



research matters

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Waterford Institute of Technology

WIT

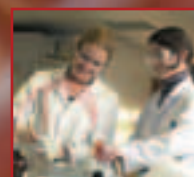
Partnering with Chinese Academy of Science



Research Training



Research Funding



Research Support

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Editorial

Welcome to the Winter 04/05 edition of research matters. In this the third issue we include a greater number of articles, which is testament to the rapid growth in high quality research at WIT.

Feedback on the publication to date has been very positive both from within the WIT research community and from external partners such as development agencies and industry.

Many of the Institute's leading research groups have strong industry links through joint research projects. Our aim in the school of research and innovation is to increase this level of collaboration in 2005.

We are planning a number of workshops for the coming year, which will be designed to provide technology briefings for industry and to showcase the outputs from the Institute's research activity. It is seen as a step towards promoting greater research and development co-operation between industry and WIT. The Institute has a strong track record in leveraging government and European funding for co-operative research and development projects with industry and other external partners. We plan to substantially increase the number of such projects in the coming year.

The Institute's commitment to co-operation with industry will be substantially enhanced by the creation of its Enterprise Ireland sponsored Innovation Centre, which is to be established as a joint research and innovation building on WIT's Carriganore campus. We will report further on this in later issues of research matters. If you have any queries on this issue of research matters or on academic industry co-operation please feel free to email me at kkiely@wit.ie



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Please address any comments or suggestions that you may have on this publication to Kathryn Kiely, External Services Manager.

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Edited by Margaret Grene

WIT partners with Chinese Academy of Science

In June of this year Dr. Catherine O'Reilly, Dr Pat Duggan, an organic chemist who works in Catherine's group and John Doran a PhD student also working in the group visited the Institute of Chemistry at the Chinese Academy of Science (ICCAS) in Beijing to develop research collaboration with Professor Mei-Xiang. The collaboration is funded jointly, by the Science Foundation of Ireland (SFI), with matching funding from the Chinese government. The joint project is focussed on the use of the microbes and enzymes isolated from recombinant clones for biotransformations.

Biotransformations, the process of using microbes or purified enzymes to make new compounds, have many advantages over traditional chemical methods. Firstly

The microbes studied by the Biocatalysis Research Group have two important potential applications, bioremediation and biotransformation. Bioremediation uses cloned species to treat contaminated industrial sites where the microbes break down the pollutants helping clean up these old sites.

they can make compounds not easily available by traditional methods. Furthermore they have an economic and environmental advantage as they can reduce the need for costly organic solvents. For this reason pharmaceutical companies are actively researching biotransformations as a route to producing pharmaceutical drugs. Stereochemical control is another key advantage of biotransformations. Some organic molecules are what is known as 'handed', in that they have right and

left versions called enantiomers. Enzymes, such as the amidase, central to the work of the Biocatalysis research group led by Dr. O'Reilly at WIT, produce only one enantiomer of the product whereas traditional chemical methods produce a mixture of both enantiomers. Usually only one of the enantiomers is pharmaceutically useful, the other being either inactive or even toxic. An often-quoted example is thalidomide, which was prescribed for morning sickness during pregnancy in the early sixties, where one enantiomer was therapeutic but the other enantiomer produced some appalling birth defects. For this reason pharmaceutical companies are actively



Prof. Mei-Xiang Wang, John Doran, Dr. Catherine O'Reilly and Dr. Pat Duggan at the ICCAS Institute, Beijing

researching the use of microbial and enzymatic catalysts to produce pure enantiomers of new drug products.

As part of the collaboration on this joint project John Doran a PhD student in Dr. O'Reilly's group spent three months conducting his research in Prof. Wang's laboratory at ICCAS, working along side post-graduate students and using the opportunity to carry out biotransformations with a purified amidase enzyme that he took to China. Another postgraduate student from WIT will visit the Chinese laboratory next year. Prof. Wang will visit WIT and some of his group will work in Dr. O'Reilly's laboratory.

Dr. O'Reilly's connection with Prof. Wang goes back to her time in Sunderland University in the U.K. As a molecular biologist Catherine's main research interest is in the genetics of microbes. Prof. Wang is an organic chemist and has worked on the use of microbes for biotransformations exploiting the enzymes in these microbes as chemical catalysts. The microbes studied by Dr. O'Reilly's group were isolated from industrial sites in Sunderland and have developed enzymes to metabolise industrial waste based on cyanide and related compounds called nitriles. Prof. Wang uses these microbes to



Members of the Biocatalysis Research Group at work in their laboratory at WIT.

convert nitriles to useful organic products. The research area has two strands the molecular biology involving expression of the genes and the isolation of the pure enzymes and the chemical application using the enzymes for biotransformation. The two research groups are complementary and offer enormous potential for synergic collaboration. As a result of the visit a number of possible areas for future collaboration have been identified and are under preparation at present.

ICCAS located in Beijing is a key research institute in China. It has a number of research divisions including some elite Chinese Academy of Science (CAS) laboratories in areas such as nanotechnology and photochemistry. The biggest division is polymer physics and chemistry with 20 professors. The organic division, which the WIT team visited, specialises in molecular recognition, selective synthesis and bioorganic chemistry. Students at the institute are all post-graduate at PhD level. The WIT team also visited the Beijing Institute of Technology (BIT), a leading Chinese university and discussed cooperation in relation to staff and student exchange programmes. WIT signed a cooperative agreement with the Beijing Institute in 2001

According to Dr. O'Reilly, "a visit to China is an exciting experience with its culture and wonderful food. Prof Wang and his colleagues treated us with great hospitality and we are very grateful for his generosity."

