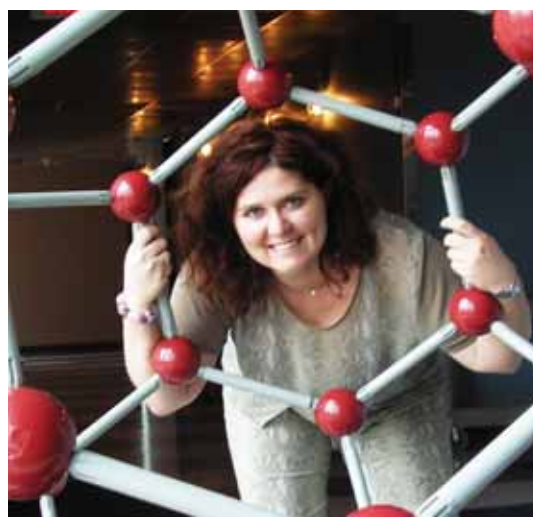


Attracting Talented Researchers to Ireland

 **IUA**
Irish Universities Association
Cumann Ollscoileanna Éireann

A review of The European Marie Curie Programme





Marie Curie (1867 –1934) was a physicist and chemist of Polish upbringing and, subsequently, French citizenship. She was a pioneer in the field of radioactivity, discovering the elements polonium and radium for which she became the first twice-honored Nobel laureate (and still the only one in two different sciences) and the first female professor at the University of Paris. She was very much a mobile researcher, moving from Poland to Paris to continue her research at the Sorbonne. She remains an inspiration to researchers today who aim to further their own careers by participating in the programme which bears her name and to which this brochure is dedicated.

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Introduction

European R&D funding has been instrumental in raising the quality and quantity of research in Ireland in our universities, institutes of technology, national research bodies and companies. In fact, R&D funding through the European Framework Programmes ensures that researchers in Ireland forge strong, lasting links with their European colleagues.

The purpose of this publication is to illustrate how researchers in academia and industry in Ireland have successfully secured funding from Europe in the Marie Curie Programme and to highlight the impact this has had in furthering their R&D ambitions.

The Marie Curie Programme is a key European instrument that funds excellent researchers. From the early 1980's, predating the Framework Programmes, it has funded researchers at all stages in their careers from PhD to postdoctoral and senior researchers. It has promoted the international mobility of researchers in all disciplines: natural, physical, engineering and environmental sciences. It is one of the few areas where the EC funds researchers in the Humanities and Social Sciences. The programme has also helped to develop R&D capacity in companies large and small.

The Irish Universities Association (IUA) is the National Contact Point for the Marie Curie Programme. The office has supported researchers in bringing in over €60m since 2002. This is an outstanding result as it is over three times what would be expected, given the size of the research population in Ireland. It demonstrates how researchers in Ireland “punch above their weight” in an internationally competitive environment. It is important to understand that this programme awards funds through a fiercely competitive process based on international peer review. Funded researchers have successfully competed against their peers from over 35 countries across Europe.

Here we present a selection of success stories of researchers funded during the Sixth Framework Programme (2002-2006) across highly diverse disciplines in academia and industry. These stories



demonstrate the hugely positive impact that Marie Curie funding has had on research in Ireland.

The Marie Curie Programme has distinct schemes for researchers at all career stages (PhD students to senior researchers), for expanding the R&D capability of organisations and for linking academia to industry. Accordingly, the stories are structured under the following headings:

Early Stage Training – “Young Researchers”

Career Development – “Worldwide Research Opportunities”

Individual Excellence – “Creating a Reputation”

Knowledge Transfer – “Building Research Capacity”

Partnerships – “Bridges between Academia and Industry”

The Seventh Framework Programme (2006 - 2013) has, over the next seven years, earmarked €4.727bn for Marie Curie schemes. We anticipate that researchers in Ireland will continue to compete successfully for Marie Curie funding.

Our future success in the programme will be an important part of the Government's aim to develop a knowledge-based society, particularly through the Strategy for Science, Technology and Innovation. In particular, our positive experiences of the training of PhD students and attracting postdoctoral researchers through the Marie Curie Programme are helping shape the development of 4th Level Ireland and developing researcher careers in our universities.

The Irish universities are committed to doubling PhD numbers, developing sustainable research careers and forging strong lasting links with business and industry. Leveraging funds from Marie Curie to compliment national funding is a key strategy of the IUA. The IUA will continue to provide support to researchers in academia and industry to maximise Irish success in this programme.



