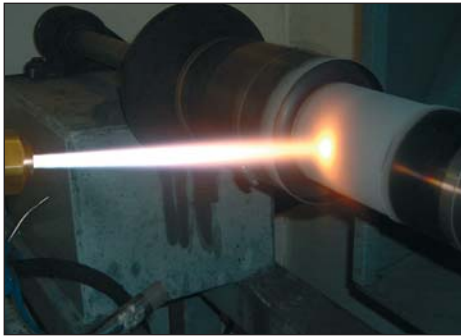
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Materials and Engineering

Social, Business and Economic Development

Corrosion resistant coatings



Researchers in DIT are working on a new coating technology funded by Enterprise Ireland's Proof of Concept scheme. It is driven by the global desire for sustainable materials especially in sectors where low-cost recyclable systems are needed to replace high-cost pump materials. This technology will eliminate the need for high-cost steel alloys by incorporating thin thermal spray coatings on relatively inexpensive cast aluminium alloys with improved wear resistance. These coatings will then be sealed using a novel technology recently developed in DIT to enhance the corrosion resistance properties of such alloys. The coating will be hydrophobic (water repellent) and in addition will possess vastly improved service performance. Preliminary corrosion work has indicated that Life-To-Failure of these advanced sealed coating systems can be improved by up to 500%.

Initially the project will focus on industrial-grade waste water pump systems. Current pump designs use cast iron and stainless steel. However, stainless steel alloys are very expensive and can increase production costs by over 300%. The industry hasn't yet discovered replacement options for these materials. If the coatings are successful the corrosion prone iron-based alloy housings could be replaced with low-cost, light-weight, cast aluminium alloy housings, significantly reducing costs and giving superior handling characteristics and improved recyclability.

One of the most novel aspects of the project is the use of relatively thin coatings which will minimise impact on design tolerances. In addition, the efficacy of the solution – high corrosion and wear resistance – will impact on the fluid flow features of the water pumps and could improve energy efficiency by over 60% – reducing both the running and maintenance costs for the end-user. The project will use a range of thermal spray powders – some based on fine nanoparticles – with the application of a novel generic sealant technology capable of performing over a wide range of harsh environmental conditions. The system represents a “Green Chemistry” approach to solving the concerted effects of wear/corrosion. The coating/sealant technology will be assessed using a range of physical wear/abrasion and electrochemical methods with microscopic and other techniques to determine the performance characteristics of the applied coatings.

Information gathered from this project could benefit other industrial sectors including the marine and aerospace industries where a combination of wear and corrosion (tribo-corrosion) can occur.

The project is led by Dr David Kennedy, Department of Mechanical Engineering, DIT, with the help of Dr Tony Betts (DIT) David Culliton (DIT), Dr M Mathew (University of Minho, Portugal) and Dr J Stokes (DCU).
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Talking research

The Discourse Analysis Group (DAG) was formed by DIT Faculty of Business staff and postgraduate students in October 2003. It has hosted 23 seminars to date with contributions from academic staff and postgraduates from across the institute.

The topics have ranged from the identity talk of pre-schoolers to discourses of creativity in advertising agencies and from the pragmatics of Friel's plays to the construction of volunteer identity. Most recently, Rachel Kiersey from DIT's Centre for Social and Educational Research gave a presentation on her research on Ireland's report in relation to the United Nations Convention on the Rights of the Child.

The DAG is interested in researching discourse (from talk to text to music) in itself and in its function. Though it is a focussed research group the trans-disciplinary nature of discourse analysis means that it is particularly suited to its DIT environment with great potential for inter-faculty synergies. Anyone in DIT working in or with an interest in discourse analysis is welcome to join DAG especially if interested in making a presentation to the group. Seminars are generally convened to facilitate the work of presenters and announced about two weeks in advance. The DAG website has more details, profiles of researchers, seminar information and links to publications.

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DIT receives prestigious international award from the United Nations

DIT has received an international award from Dr Rupert Maclean the Director of the United Nations, UNESCO-UNEVOC International Centre for Education, Bonn, Germany. This is to acknowledge the proactive work carried out by the UNESCO-UNEVOC National Centre for Ireland which is run by DIT's Skills Research Initiative.