Development is progressing at a staggering rate in China and it was clear to the WIT team that key research areas are being targeted for development. China is interested in establishing collaborative links with the west and as an English speaking country Ireland has an advantage.

"Our visit was very fruitful with respect to the research collaboration and also very enjoyable. There are many opportunities there for anyone wishing to establish links with Chinese researchers", says Dr. O'Reilly.

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Dr. Pat Duggan (pduggan@wit.ie)

Biotransformation, the other potential application of the microbes studied by the Biocatalysis Research Group, uses these microbes or purified enzymes to make new compounds, some of which have potential for pharmaceutical applications.

WIT's School of Business - exploring the dynamics of relationships and networks

Dr. Thomas O'Toole is Head of WIT's Business School. As well as being actively involved in the promotion of research in WIT, Tom is also an active researcher in his own right. The generic subject domain of his research is in business strategy and marketing.

Tom's core research area is in inter-organisational relationship governance. This involves the study of the management of linkages and connections across independent organisations. Within this, Tom is particularly interested in how bilateral relationships are governed. "These can be described," he says, "as close, co-involved, high trust relationships." Tom has three PhD students in his research area and the link between each of these projects is the study of relationships using a dynamic interaction world-view. This approach characterises all of Tom's work and hence provides what he calls "the rules of engagement" for his research team.

Mary Holden, who was awarded a Government of Ireland Scholarship, is completing her PhD in the field of relationship communication. In particular she is focussing on the effect of relationship communication on the development of relationship norms, moderated by interpersonal relationship behaviours. Mary's work is being completed using structural equation modelling and she is the first in Europe to investigate this neglected area of study.

Pat Lynch is researching the underlying dynamics of the user-manufacturer interface in the early stages of new product development. He has completed a national study on user involvement in new product development.

Pat is also the chairperson of the Business Postgraduate Society. (See below)

Ray Griffin, lectures in international business in DIT, and is engaged in doctoral research that examines how subsidiaries of multinationals create strategy given their relationship with their headquarters. He is using a story telling methodology to complete his work and is being provided with some additional help on the project from Prof. Julian Birkinshaw of the London Business School, who is a world authority on international business strategy.



Tom's research students have been published in international peer reviewed conferences and journals. Being part of a larger international research group in the area is a key part of the activity of the group. Tom is also involved in additional projects as part of the group's overall work.

In 2002, Tom published a book entitled

Strategic Market Relationships - from strategy to implementation (John Wiley: 2002), with Prof. Bill Donaldson of Aberdeen Business School. His research has been published in over twenty-five peer reviewed journals and international conferences.

This research has been funded at strands one and three of the Technology Sector Research strands with Tom as lead researcher. The Strand One projects are complete and the Strand Three project has formed the nucleus of the centre for management research in healthcare and in healthcare economics now led by Drs. Denis Harrington and Sheila O'Donohoe. This group has four PhD students, one research assistant, one masters by research and three dissertation students now completing projects in the centre, along with a number of other projects including one with Memorial University of Newfoundland with which WIT Business School has an exchange agreement.

One aspect to Tom's research work is an applied orientation to practice. In 2001 he was part of a Government appointed task force, which produced a report entitled *Strategy Waterford Vision 2011 linking Waterford and its partners* and he continues to be involved in regional development groups and to contribute opinion in this area. Indeed, he is also involved in entrepreneurship research and initiatives that are developing in parallel with the development of a research centre in entrepreneurship in WIT Business School. This group, with Tom's involvement, has attracted significant funding for both entrepreneurship training and research.

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Business Postgraduate Association - building a community of postgraduate students

In September 2002, supported by the Business School, the Business Postgraduate Association was established with the goal of creating a postgraduate community that supports its members both academically and socially. Since its inception the association has held 22 master classes in research and attracted some of the world's most renowned academics to speak on topics ranging from philosophical matters, to conducting literature reviews, to methodological issues. This year the association has lined up some exceptional speakers such as Professor Richard Lynch from Middlesex University, London. Professor Lynch addressed the topic of the Strategy Case Seminar. Other speakers include Michael J. Baker, Professor Emeritus who provided his insights on the topic of getting published. Besides supporting its members

academically, the association is also active in creating a social community amongst business postgraduates and staff. "Postgraduate studies are difficult and people can feel very isolated. By developing a social community we create the vehicle by which postgraduates can express ideas, share knowledge and provide support for one another academically" says Pat Lynch, one of the founding members of the association.

In conjunction with the WIT Alumni office, the association has also initiated an alumnus within the Business School and it is planned that reunions of past Business graduates will take place annually.

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Designing the next generation of vehicle control systems



Participants in the successful visit to TRW headquarters in Solihull in June 2004 were from left : Richard Butler, Anila Mjeda, Brendan Jackman, Fergal Keating, Gavin Walsh, Donal Morrissey and Eamonn McDonnell.

Postgraduate research in automotive control systems has taken place at WIT since the year 2000 under the supervision of Brendan Jackman. A considerable level of expertise in automotive diagnostics, real-time control systems, embedded vehicle hardware and networks has been built up over the years. Research is currently focused on applying knowledge-based and mathematical optimisation techniques to automotive software and electronic systems. Current research activities include the development of fuzzy logic control strategies for power steering systems, intelligent car diagnostic systems, vehicle power management systems and vehicle distributed software optimisation.