Early Stage Training – “*Young Researchers*”

Research talent and the enthusiasm for scientific endeavour must be nurtured at an early stage if they are to evolve into a long lasting career. The Marie Curie Host Fellowship Scheme for Early Stage Training and the Research Training Networks provide funding to institutions that offer a structured framework for the training of early stage researchers from other countries, in particular PhD students. Fellows at these institutions not only receive world class training in areas directly related to their specific research project, but also in complementary and transferable skills. This gives them an excellent preparation for a multitude of career options in a diverse range of settings, within research but also in other professions.

The emphasis that the EU puts on early stage research training is reflected in the increasing share of the overall Marie Curie budget that has been

allocated to this action line over recent years, with more than 50% of the total budget for 2007 being dedicated to the “initial training” scheme. This means an important source of funding for Irish higher education institutions that want to attract young researchers from abroad – an essential step towards achieving the national target of doubling the number of PhD graduates by the year 2013.

“We aim to create an environment where Ireland is seen as a location for high quality PhD training. This will allow us to retain our best graduates and attract more from abroad as PhD students. The Marie Curie Early Stage Training scheme is a very valuable experience for both the institutes and the young researchers involved”

Professor Eugene Kennedy,
Vice President for Research,
Dublin City University



Novel Fabrication Techniques to Produce Scaffolds for Tissue Engineering Applications

– *Dr Lisa Looney, Materials Processing Research Centre (MPRC), Dublin City University*

Funding from the Marie Curie Host Fellowship for Early Stage Training (EST) has enabled researchers within the Materials Processing Research Centre at Dublin City University to recruit seven international PhD students over the years 2006 to 2010, to examine innovative methods of producing hard and soft tissue substitutes.

The main task of this EST is to contribute to the ultimate goal of patient specific biological substitutes. There are several circumstances under which it is necessary to replace human tissue, either on a permanent or temporary basis. The current 'gold standard' in replacing both bone and vascular tissue is to use autografts (material from other sites in the patient), but this can be problematic. Tissue may not be available and the 'double' procedure incurs higher risk of infection, pain and prolongs hospital stays. Synthetic alternatives do exist, but have not found widespread application due to difficulties in producing the optimum material structure and properties, in a repeatable and controllable manner. The research at DCU will study a number of innovative manufacturing processes with a view to achieving this control and repeatability, while characterising the properties, and response of cells to the tissue substitutes (or scaffolds).

The recruited PhD students will use existing equipment and infrastructure within the centre to perform their research. In addition to this technical training, students will undertake supplementary activities to enhance their PhD experience and provide them with strong foundations for their future research career. These include postgraduate level modules on aspects of materials science and biotechnology, seminars on ethics and commercialisation in research, a chance to demonstrate undergraduate practical classes and undertake an industrial placement. Aspects of the

research will involve researchers in IT Tallaght and DCU's Vascular Health Research Centre. The cost of the work will be approximately €1.2million.

The funding achieved through the EST scheme has enabled a critical mass of international researchers to be recruited and drive the MPRC research activities in an exciting new direction. This would not be possible through national funding.

By performing research on the area of "Tissue Engineering", a new generation of young researchers can be trained to handle complex technological problems associated with either the life sciences or engineering. Europeans will likely be the chief beneficiaries of solutions offered by these "bioengineers" in the form of products, services and public benefits.



Photo: Researchers at the MPRC developing patient specific hard tissue scaffolds.

Marie Curie Programme puts Waterford on the map in Materials Research

– *Dr John O'Dwyer, Materials Characterisation and Processing Group, Waterford Institute of Technology (WIT)*

The Materials Characterisation and Processing (MCP) Group at Waterford Institute of Technology (WIT) is currently participating in an FP6 Marie Curie Research Training Network (RTN) that focuses on Bulk Metallic Glass Composites. This 4-year, €2.0 million network which began in January 2004 is being coordinated by Institut National Polytechnique de Grenoble and involves ten other European participants including University of Cambridge. WIT's primary responsibility within this RTN is mechanical characterisation of these materials at both room and elevated temperature.