In the formal announcement letter sent to Professor Brian Norton, President of DIT, Dr Maclean said: 'It is with great pleasure and pride that I present this UNEVOC Centre Award to DIT in recognition of your Institute and its continued efforts in furthering UNESCO goals in technical and vocational education and training as part of the UNEVOC Network. We hope this Award will enhance the status and presence of the Network as a whole, and serve as an incentive to promote closer knowledge sharing and co-operation between Network Members'.

Professor Norton welcomed this announcement and stated, 'It is a great privilege to accept this International Award on behalf of the Institute. This award clearly demonstrates that DIT's expertise and standards of excellence in technical vocational education and training are comparable with best international practice. It displays the Institute's commitment to operating at the highest international level and making a positive contribution to knowledge sharing and collaboration with the 220 UNEVOC Centres located in over 120 countries from both the developing and

developed world. I would like to credit DIT staff for achieving this international acclaim in its first year of operation'.

In 2006, DIT began the formal application process to become the UNESCO-UNEVOC National Centre for Ireland. The Director of the International Centre formally appointed DIT as the UNESCO-UNEVOC National Centre in April 2007. Since then DIT Skills Research Initiative has coordinated its activities. This involved proactive participation in the UNEVOC Network E-Forum sharing knowledge, expertise and experience on quality assurance; accreditation; qualifications; curriculum development; and skills development in relation to technical vocational education and training.

The UNESCO-UNEVOC National Centre developed a close working relationship with the Head of the UNESCO-UNEVOC International Centre (Dr Munjanganja) who visited DIT in August 2007. Since then the Centre has worked on developing collaborative projects to explore the enhancement of the capacity of the UNEVOC Network. DIT has now been chosen as a partner and a venue to host an international UNEVOC Network 'Experts consultation and capacity building' event in August 2008. To facilitate the attendance of participants from UNEVOC Centres in developing countries, Dr Munjanganja has acquired funding from UNESCO and recently, 'InWent' a Germany based not-for-profit organisation who specialise in International Capacity Building programmes, has agreed to

become a partner in this project and provide some sponsorship.

This project is a unique opportunity for DIT's National UNEVOC Centre to make a leading contribution to the development of strategy and policy relating to future developments of the UNESCO-UNEVOC Network. It offers a valuable environment to engage with international experts to share knowledge and expertise and create the conditions for future research and scholarship. The Skills Research Initiative would like this forthcoming event to:

- Increase their international standing and reputation in the TVET area.
- Afford opportunities for DIT academic and research staff to meet with other international experts and develop collaborations.
- Showcase the expertise of DIT academics in skills, craft and apprenticeship.
- Strengthen DIT's relationship with international organisations.
- Act as a stimulus for the development of future research and scholarship projects, consultancy work and exchange visits between staff and students.

**Any Irish organisation or individual who would like to contribute to this event directly or sponsor travel and subsistence costs of UNEVOC Centre participants from developing countries can do so by contacting Dr Aidan Kenny
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Social, Business and Economic Development

Poverty, social exclusion and holidaying: towards developing policy in Ireland



A research team at Dublin Institute of Technology, funded by the Combat Poverty Agency, has investigated how promoting access to annual holidaying can help combat social exclusion for children and families experiencing poverty. The research findings will stimulate debate on the need for developing social tourism policy and the investment of state and private sector resources, in the area. The final report examines a range of policy rationales and reviews developments in policy and practice in other EU states.

The study found that extant provision in Ireland is predominantly dependent on NGOs. Public support is modest, ad-hoc and informal, while private sector involvement is rare. Extant provision is poorly integrated into the array of supports offered to children and families experiencing disadvantage.

The findings argue that access to an annual holiday generates benefits. Specifically it found that the structured child-centred holidays studied broadened children's social horizons.

They created opportunities to learn and acquire new skills, offered exposure to positive role models and promoted positive behavioural change. In addition, further benefits were generated for guardians and the wider family unit. The policy implications of these findings are considered in a Working Paper entitled 'Poverty, Social Exclusion and Holidaying: Towards Developing Policy in Ireland'.