The next generation of cars will use by-wire systems to control vehicle functions such as steering and braking. These new systems will replace hydraulic and mechanical links with electrical wires. So for example, instead of having a mechanical linkage between the steering wheel and the road wheels, the driver will provide a steering input to a computer using a steering wheel or joy-

stick. The computer will then provide direct full authority control over the road wheels using electric motors. This new control technique will provide increased safety by having the control computer take the overall vehicle conditions, such as speed and lateral acceleration (spin), into account when deciding how much steering effort to apply. Hybrid steering systems such as BMW's Active Front Steering (AFS) system currently provide such features but they include a backup hydraulic control system in addition to the computer control system.

To completely remove the hydraulic system, the computer system must be utterly reliable or fault-tolerant, to ensure a high level of safety. New hardware and software design techniques are required when developing such fault-tolerant vehicle control systems. Fault-tolerant design techniques are used in the aviation industry, but the automotive industry has an additional cost constraint on the components used.

Research, training and consultancy in the application of software and electronics to automotive systems are provided by Jackman and his research team, which comprises supervisors David Power and Gavin Walsh, and postgraduates Anila Mjeda, Padhrick Devlin, Pat McInerney,

Donal Morrissey, Eamonn McDonnell, Richard Butler, Fergal Keating and Jason Chadwick. The international reputation of the team has been strengthened recently with the announcement of a collaborative research project with TRW Automotive UK, the world's leading supplier of automotive safety systems. Jason Chadwick from the team will work with TRW over the next two years to develop new techniques for the design and development of fault-tolerant vehicle control systems. TRW will use the WIT research as part of a technology demonstrator for showcasing the next generation of TRW control systems to car manufacturers.

The awarding of this project to WIT is the result of two year's collaboration with TRW, and in particular a successful visit to TRW headquarters last June by the researchers and supervisors to make presentations to senior TRW technical staff.

The team is also undertaking related research on time-triggered networks in collaboration with Ford.

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Materials Characterisation and Processing Group researches dynamics of interacting magnetic nanoparticles

Magnetic materials are a multibillion Euro global industry. Magnetic particles are the building blocks of many materials including magnetic memories (e.g. hard disks, floppy disks, audio and video tapes), as well as transformers and permanent magnets. They are used also for magnetically targeted drug delivery and more recently in magnetic random access memory (MRAM).

Dr P J Cregg, Lecturer in Electronic Engineering and member of the Materials Characterisation and Processing (MCP) group at WIT has recently returned from career break, during which time he undertook research in the Department of Engineering Sciences at the Ångström Laboratory, Uppsala University, Sweden.



This was enabled through a Senior Visiting Fellowship from the Royal Irish Academy. At Uppsala, he worked on the Dynamics of interacting magnetic nanoparticles with Prof. Peter Svedlindh and Dr José L García-Palacios, who was on a research visit from University of Zaragoza, Spain.

Drs. Cregg and García-Palacios are developing a model for the behaviour of magnetic particles, to include the interactions between the particles. This research is a culmination of their respective outputs in the area which includes their PhDs and over 15 journal publications. Their recent results are expected to appear

shortly in a letter to Europhysics Letters or Applied Physics Letters, followed by a full report in Physical Review B.

Dr. Cregg recently published a paper entitled *A variational approach to the relaxation of single domain magnetic particles based on Brown's model*. The work was enabled through an EC funded Marie-Curie Fellowship at Queen's University Belfast. The paper appeared in a special issue of the Journal of Molecular Liquids covering the proceedings of an international meeting at the Royal Irish Academy, which focussed on Diffusion and Relaxation in Disordered Fractal Systems with contributions from Ireland, Northern Ireland, France, Denmark, Spain, Sweden, USA & the Russian Federation.

Optics Research Group granted funding to research photonic crystal fibres

The Optics Research Group (ORG) was successful in winning funding, under Enterprise-Ireland's International Collaboration Scheme, for a proposal which involved joining an existing collaboration between the University of Bath and Heriot-Watt University, Edinburgh in the field of photonic crystal fibres. These fibres, originally invented by the scientists at Bath, are recognised as one of the most exciting developments in fibre optics in the past five years.

The proposed research investigates dispersion in these fibres, and its exploitation in the application of the fibres as advanced photonic sensors. The work represents the first Irish activity in this field.

In the first part of the work, one of the group's postgraduate researchers, John Rothwell, undertook an intensive three-month period of research at Heriot-Watt from July to September.



Members of ORG in the Optics Research Laboratory, from Left: Kieran O'Mahoney, John Rothwell, Dónal Flavin and Dr. Mohammad Alhourani.

Two other postgraduates of ORG also registered significant achievements in recent months. In September, Dominic Murphy became the first postgraduate research student in the group to gain a PhD degree. His thesis, for which Dr. Kenneth Weir of Imperial College, London acted as external examiner was titled *Low-Coherence Optical Interferometry based on Phase Recovery*. Since completing the experimental component of his thesis with the group in 2001, Dr Murphy has worked with the Sumicem Corporation in Limerick and with BlazePhotonics at Bath. He is currently Research Fellow with the Lightwave Technology Research Centre at the University of Limerick.