Bulk metallic glasses (BMGs), also known as amorphous metals, differ from conventional metals in that they lack crystalline structure. The atoms in the amorphous structure are randomly arranged. This lack of crystalline structure means that metallic glasses do not contain crystalline defects, such as grain boundaries and dislocations, and consequently exhibit extraordinary mechanical properties such as, exceptionally high strength and elastic strain together with significantly lower stiffness than their crystalline counterparts. In addition, these materials exhibit high hardness, good wear and corrosion resistance, and good processability via visco-plastic flow above their glass transition temperature. However, one major impediment to the exploitation of these superior properties of BMGs is their near-zero plastic strain, typically <2% even in compression, this being due to strain softening and abrupt failure associated with shear bands. Due to the highly localised nature of flow and the lack of microstructural features in BMGs, shear band formation typically leads to catastrophic failure. Significant research effort is currently being invested into the microstructural enhancement of these materials in order to stabilise the shear bands and thereby enable the unique properties of BMGs to be exploited in a diverse range of industrial sectors, many of which are strategically important for Ireland.

The MCP Group previously participated in a €1.4 million FP5 Research Training Network on Nanostructured Aluminium Alloys. This 3-year network which concluded in 2003 was coordinated by the University of Oxford and was undertaken in collaboration with seven other European participants. Significantly, this network represented a new departure for WIT in that it enabled the appointment of the first two postdoctoral researchers at the Institute. In addition, the inaugural Waterford Materials Symposium, *WatMat'03*, was facilitated by WIT's participation in this network.

Participation in these Research Training Networks has enabled the Group to collaborate with some of the leading experts in materials research. Coupled with other initiatives such as the International Collaboration Programme, the research outputs from these RTNs, including collaborative publications, have provided a useful platform to secure additional funding for materials research at WIT. The MCP Group has recently secured €1.25 million to establish the South Eastern Applied Materials (SEAM) Research Centre which is being funded by Enterprise Ireland under its Applied Research Enhancement programme.



Photo: Members of the MCP Group and special guests pictured attending the official launch of MCP Group at WIT in May 2003

Arrested Matter

– *Professor Kenneth Dawson, School of Chemistry and Chemical Biology, University College Dublin*

We sought funding within the Marie Curie scheme for several reasons. In our case we had clear ideas that there was a new field of 'Arrested Matter' opening up in science. The key paradigm here was that particles or molecules in the system are just 'trapped' or stuck where they are, rather than settling down to their most favored position. This is a bit like a traffic jam for particles; things just don't move because they depend on everyone else to move, and this leads to an almost unlimited range of solid-like materials. These are far more common in nature than the simple phases we are taught about, and much more important in industry in everything from medical implants, novel structural materials, new electronic devices and gels in the food industry. However, they were always viewed as 'too complicated', and left to engineers or industry to worry about. The peculiar thing was that, even though we wanted to do deeply fundamental science, it was actually going to impinge strongly on industry and applications, and paradoxically it was a 'bottom up' Marie Curie scheme that allowed us the framework to capture the ideas we wanted to.

Looking back on the first phase of the programme, the science has worked very well indeed, but perhaps the most exciting success has been the implications for the international students that have been involved around this whole program. This whole approach has created a wonderful atmosphere in the group, making it cosmopolitan, dynamic, and an excellent experience for the Irish young researchers also. Perhaps the greatest pleasure of this whole thing is that we are seeing the vision of students having a truly European education, building excellence from a variety of experiences.

The Marie Curie programme emphasizes the people we teach, and their achievements. In our group we like to have very close contacts and individual

interactions between students and teacher, and see a great part of the achievement not just in scientific terms, but also in the distinction and excellence achieved by the young researchers. The outcome is a feeling of achievement and success for all of the stakeholders, the young and the older.

We do, and will continue to, work hard to compete for grants of all types at National and European level. But to the Marie Curie scheme is reserved a special, very personal, and most highly respected place.



Marie Curie Early Stage Training programme in Molecular Neuroimmunology

– *Dr Clare O'Connor, School of Medicine and Medical Science, Conway Institute, University College Dublin*

Neuroimmunology, the study of interactions between the immune and the nervous systems, is a rapidly growing area of research with enormous potential to contribute to our understanding of physiological and disease processes. The Molecular Neuroimmunology Early Stage Training (MNIEST) programme at UCD's Conway Institute is one of the first programmes worldwide that is designed to provide motivated young scientists with the expertise and skills required to excel in this emerging area.