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Legal eagles soar in research

In addition to offering several innovative programmes in law to over 400 students, the Department of Law is active in the field of legal research. In the past 2 years alone, 11 staff members have completed 8 new texts, 3 commissioned reports and a large number of published essays, articles in leading academic publications and papers at national and international conferences. The Department has also hosted conferences and seminars on issues as diverse as Employment Law, the EU Constitution, the War on Terror and Data Protection. While it is difficult to do justice to the breadth and depth of this research, some important examples are highlighted here.

Dr Elaine Fahey is the author of two recent texts on references to the European Court of Justice and on Irish Tort Legislation respectively. She is the editor of the new monthly European Law journal as well as author of several articles in leading academic publications, including European Public Law, the Bar Review, the Dublin University Law Journal, and the Irish Journal of European Law.

The second edition of Bruce Carolan's acclaimed European Union Law for Irish Students (Gill and Macmillan, 2008) hits the shops in 2008,

as does the third edition of Eavan Murphy's popular text on Irish Company Law. Meanwhile Geoffrey Shannon's Divorce and the Law (Thomson Round Hall, 2007) adds to an already impressive repertoire that includes over ten major texts in as many years from an author who is widely acknowledged as one of Ireland's leading authorities on Family Law.

This year also marks the publication of the second edition of Dr Fergus Ryan's popular Constitutional Law, which follows on the 2006 publication of Contract Law. Additionally, Fergus has, since 2006, co-authored two reports for the Irish Human Rights Commission. He regularly appears on national and local media (including RTÉ, Newstalk and TV3) speaking on a variety of legal issues, and is widely published in academic journals and essay collections.

Dr Stephen Carruthers, an expert in European Union Law, Human Rights and Refugee Law, has recently published in the European Human Rights Law Review, while Niall Neligan's recent work on aviation law and policy, criminal law and employment law features in the Bar Review, the Commercial Law Practitioner and the Irish Criminal Law Journal as well as the Irish Independent and Sunday Business Post. Ruth Cannon's Land Law remains a vital source for Property Law students. Ruth has been also active in various committees studying property law reform, and has been instrumental in forging reform in this complex area.

Mary Rogan's work on criminal justice, prison policy and victim's rights has resulted in several seminal articles for the Irish Law Times as well as many well-received conference papers. She has also authored a policy paper on Sexual Offences and Trafficking for the Irish Human Rights Commission.

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Social, Business and Economic Development

Researching entrepreneurship challenges



The Institute for Minority Entrepreneurship (IME) was founded in Dublin Institute of Technology (DIT) in 2006 with the objective of bringing real economic opportunities to people who are considered

to be on the margins of mainstream Irish society. The mission statement for IME is "to offer all of the people of minority groups in Ireland equal opportunity to maximise their economic and social potential through entrepreneurship research, education, training, and mentoring." Minority entrepreneurship has been broadly defined by the Institute to be inclusive of those communities who are generally regarded as being marginalised or in any other way socially disadvantaged in Irish society in terms of entrepreneurship. The following groups are considered by the Institute to be 'minority entrepreneurship groups': ethnic; 'grey' (over 50 years of age); disabled; travellers; gay; Irish-speaking; young offenders; and socio-economically disadvantaged.

The ambition of the Institute is to undertake a detailed study of the challenges facing each community through a multi-disciplinary approach. Based upon these studies, specially designed entrepreneurship programmes are then developed for each community. IME has recently completed a programme for female travellers in Tallaght and has hosted the First Eastern European Business Forum. The Director of the Institute for Minority Entrepreneurship is Dr Thomas Cooney and further information on its work is available at www.ime.ie.

A new book detailing entrepreneurship and innovation policy across 14 European countries was written as part of the (Innovative Policy Research for Economic Growth) IPREG project. Its core objective is the facilitation of a "network of networks" to address one of Europe's most critical issues – empirically relevant research on growth policy. IPREG encompasses researchers, policy-makers and business people from each of the 14 countries: Sweden, Germany, Belgium, Czech Republic, Hungary, Norway, Spain, Finland, United Kingdom, Denmark, Portugal, Poland, Greece and Ireland. The Irish research is led by Dr Thomas Cooney.