Kieran O'Mahoney, the most recent postgraduate research student to join the group, won first prize for his presentation on *Fourier Transform Spectroscopic Demodulation of Fibre Bragg Grating Sensor Arrays* in the physics category at the National Institute of Technology Science and Computing Research Colloquium, hosted at WIT in June 2004.

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The Construction IT Alliance (CITA): a model for collaboration between education and industry

The formation of CITA in 2001 and its subsequent development took place mainly through a unique partnership arrangement between two of the leading Architecture, Engineering and Construction (AEC) Education providers in Ireland; Waterford Institute of Technology (WIT) and Dublin Institute of Technology (DIT).

The specific objectives of CITA are:

To inform the Irish construction sector of relevant IT developments.

To establish and disseminate best practice in the use of IT in the Irish construction sector.

To encourage IT related research and training collaboration between the Irish academic sector and the leading firms in the Irish construction sector.

To establish and maintain links with relevant national and international organisations.

To encourage the strategic use of IT by the leading firms in the Irish construction sector.

Dr. Ken Thomas who is the Head of Department of Building Technology at WIT is one of the two Directors of CITA and is also a member of the Board of Management. Part of the strategy in the formation and initial development of CITA was to actively target the leading participants in the Irish AEC industry. These participants play a very influential role and it is recognised that they are key to the improved use of IT in the industry in the short to medium term.

Working towards a clear set of objectives, which include informing the Irish construction sector



of relevant IT developments and establishing best practice in the use of IT in the sector; two of the more important sets of CITA activities are bi-annual Members' Meetings and the Special Interest Groups (SIGs). The Members' Meetings have been crucial in the development of CITA. These meetings are significant milestones as they have provided opportunities for the members to listen to leading experts on relevant up-to-date issues. More importantly perhaps, they provide an opportunity for the members to discuss these issues in an open and relatively informal manner. CITA depends a great deal on the network of Special Interest Groups (SIGs) formed by members. There are seven Special Interest Groups at the moment and this includes a Materials Procurement group and an eTendering group, which is particularly relevant in light of national policy to move public sector spending online. Members are encouraged to get involved in developing new interest groups or by joining established groups. It is intended

that the findings of these groups will be published and will encourage further research.

In July 2004 there were one hundred and four member organisations in the Irish AEC industry who had joined CITA.

Member organisations include construction firms, designers, consultants, product suppliers, specialist contractors, IT suppliers, professional institutions, legal, education and government bodies. The need for maintaining a multi-disciplinary membership to CITA is vital as it was recognised from the outset that many of the factors hindering effective IT use in the industry relate to poor integration. A strong and diverse membership should also mean that CITA will be able to help shape the successful development and implementation of future IT innovations in the industry. The work of CITA in promoting the exploitation of information and communication technologies by the Irish construction industry has been endorsed by government, the influential Forum for the Construction Industry (FCI) and all the relevant professional bodies.

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or visit the CITA website at
www.cita.ie.

The Special Interest Groups that are currently in operation are:

- Materials Procurement
- Layering convention for CAD drawings
- Website development
- Collaboration Tools
- eTendering
- Object Modelling
- Education and Research.

ECPPM CONFERENCE IN ISTANBUL

Dr. Ken Thomas attended the European Conference on Product and Process Modelling in the Building and Construction Industry (ECPPM 2004) in Istanbul in September this year and delivered the keynote paper to the ITC@EDU Workshop. The title of this paper was *Integration, Isolation and IT Education for an improved Architecture Engineering and Construction (AEC) Industry*. Dr. Thomas also chaired a 'Knowledge Management' session and was a Panel Member for the discussion on 'Construction IT Body of Knowledge in the light of Bologna Process'. Approximately 140 delegates from around the world attended.

John Wall presented his paper on *e-Learning and Pedagogical Challenges in Construction Management: Bridging the Gap between Academia and Industry* at the ARCOM Conference in Edinburgh on September 1st. There were various themes throughout the conference including Economics and Strategy; Project Management and Risk; Design and Design Management; Marketing and Inter-Organizational Relations; Information Technology and Visualization; Learning and Innovation; Law Contracts and Procurement; Productivity and Planning; Facilities and Maintenance Management and Sustainability and Eco Systems. Over 120 delegates from the U.K. U.S., Mainland Europe and Australia attended the three-day conference.

Centre for Social and Family Research

The Centre for Social and Family Research was established in 2003 within the Department of Applied Arts at WIT. Launched in 2003 by Director of WIT, Professor Kieran Byrne with a guest lecture by Thomas Moore, world renowned author of *Care of the Soul*, the centre brings together the teaching and research strengths of members of staff and postgraduate students from social studies and law.

Since then, other guest speakers have included, Professor Michael Kimmel, State University New York, renowned author on men's lives and masculinities.

The centre's core objective is to conduct applied social research which will critically address current debates in Irish social policy and make a contribution to the development of policy.

Practice minded and committed to the pursuit of social care and social justice, the centre seeks to develop collaborative research projects within the South East region, nationally and internationally.

Since its establishment the centre has won a number of national research



From Left: Fergus Hogan; Dr. Willie Donnelly; Professor Michael Kimmell; Director of WIT, Professor Kieran R. Byrne; Dr. Michael Howlett; Walter O'Leary and Jonathan Culleton.

commissions. These include, *Strengthening Families Through Fathers*, commissioned by the Department of Social and Family Affairs and published in November 2004; *Men, Sex and Crisis Pregnancy*, commissioned by the Crisis Pregnancy Agency; and *Investigating the impact on children of witnessing domestic violence - nature and adequacy of child centred services*, commissioned by the National Children's Office. The centre has also been awarded four postgraduate research scholarships under the Technological Sector Research: Strand I Post-graduate R&D Skills Programme. These awards include, *A study of shared parenting in post-nuclear Irish families*, *Racism in contemporary*

Ireland, Fathering from prisons and An analysis of victims of crime in Waterford City.