The programme, established under the EU Marie Curie Actions, is now in its third year and is currently hosting eight full-time Ph D fellows, four of the fellowships awarded in 2005 and four in 2006 against stiff competition from hundreds of applicants from all over the world. The programme has also provided six short-term (3 month) training fellowships, which have enabled international students to access state-of-art facilities in genomics, proteomics and imaging available in the UCD Conway Institute. A further six short-term fellowships are to be offered in 2007/2008.

The fellowships are hosted by investigators from the UCD Schools of Medicine and Medical Science, Biomedical and Biomolecular Science, Agriculture, Food

and Veterinary Science based in the Conway Institute and at St Vincent's University Hospital. This multidisciplinary network of investigators ensures that the students' research is embedded in a dynamic, interactive intellectual environment that is fully informed of developments in both the neuroscience and immunology fields.

The programme also encompasses a formal education programme with modules in immunobiology, neuroscience and neuroimmunology and complementary research and professional skills courses. A weekly Journal Club and Seminar Series, which is now organised by the students themselves, provides a lively forum for interaction and debate with senior investigators from a range of disciplines and research backgrounds.

The calibre and international mix of the students - who come from western and eastern Europe, Africa and South America - has provided an increased breadth of perspective to their research colleagues and co-students and has contributed significantly to the positive multi-cultural research and learning environment of the UCD Conway Institute.

Programme website: http://www.ucd.ie/mniest/mniest_index.html



Photo: Programme Participants.

Back Row: Alfred Welzel (Germany), Yann Decker (France), Terence Agbor-Agbor (The Cameroons), Sofie Meerschaut (Belgium)
Front Row: Bartłomiej Lukasz (Poland), Laura Batti (Italy), Danielle Corbett (Brazil), Paola Atezi (Italy)

Career Development – “Worldwide Research Opportunities”

One of the core elements of the Marie Curie programme is the funding of individual researchers who want to undertake advanced “training through research” or complement their skills through an extended stay at an institution in a different country. For post-doctoral researchers such a stay often means the final boost before they establish themselves as fully independent researchers. Apart from the Post-doctoral fellowships offered by the Marie Curie Research Training Networks, a special focus has always been on the Marie Curie individual fellowship schemes. These offer Irish researchers who either hold a PhD or have at least four years research experience the opportunity to spend between one and two years at a foreign institution in any part of the world, while foreign researchers can avail of the scheme to join an Irish research team for up to two years.

But the Marie Curie programme not only helps people to move to a different country – it also provides mechanisms that will facilitate their return. While the European Reintegration Grants are designed specifically to assist in the reintegration of Marie Curie fellows after an intra-European fellowship, the International Reintegration Grants provide European researchers who are active outside of Europe with an incentive to return. These grants are thus a valuable instrument to attract high profile researchers who have emigrated for example to the US back into the Irish research system.

“Marie Curie fellowships are an excellent tool for early career researchers to learn new skills and prepare for scientific independence. Through their bottom-up approach they offer great opportunities to anybody wanting to pursue creative and innovative research, be it in academia or in industry.”