The book is focused on the development of start-up and early-stage growth of entrepreneurial firms and entrepreneurial firms engaging in innovation. Accordingly the work has significant implications for stakeholders in the IPREG triangle. Ultimately, through the information generated by this project, policy makers will have the opportunity to gain insight into the limitations faced by entrepreneurs within the context of the countries involved. This international network will allow policy makers to observe best practices in other countries and can inspire new initiatives to remedy problems uncovered.

The development of a structure for further research on the evaluation and implementation of entrepreneurship and innovation initiatives by academics involved in the project will enable the construction of a tangible knowledge base which will detail the comprehensiveness of growth policy in Europe. As a result of this, the national approach to growth initiatives may be significantly improved and levels of entrepreneurship will have the opportunity to reach their full potential.

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Food for thought

The findings of the 2007 Dublin Visitor Survey were launched in April at the Guinness Storehouse. The launch was hosted by DIT's Tourism Research Centre and Dublin Tourism with support from Guinness Storehouse. The audience were provided with key findings from the TRC's annual survey of 1,000 overseas visitors to Dublin, conducted via face to face interview at various locations around the city. The survey explores some 40 aspects of visitor attitudes, behaviours and perceptions of Dublin and their stay here.

The survey indicated that 2007 was another great year for tourism in the city with 95% of respondents agreeing that 'the people are friendly and hospitable' and 90% indicating they are 'likely to return again!' But who is visiting Dublin and what are they doing while they are here? The report offers some interesting insights such as:

- Only 4 % of those interviewed were visiting in a family group with children under 17. This raises the question – does Dublin city offer a family friendly environment?
- An aging population with more disposable income and mobility to travel is not a new phenomenon, but is Dublin on the 'must visit' list for the 55+ age group? Apparently not, as this segment accounts for only 16% of visitors surveyed.
- There was growth in the 'non' hotel accommodation sector – the little guys are fighting back! After 5 years of decline, bed and breakfast accommodation has shown an upturn, as have youth hostels – up 2% and 7% respectively.

For more information or a copy of the report contact: tourisminfo@dit.ie

A special interest in consumption and leisure

At the beginning of the year Dr Paddy Dolan and Olivia Freeman (School of Marketing) established the Consumption and Leisure Studies special interest group (CLS). They are interested in pursuing and disseminating research in the broad field of consumption and leisure, including sport and tourism practices. Research will not be restricted to any particular academic discipline or theoretical approach and although it was founded in the Faculty of Business participation from researchers based across the entire Institute is encouraged.

A seminar series is underway and working papers from these are available on the CLS website (www.dit.ie/cls). To date, Dr Paddy Dolan, Olivia Freeman and Dr Eddie Brennan (School of Media) have delivered talks on the sociology of living standards; relations between products and childhood identities; and the localisation of television formats.

Two more seminars took place in May with presentations from Sean Dunne (School of Marketing) and Anthony Quinn (School of Media). These seminars are a great opportunity for researchers to discuss their findings and get valuable feedback prior to submission to academic conferences and journals.

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Retail research

A group of researchers in the School of Retail & Services Management is focussing on the increasingly technical nature of the global retail industry. The research interests of the DIT Retail Research Unit include contemporary issues in the retail environment, efficient supply chains, inventory micro-management and on-shelf availability of goods. They are also interested in research in the areas of store location, servicescapes and retail performance measures. The Unit has acquired proprietary software for category management, geographic information systems (GIS), CAD for store design and is currently working with a major industry sponsor on the development of a retail technology virtual laboratory.

Most of the big international retailers now have a presence in Ireland so Dublin, in many respects, is a microcosm of the world retail market. Research on the Irish market inevitably links into the bigger international context in the sector. The DIT Retail Research Unit has prepared reports, organised seminars, delivered academic conference papers, made contributions to industry and academic journals and provided broadcast media commentary. Increasingly, the Unit is being asked to carry out consultancy projects both for retail companies and for the international consultancy world. The DIT Retail Research Unit is interested in collaborating with international academics interested in researching the retail sector.