Key to the centre's success in attracting research funding is the collaboration between disciplines within the department and joint research projects with researchers from other institutions.

The centre is committed to enhancing good working relationships between the Institute and a variety of state and voluntary

agencies and cultivating links with community groups.

In addition to funded research, the centre has a wide range of research interests and activities, including; men, masculinities and fatherhood, child protection, race and ethnicity, parenting, foster care, social care training and professional supervision, drama, culture & ethnicity, domestic violence and power relations.

The centre is co-ordinated by Maire O'Reilly (moreilly@wit.ie), Fergus Hogan (fhogan@wit.ie) and Jonathon Culleton (jculleton@wit.ie).

Visit of Danish wood energy expert establishes network of research links

This autumn a working visit from Danish Wood Energy Expert, Mr. Pieter D. Kofman was hosted by WIT Forestry and supported by COFORD, the National Council for Forest Research and Development.

Wood energy has been identified as a sustainable renewable resource that should be developed to contribute to Ireland's national carbon emission abatement strategy, aiding sustainable rural development and expansion of the forest industry. With this in mind the objective of the working visit was to allow Dr. Kofman, who has over 20 year's experience researching forest harvesting for wood energy, to share this experience with the Irish forestry sector. Through individual and group meetings Pieter identified opportunities for the development of wood energy supply strategies in Ireland.

Key elements of the work programme

included meeting all the main industry and research people involved in wood energy, identifying problems and potentials in harvesting wood for energy in Ireland and carrying out a literature review of relevant Irish and international work. To this end, Pieter met with sixteen companies and organisations and attended a two-day conference in Cork on Wood Energy, arranged by Sustainable Energy Ireland.

The main output of Pieter's visit was a report on recommendations for developing suitable wood energy harvesting systems in Ireland. The visit had the broader benefit of giving a wide range of interested parties in Ireland access to Pieter's expertise and network of international industry and research links. WIT has benefited from Pieter's visit by gaining direct access to his expertise and international network of research and industry links. The Institute can use

Pieter's visit as an opportunity to liaise with Irish interested parties and identify specific areas of applied research and development where WIT may form partnerships. Pieter returned to Ireland in November for one week to demonstrate some innovative Danish technology in wood energy harvesting. This demonstration took place on a number of private forest plantations supplied by Glanbia's Forestry Development Association. WIT forestry students were involved in the demonstration organisation and collected and analysed field data on the equipment and site. Pieter presented the findings of his working visit at a seminar arranged to coincide with the machine demonstration. Over 150 people from the forestry, agriculture and energy sectors attended the seminar.

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Careers Services research demonstrates importance of transferable skills

According to a project focussing on the transferable skills in third-level modern languages curricula, not all students are aware of the importance of the transferable skills they acquire during their time in third-level education.

Angela Collins, WIT Careers Advisor, together with her colleagues in the Trinity College Dublin (TCD) and Dublin City University (DCU) Careers Services, has been working on this research project since January 2003. The project has been funded through the HEA's Strategic Initiatives Scheme (formerly Targeted Initiatives Scheme) for two years. The funding received has enabled the institutions to jointly conduct research to identify the transferable or "soft" skills, such as, communications, time management, decision-making and problem-solving, which are important for students to acquire while in third-level education. This is a truly innovative project, as it is the first time that such extensive primary research has been conducted in Ireland on the topic. The project will also investigate the most effective ways of integrating these skills into an academic curriculum. The experience of many Careers Services has been that students on modern language programmes tend to be less confident on graduation than some of their more vocationally-oriented colleagues. The fact that graduates from these programmes enter a diverse range of occupations, in which many are not required to use their language skills, increases the necessity for these students to become aware of the transferability of other skills they have acquired.



From Left: Ms. Muireann Ni Dhuigheain; Careers Advisor DCU, Deputy Olwyn Enright T.D. Fine Gael Spokesperson on Education and Science; Rhona Sherry, Project Manager; Orlaith Tunney, Careers Advisor TCD; Angela Collins, Careers Advisor WIT.

The research in WIT was conducted with four key stakeholder groups - graduate employers, and modern language academic staff, students and graduates. The results of this make interesting reading and the main findings for the combined WIT cohort are listed in column three.

The WIT Careers Service was supported by Dr. Don O'Neill, Dr. Rosanna Molloy and Dr. Carmel Coyne from the Department of Applied Arts.

The full reports from this research can be viewed at www.skillsproject.tcd.ie.

For more information contact:
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MAIN FINDINGS

- A) Transferable skills are the third most important factor when seeking employment, after enthusiasm for the position and personal qualities, and ahead of a good academic record.
- B) The transferable skills regarded as most important are: oral communication, time management, team work, presentation skills and IT skills.
- C) Of these skills, only time management is regarded as quite poorly developed.
- D) The majority of respondents (85%) agreed that transferable skills are more important than specialist knowledge in a work environment.
- E) Almost half of the responding graduates (45%) were not using their language skills at the time they were surveyed.