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Transcultural research

DIT's Centre for Transcultural Research and Media Practice (<http://ctmp.dit.ie/>) offers a distinctive, interdisciplinary postgraduate and research environment, dedicated to scholarly and public understanding of migration, transcultural relations and new and established identity formations in Ireland and beyond. The Centre promotes the innovative use of lens and screen-based practice (film, photography and multimedia), allied to traditional scholarly methods in social research. Dr Aine O'Brien and Dr Alan Grossman are co-directors of the Centre and currently there are 11 doctoral students.

The work of the Centre dates back to an inaugural conference in 2001 titled 'Migration and Location: Visual Media Research'. In this context international media practitioners, activists, migrant constituencies, NGOs, voluntary sector workers, academics and policy makers came together to present transnational media projects on the subject of migration. What emerged from this forum was recognition of the transformative role and impact of media in representing the everyday reality of the immigrant experience. The critical use of media in response to questions of social justice remains a central and organising concern of the Centre, disseminated through documentary film, photographic exhibitions, installation, CD/DVD-ROM, online distribution and written publications.

The Centre has recently published *Projecting Migration: Transcultural Documentary Practice*, edited by Aine O'Brien and Alan Grossman (Wallflower Press). An integrated book/DVD-ROM anthology comprising contributions from international scholars/practitioners provides a timely foregrounding of audio and visual practice-based scholarship as a trans-disciplinary engagement with the material and embodied dimensions of migration.

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The IMAAS Project

IMAAS (Interactive Music Archive Access System) is an inter-institutional and cross-disciplinary research initiative between DIT and Cork Institute of Technology (CIT) and in association with the Irish Traditional Music Archive (ITMA). The aim of this joint venture is to develop and implement a system that will enable remote online access to an audio music archive such as that at ITMA.

Specifically, the essence of the project is to develop a range of enhanced methods and novel tools for remote interactive access to music audio archives to cater for the needs of a wide variety of user groups, including the casual listener as well as the professional ethnomusicologist. These new techniques will provide an opportunity for the introduction of value-added services tailored to the needs of such users.

An important element of this major task, which embraces both the technical and musical domains, is the digitisation and transfer to CD format of a significant part of the large collection of 78 rpm records which are preserved in ITMA. In addition, it will be necessary to extract 'meta data' relating to this material, and also to notate the tunes in a number of specific formats.

This project embraces a range of diverse academic and research disciplines, including music technology, digital signal processing and Irish traditional music. It draws on the combined expertise and skills of a number of specialist research staff and post-graduate students in DIT under the direction of Dr Eugene Coyle, in CIT under the direction of Dr Matt Cranitch, Dr Nicholas Carolan, director of ITMA. This innovative work is being funded for three years by Enterprise Ireland (Commercialisation Fund) and also by a grant from the Arts Council (Deis Scheme for the Traditional Arts).

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Experimental gaming

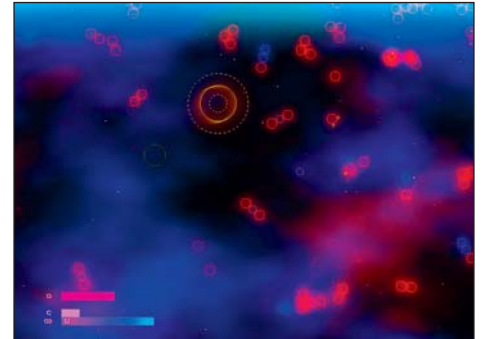
The DIT Experimental Gaming Group (EGG) is a cross-faculty research group active in the area of digital games. The EGG has members from DIT's School of Computing, Digital Media Centre and Learning Technology Group. Leading members of the group include Bryan Duggan, Hugh McAtamny, Brian Mac Namee, Kevin O'Rourke and Pauline Rooney.

The main work of the group is in the area of serious games. Serious games are games developed to do more than simply entertain – typically educate, train, and advertise. Significant serious games projects developed by the EGG include grangegorman VR, Serious Gordon, and Contamin8.

The grangegorman VR project was developed as part of the DIT plan to move to a new campus in Grangegorman. Using freely available commercial games tools the project created a virtual model of the campus that has been used as part of the master planning process to give Grangegorman residents, DIT staff and planners a clearer view of what the campus will look like. Both Serious Gordon and Contamin8 were developed in collaboration with DIT's School of Food Science and Environmental Health and use serious games technology to teach food safety to kitchen workers.

In Serious Gordon the player takes on the role of a kitchen porter on their first day at work. Interacting in a fully immersive three dimensional environment, the player must perform tasks given to them by a head chef character with whom they interact. Contamin8 is a simpler puzzle style game in which the player attempts to fulfil orders in a kitchen whilst avoiding contamination of foods, kitchen implements and kitchen surfaces.

Both of these games achieve the task of teaching the fundamentals of food safety in an interactive fun way. More recently final year undergraduate students have undertaken



projects within the EGG. These have included serious games focusing on global climate change, a high fidelity physics simulation of wind turbines and mixed reality games which join together real and virtual objects to create uniquely interactive experiences. Other significant activities include hosting the 9th International Conference on Computer Games: AI, Animation, Mobile, Educational & Serious Games and hosting an annual game design workshop for secondary school students with famed game developer Ernest Adams.

For further information on EGG's activities visit: www.seriousgames.ie

ICT, Arts and Media



Common interests in engineering and science: DIT and UL collaborate

This new initiative has established a Common Interest Group (CIG) to reflect shared research interests in DIT and UL and to foster postgraduate research development. Research students who successfully complete the programme will be awarded joint research degrees from DIT and UL, graduating from one of the two institutes. The common areas of interest identified for this scheme are; Energy, New Materials, Assistive Technology, and Engineering and Science Pedagogy.

A competition for Research Student Scholarships was held among CIG members and five applications, one more than originally expected, were successful. Each project will have joint DIT and UL supervisors and student mobility between institutions is encouraged. Scholarships are initially awarded on a two year (MPhil) basis with opportunity for transfer to PhD as appropriate (with extension of funding). The successful scholarships were awarded in the areas of New Materials and Assistive Technology.

Similar joint awards will be made for partnerships with Warsaw University of Technology (WUT) and Université de Nantes. Interdisciplinary and inter-institutional international partnerships are central to high quality academic research.

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Applying the arts

Research in applied arts is organised around four main themes, which encourages close co-operation between researchers and research centres and units. Each centre has a particular focus within which the various themes can be addressed.

Research Themes

- **Intelligent and Interactive Media Content and Applications:** Research is focused on creative and cultural applications of intelligent content, geospatial imaging, interactive 3D interfaces and social/community portals.

- **Transforming Cultures and Social Justice:** Research encompasses processes of cultural change and social intervention in Ireland and internationally, including issues of migration and new modes of citizenship; gender, sexuality and the law; diversity and equality issues; juvenile crime and youth justice; and media, technologies and civil society.

- **Education, Social Context and Policy:** Research is focused on early childhood care and education; higher education and pedagogy; social care/alternative care.

- **Performing cultures and public life** brings together significant expertise from across all visual and performing arts. It is particularly interested in developing practice-based methodologies to integrate critical inquiry with visual imagery, musical performance and public exhibition.

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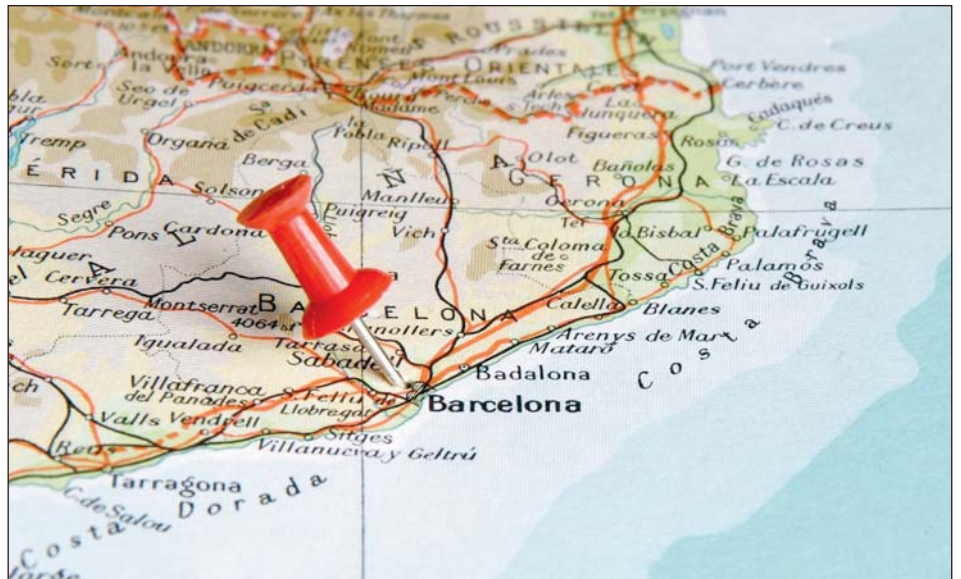
Major European e-government project