WIT Lecturer presents research at Medical Devices Conference in Minnesota

Mr. Conall Doran, Lecturer in the Department of Engineering Technology, recently presented a paper entitled *A Model of the Failure Process of Skin During Cutting* at an ASM International (American Society for Metals) organised conference on Materials and Processes for Medical Devices in St. Paul, Minnesota.

The paper, which was co-authored by Dr. Brendan McCormack of IT Sligo and Mr. Andrew Macey of Sligo General Hospital, presented results of Conall's research into defining the sharpness of medical cutting tools, such as scalpels. This paper explored how a sharp cutting blade can be used to measure the fracture toughness of a biomaterial, in this case skin, and how the sharpness of the cutting blade will affect the fracture toughness measured.

This research is being carried out in conjunction with IT Sligo as part of a larger project investigating the concept of sharpness of cutting tools, which is currently ill defined. While much work has been done in researching the process of cutting for industrial applications, such as machining, very little work has been done in investigating the process of cutting for medical applications. A deeper understanding of what is meant by sharpness will allow the development of more effective cutting tools for surgery and improving healing after surgical procedures.

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WIT project included in EU Framework Programme success stories

The Minister for Trade and Commerce, Mr. Michael Ahern, T.D., recently, launched a booklet describing the success of Irish participants in the EU Framework programme for Research & Technological Development. This book, published by Enterprise Ireland, highlights achievements of Ireland's research community - in industry, research institutes and third level colleges.

Speaking at the launch, Minister Ahern said, "The European Union's Framework Programmes for Research and Technological Development have provided opportunities to Irish companies, research institutes, universities and colleges to participate in high-quality research with their counterparts in Europe. It has had knock-on benefits in the provision of technology transfer opportunities." The Programmes have been a crucially important source of funding in supporting the growth of the Irish research base, and have helped to increase the knowledge and credibility of the Irish research community. In so doing, they have helped create a well-qualified,

technologically aware workforce.

"This publication clearly shows that Irish researchers have built a solid reputation for good research. The examples set out in this book are representative of the many hundreds of successful research projects, which, over the years, can claim an honoured place on the European stage", Minister Ahern concluded.

Case studies outlined in the book include: Aughinish Alumina Ltd, Trinity College Dublin, Engineering Solutions Ltd, Biotrin International, NTERA Ltd, GEM Plastics Ltd, SIFCO Turbine Components Ltd, Lake Communications & Waterford Institute of Technology and the National Universities of Cork, Dublin and Galway.

Lake Communications & the Telecommunications Software & Systems Group (TSSG) at Waterford Institute of Technology are the two Irish partners on the Sixth Framework 14.7 million euro project Daidalos (Designing Advanced Network Interfaces for the Delivery and Administration of Location Independent, Optimised Personal Services).

Micheál Ó Foghlú, Research Director at the TSSG, who was an invited speaker at the launch event, described the work of LAKE Communications and the TSSG as "building real scenario-based end-to-end services using IPv6 on multiple fixed and wireless access networks".

"The scope of the project is large, and the extensive network of nearly 50 partners enabled by EU funding is what makes this possible", he says.



Director of Research at the TSSG,
Micheál Ó Foghlú

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Calmast researching obstacles to learning science

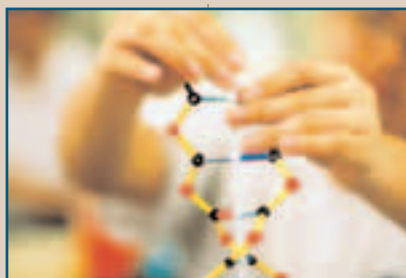
Since its foundation the Centre for the Advancement of Learning of Maths, Science and Technology (CALMAST) has organised numerous science events for schools, both primary and secondary. Recently, CALMAST has broadened its activities into the field of active research in Irish schools in response to the introduction of science as part of the new primary curriculum.

Dr. Sheila Donegan and Eoin Gill of CALMAST have recently secured funding through the EU Socrates programme for a pan-European project entitled *Growing Interest in The Development of Teaching Science*.

The lead institute for this project is the Pole Universitaire de Lorraine, Nancy, France and other partners include University of Bradford, UK; EDUCONSULT, Belgium; Amitie, Italy; Faculty of Science, Helsinki and the National Institute of Public Education, Hungary.

The aim of the project is to investigate how science is perceived among second level students, and to investigate the numbers studying science, engineering and technology courses at third level.

Importantly the project will explore the obstacles to learning science in second level and how science is taught in the different countries.



Ideas and results will be shared through conferences and research papers.

The study will investigate the reaction, perception and preparedness of primary schools to the introduction of science and the work is based around a questionnaire for both students and teachers, respectively.

Questions are constructed in such a way as to determine whether age and gender profiles have any bearing on peoples' perceptions of science.

Target schools include a mix of urban, rural, mixed and single sex schools.

CALMAST

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(sdonegan@wit.ie or egill@wit.ie) or
visit www.wit.ie/set



PhD graduates from the School of Science, October 2004, from left include: Dr. Rebecca O'Mahoney; Dr. Dominic Murphy; Dr. Audrey Hearne; Dr. Orla Cahill; Dr. Tadhg ó hEalaíthe (HETAC); Dr. Pádraigin Harnedy and Director of WIT, Professor Kieran R. Byrne

Recent developments in practice based / led research in art and design

Dr. Peter Jordan of WIT recently delivered a research paper to the All Ireland Society for Higher Education (AISHE) Conference, Trinity College, Dublin. This paper summarises the state of the art in practice based/led research in art and design.