A €5million project funded through the European Sixth Framework programme will develop a prototype approach for effective e-access to city administration. Dublin Institute of Technology is overall co-ordinator for ICING, and the project is managed from the Digital Media Centre in DIT. ICING will research a multi-modal, multi-access concept of e-Government. The model 'thinskin City' will be sensitive to both the citizen and the environment through the use of mobile devices, universal access gateways, social software and environmental sensors. Intelligent infrastructure will enable a Public Administration Services layer and a Communities layer.

Communities will interact with the infrastructure to avail of services created by the administration, and will also create their own information-based services.

ICING will conduct research into eCommunity and Usability and also into two-way interaction with the physical environment. The research will focus on: embedded intelligence, tighter integration of operator platforms and city infrastructure to enable novel services, empowerment of citizens to evolve systems of interaction with the city via social software, input from citizens and sensors for management systems and decision modelling, and a combination of city systems and multi-modal, multi-device communications to provide enhanced services.

The technology platform will gather indicators from the City, process the information, propose actions to be taken with human intervention and supervision and connect the City with its constituency. Services and information will be delivered on a range of commodity devices, providing greater reach



and accessibility to local government and communities. Solutions will be tested in 'City Laboratories' in strategic city regeneration districts, 22@ in Barcelona, Grangegorman in Dublin and Arabianranta in Helsinki, where users will trial and evaluate technologies and services.

Outcomes will include the following:

- Vision Model of a more sensitive and accessible city;
- Technology Models and Open Source Tools for multi-modal access;
- Communications Gateways and Location Based Services that interact with the citizen and the environment;
- 'Urban Mediator' system for citizen-led services
- Research-Based Evidence of community use;
- Roadmap for implementation and further RTD.

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For information on ICING visit:

www.fp6-project-icing.eu

On June 26th 2008, at a combined ICING/Eurocities network event hosted by Barcelona City Council – the ICING partners presented the project findings, demonstrated integrated web and mobile communications used in the ICING testbeds in Barcelona, Dublin and Helsinki, and outlined a future ecosystem of ICING related projects. This event was attended by representatives of the European Commission, City members of the Eurocities network, public representatives and city administrators. Keynote speakers included global leaders in e-Government service provision from Korea and Portugal, and there was input from commercial leaders in this space such as T-Systems Iberia, Telefonica and eSpatial Limited (Ireland).

See www.epractice.eu/workshop/icing for further information.



Interview: John Carfora, Director of Sponsored Research, Amherst College.

Dr John Carfora is Director of Sponsored Research in Amherst College, Massachusetts and is one of America's leading experts on international research collaborations.

Dr Janet Carton, interviewed John recently to get an insight into his academic and administrative career to date and to ask him about good research management skills based on his vast experience in the area.

Could you please briefly tell our readers about your academic career?

I began my career in research administration, believe it or not, in 1974 when I was a graduate student and a very skilled Director of Grants and Contracts asked me if I wanted a job! Since that time, I have been working in the field in both the USA and Europe, and even when I was a tenured faculty member during the 1980s I was still directly involved in research administration. During the 1990s, however, I decided to make a full-time transition to research administration (and devote part-time to university-level teaching). Indeed, starting in 1990 I increasingly became involved in international aspects of higher education, which further set me on a path in international research administration.

What attracted you to move from active academia into research administration?

I sometimes think it may have been one too many pints of Guinness, but in actual fact I don't think I ever fully "moved from" an active academic career. I somehow found a balance if you will between research administration, university-level teaching – albeit part-time –

and my own active research agenda. I am fortunate to have found a comfortable and productive way to balance the three. The "attraction" of research administration, for me anyhow, is involvement in the creation or discovery of "practical solutions" to administrative challenges.

What in your opinion are the key qualities required for your post?

The key qualities are really quite simple in theory: being comfortable with ambiguity; being able to listen attentively; being patient; trying to communicate clearly and effectively; and being professional and accountable. Perhaps the most important quality is being able to do all this with humour and charisma.

Do you sustain personal research interests in tandem with your successful research administration functions?

Absolutely. I am currently updating a chapter to a book that will soon be published in its second edition, and I am writing a book – that is essentially done now – on factors that influence decision-making in higher education. I am working on a brief article for the Harvard Magazine, and I am finishing a book proposal for an edited work on international research administration. Last but not least, I am also working on a co-authored book – with my wife – on the "culture of tea" in the United States.

What are the key challenges in administering research?

Here in the USA, there are national, regional, and state-by-state challenges such as making sure our elected officials have a clear "picture" of the many current and future contributions institutions of higher learning make/will make to research and development, and to our nation's economic prosperity in general. At colleges and universities there are challenges pertaining to public accountability, and to minimizing those "administrative burdens" that too often cloud relations between faculty researchers and institutional officials. At campus-based Offices for Sponsored Programs, the challenge is to provide high-profile research support to faculty in an atmosphere where expectations are high and resources are tight!

Is it advantageous for institutions to recruit academics into senior managerial roles?

Yes, and hopefully those very academics will have the applied experience, professional expertise, and practical knowledge needed to be effective senior managers. Success as an academic does not necessarily mean one will be a successful manager.

Are there different problems associated with the administration of humanities versus science research activities?

Indeed. The administration of monies and programs in support of the humanities are not as well-endowed or necessarily as prominent as those that support the sciences.

What are the key areas of research management that require your greatest input?

Human communications, contracts, intellectual property, technology transfer, publication rights, education and training, and international research administration.

What are your opinions on central management versus faculty management of research activities?

Central research managers represent two constituents: their institution and their faculty. Faculty usually represent one constituent: their own research. Both sides must always be good neighbours; fences don't make good neighbours.

Can you provide some background to your roles in the National Council for University Research Administrators?

I serve as Chair of NCURA's National Commission on International Research Administration, and Chair NCURA's International Neighborhood. I also serve on the Editorial Board of the Research Management Review.

Tell us about the International Neighborhood, who participates in the group and what are its objectives?

In brief, the International Neighborhood – which reaches participants essentially through its website – is dedicated to providing a broad and thoughtful range of professional material and information NCURA members want to see included in a web-based international resource. You must visit the website to fully appreciate how it works. On behalf of NCURA and all its members, I invite you to visit us at www.ncura.edu/.

Boston College and Amherst are different institutions, how do you feel about your new role?

I am delighted to be at Amherst College. It is regarded as one of America's most selective liberal arts colleges, and the administration, faculty and staff are the most professional I have ever worked with. The campus is beautiful, and it's nicely located in one of the most attractive communities (Amherst-Northampton) in America.

Do you have any recommendations for research managers starting out in their careers?

Be committed to your work and always be professional. Communicate clearly and effectively, be a lifelong learner, have patience, develop an appreciation for ambiguity (including your own), and have an intensive and spontaneous sense of humour.

You have achieved a lot in higher education, do you still have particular career aspirations?

Yes, I want to go back to university and pursue postgraduate study in the literary arts – though I have a doctorate, that just proves how little I know. I would like to write a novel (thus the literary arts), and continue pursuing my research and academic writing (thus the doctorate). I also have an interest in logic, philosophy, and scientific methods...but all that will have to wait until I am a whole lot older!

Research Publications

A sample of research publications
in the first six months of 2008

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Food Product Development Centre

Dublin Institute of Technology

With its unique combination of technical and culinary expertise the Food Product Development Centre is dedicated to developing innovative food concepts for the Irish food industry.

Through its links with the Dublin Institute of Technology, the Centre provides a comprehensive range of confidential, professional and innovative services including market research, sensory analysis, product development and customised training opportunities.

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