Practice based/led research in art and design itself has a fairly short history having originated and developed over the last twenty years. Initially described as practise based research, more recently the concept of practice led research has been mooted, in which the primacy of written over visual text is challenged.

The paper addresses a number of the AISHE conference themes, in particular, those of scholarship, diversity, Bologna and assessment criteria. In terms of scholarship, reference is made to significant issues such as the definition of core characteristics and regulatory requirements for practice based/led research.

Recognition of diversity between subject areas and methodologies must allow for the recognition of a specific mode of research appropriate to the practice of art and design. The precise formulation of this mode has proved to be problematic as indicated by the findings of the 1996 Helsinki Conference, titled *No guru, No method*. Recent literature on the subject however, for example, *On the Move*, published by the European League of Institutes of the Arts, suggests the gradual recognition of a new culture in Doctoral Fine Art and evolution towards practice led research in higher arts education.

Progress in the above has been aided by the Bologna process, which requires a more unified Europe-wide approach to education in art and design as in other fields.

For more information contact:
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Research in the area of Chronic Fatigue Syndrome

Professor Trudie Chalder, Chair of Cognitive-Behavioural Psychotherapy at Guy's, St Thomas' and King's Medical School, King's College London, was the guest speaker at the Department of Nursing's monthly academic seminar. Professor Chalder spoke on past and current research in the area of chronic fatigue syndrome and issues confronting researchers when engaging in areas of sensitivity and controversy. She highlighted that current research evidence supports a programme of treatment that includes graded exercise and cognitive-behavioural interventions to promote activity instead of reinforcing

fatigue thinking and behaviour by advising patients to rest. However, whilst this clinical approach was highly successful in terms of patient outcome, it often did not fit in with their conceptualisation of their problem and could be frowned upon by self-help groups. The seminar was well attended, both by academic staff from WIT and clinical staff from the South Eastern Health Board and lively discussion of the issues raised ensued. Professor Chalder is currently engaged in a major six-year national study of a range of interventions in the treatment of fatigue in the UK.

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WIT represented at International Manufacturing Conference

The 21th International Manufacturing Conference (IMC-21), entitled *Servicing Manufacturing* was hosted by University of Limerick during the first week in September 2004. The delegates attending came from educational and research institutes in 14 countries and a total of 94 papers were presented during the 3 day conference. Three papers were presented by WIT staff and postgraduate students from the School of Engineering. These papers are listed on pages 14 and 15. WIT will host the twenty-fourth International Manufacturing Conference in September 2007.

South East scores high on computers but low on broadband access

An international survey on the use of information technology has revealed that the south east of Ireland, with one of the highest levels of computer usage in business, has one of the lowest levels of access to broadband.

The South East Information Society Strategy (SEISS) group held a one-day workshop last month in Kilkenny at which the results of an international survey on the impact of the Information Society on seven regions in Europe were announced. Frank McCarthy, Project Manager, outlined the work of SENSITIC, a project funded by the INTERREG IIIB Atlantic Programme, which gauges the impact of the Information Society in seven regions of Europe, including south-east Ireland.

"Progress achieved by the Information Society within these seven regions in six sectors - citizenship, enterprise, governance, education, tourism and culture - was measured," he said. "The results of this research pointed to significant differences between the regions, particularly in the enterprise sector."

Indeed the south-east region demonstrated some very interesting results. For example, 88 per cent of businesses surveyed used computers, the second highest number in the regions examined and 67 per cent of the businesses surveyed had Internet access, again the second highest in all of the regions. Yet only 19 per cent of these businesses had access to broadband, the second lowest percentage in all of the regions.

"The south-east region is also the second largest user of E-commerce of all the regions and actually comes in at the top of the scale with regard to the percentage of enterprises with an Internet site. The SENSITIC report points to inadequate cover by broadband networks, preventing regions like Carmarthenshire (Wales) and south east Ireland from deriving full benefits from their ICT-related services," added Mr. McCarthy.

SEISS has been primarily responsible for the flagship 18 million euro SERPANT South-East Broadband Project - a unique approach to the rollout of broadband in six municipal area networks in Clonmel, Dungarvan, Carlow, Kilkenny, Wexford and Waterford. What this means in practical terms is that businesses in these



Frank McCarthy, SEISS Project Manager and Gerry Conheady, Chairman, SEISS Steering Committee at the Workshop in Kilkenny

towns and cities can now have access to the Internet faster, always and in the long term, cheaper; allowing them to compete with any similar business anywhere in the world from the same starting block.

"The SERPANT municipal broadband network has levelled the playing field for businesses in the towns and cities of the south-east region. And now SEISS is turning its attention to the demonstrated need for broadband in the rural areas," said Mr. McCarthy.

The SEISS programme has been primarily responsible for the attraction of over 19.2million euro of project funding to the south east region. Projects currently funded and underway by SEISS cover the areas of wireless broadband, eProcurement and other aspects of Information and Communications Technology (ICT).

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Record number of entrepreneurs participates in Enterprise Programme

The number of south east entrepreneurs currently participating in the South East Enterprise Platform Programme (SEPPP) has reached twenty two, the highest number since the programme began in 1997.

The latest cohort of ten entrepreneurs commenced the programme in recent weeks, joining the twelve existing participants, who have been on board since Summer 2004.

Representing a broad cross section of industries including IT, Engineering and Animal Nutrition and bringing with them a wealth of experience and knowledge in their various fields, the entrepreneurs have been attending training workshops covering topics such as *Innovation and Creativity*,

Entrepreneurship and Leadership, Market Definition, Financing your Business, Intellectual Property Rights and Business Planning. Training is broken into three distinct modules and will continue throughout the one-year programme.

Commenting on the positive results achieved by the participants to date, Programme Manager Eugene Crehan stated that "the programme is proud to be associated with the contribution these business people are making to the south east's industry base as a whole."

For more information contact:
info@sepp.ie or visit the SEPPP website at www.sepp.ie

WIT RESEARCH IN FOCUS

Institute selects new Research Council

A Research Council has been established at WIT composed of active researchers from within the Institute and a panel of suitable external experts. Dr Willie Donnelly, Head of Research & Innovation will chair the Council.

The main role and responsibilities of the Council include formulation and ongoing review of the Institute's strategic research policy; identification of appropriate research areas of activity; identification of impediments to progress and the drawing together of

the research portfolio within the Institute to provide for leadership.

Four internationally respected external academic members including Professor John Davies of Anglia Polytechnic University will support the work of the Research Council.

The Research Council comprises the following staff members:

Dr Willie Donnelly (Chair)

Dr Jean Clark

Dr Sheila Donegan

Mr Donal Flavin

Dr Denis Harrington

Dr Michael Howlett

Dr Peter Jordan

Dr Venie Martin

Dr John O'Dwyer

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Research Methods course for postgraduate students

The Research Methods course for postgraduate students provides essential training in research methodology for all postgraduate students in WIT and aims to foster a thriving postgraduate environment and community.

A total of twenty two sessions have been scheduled to occur between November 2004 and May 2005. Topics covered to date include an exploration of epistemology in research; the process of engagement with the research process and values, ethics and power in research.

Sessions resuming in January will cover such areas as the Research Proposal; Literature Reviews; Multi-method Approaches; Writing and Presenting a Research Dissertation and Writing for Publication. In addition participants will opt for one of the two main methodological approaches, Quantitative Methods or Qualitative Methods.

The course is currently under investigation by the Academic Council as a single subject certificate and it is possible that exemptions could be available if learning outcomes are matched. Basic requirements for this certificate would include a research portfolio and a minimum of 75% attendance to include the generic topics and a chosen methodology option.

For more information contact:
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Topics in the Quantitative Methodological Approaches Sessions will include:

- >The principles of quantitative research
- >Experimental research design
- >Sampling and statistics
- >Questionnaire design
- >Types of variable
- >Methods for one variable
- >Methods for two variables
- >Outline of multivariate methods
- >Introduction to statistical inference
- >Statistics and research
- >Computer applications - SPSS and Minitab

Topics in the Qualitative Methodological Approaches Sessions will include:

- >Theory and its relation to qualitative research methods
- >Grounded Theory
- >Phenomenology
- >Ethnography
- >Action research
- >Case study research
- >The interview as an investigative method
- >Observation and the nature of observation
- >Reflection and reflexivity within qualitative research
- >Principles of data analysis within qualitative research
- >Use of CAQDAS in qualitative analysis

Profile of a Researcher - Dr.-Ing. Tom Pfeifer

The Telecommunications Software & Systems Group (TSSG) at WIT has grown rapidly, from three people in 1997 to nearly fifty full-time staff with a current turnover of over nine million Euros. A critical mass of funding from the 6th European framework (FP6), the Science Foundation of Ireland (SFI) as well as from major industry affords them a full scope and breadth of research areas from basic research, applied research & development to the commercialisation of results.

This synergetic environment attracts internationally renowned scientists, such as Principal Investigator Dr.-Ing. Tom Pfeifer who joined the TSSG from Fraunhofer FOKUS in Germany last year.

Tom holds a Dr.-Ing. (PhD) in Computer Science from the Technical University (TU) of Berlin, and a Dipl.-Ing. (Masters) degree in Electrical Engineering from the Technical University of Dresden, Germany.

In the Nineties, he worked as a teaching Research Assistant at TU Berlin, where he

first collaborated with GMD/Fraunhofer Institute FOKUS. From there he became Project Manager and Senior Consultant for multiple industry funded research projects in the area of location aware computing, personal communication support and ubiquitous computing. In most recent years, while acting as visiting professor, again at TU Berlin, he became recognised internationally through his publication record, and invited to join several program committees and editorial boards of leading conferences and journals in his area.

In his current position as a Principal Investigator and Director of Research in Ubiquitous and Pervasive Computing, he leads academic activities within the TSSG and coordinates them with the applied and commercial side of research and development. He supervises PhD and Masters students, and now represents WIT when organising international conferences and topical seminars, and in the acquisition of new sources of funding.

According to Dr. Pfeifer, the concept of Smart Spaces, a key issue in the basic research programme of the TSSG, recognises



Dr.-Ing. Tom Pfeifer Principal Investigator and Director of Research in Ubiquitous and Pervasive Computing at the TSSG

the emerging trend in pervasive information technology towards highly dynamic, heterogeneous computing environments. "In these environments", says Dr. Pfeifer "users will be able to migrate seamlessly between their computers, their PDAs and their laptops".

For more information contact:

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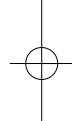
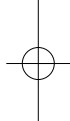
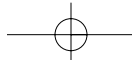
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