Dr Antonella Di Trapani,
Former Chairperson,
Marie Curie Fellows
Association



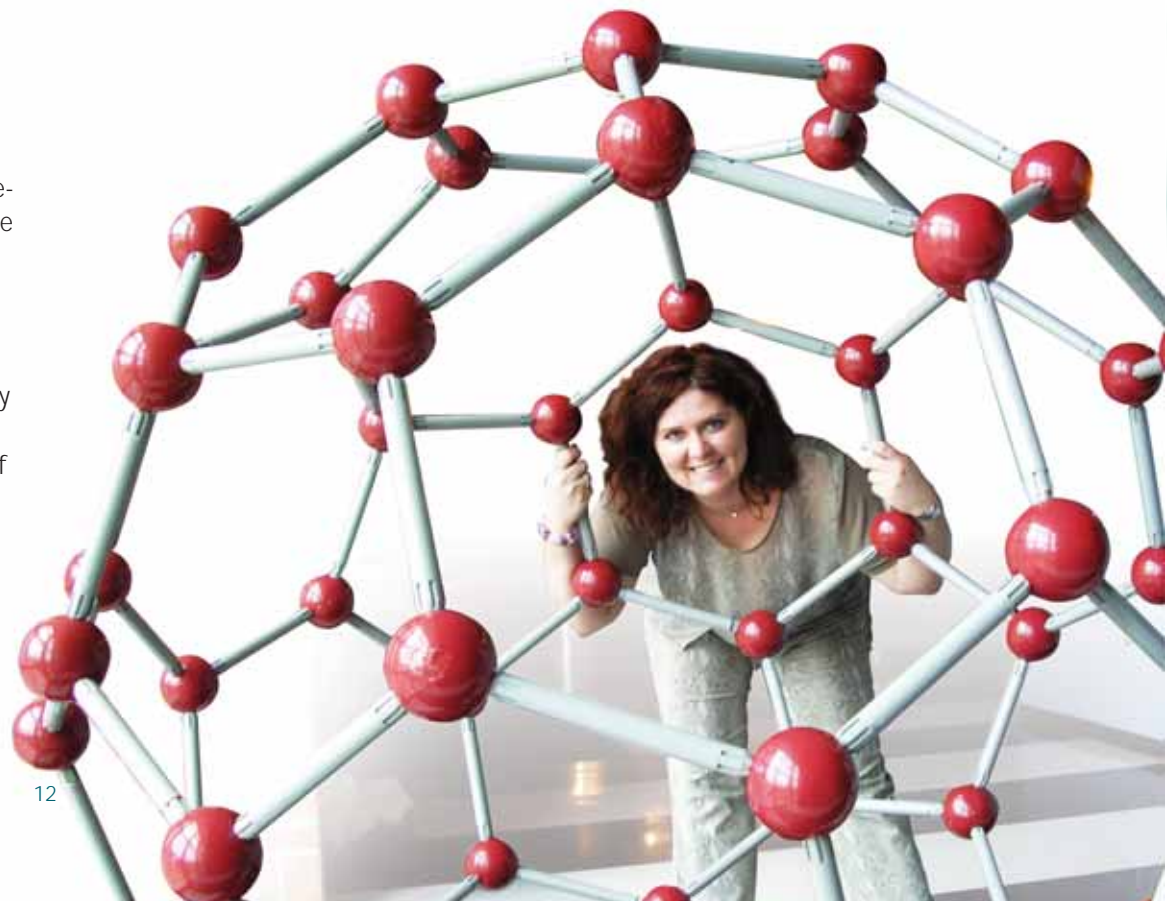
Template Grown Molecular Nanomaterials

– *Dr Silvia Giordani, School of Physics, Trinity College Dublin (now at School of Chemistry, Trinity College Dublin)*

After being awarded a PhD in Chemistry from the University of Miami, I moved to the School of Physics at Trinity College Dublin (TCD), to work on a Marie Curie Research Training Network project on “Template Grown Molecular Nanomaterials”. A broad-based interdisciplinary European research team was assembled in order to generate new fundamental knowledge and a deeper understanding of nanostructures and nanotemplates and I really wanted to participate in such an ambitious and important scientific challenge. Nanotechnology is undoubtedly an area with enormous promise for applications relevant to a wide range of society. Nanomaterials such as nanotubes and nanowires are likely to offer significantly improved properties (strength, durability, etc) as well as unprecedented advances in design and delivery of anti-tumour agents. During my post-doctoral training I acquired extensive and interdisciplinary expertise in the design, synthesis and characterization of nanomaterials. In particular, I focused on the problem of controlling the aggregation of single-walled carbon nanotubes, which is the major bottleneck to applications. We were able to develop a novel simple methodology to de-bundle and disperse such nanotubes using polymers, small molecules and solvents as dispersants.

The project allowed me to establish extensive national and international collaborations, not limited to the members of the EU Network. I successfully applied for a Marie Curie re-integration grant to continue my work in one of the leading groups on functionalization of nanotubes at the University of Trieste, staying in close contact with my colleagues at TCD. I am happy and also proud that I have recently returned to Dublin, as I have been awarded one of Science Foundation Ireland's prestigious “President of Ireland Young Researcher Awards” (PIYRA) which will allow me to build up my own research group over the next five years.

During my first Marie Curie fellowship I got actively involved in the Marie Curie Fellows Association (MCFA) as Advisory Board Member and National Coordinator for Ireland. The Marie Curie funding offers unique avenues for researchers like myself who are seeking a high level of interdisciplinary training and mobility. The mobility experience in several countries has certainly enabled me to develop a dynamic, flexible and creative scientific and personal outlook. I could not be more enthusiastic about the opportunities and possibilities that the Marie Curie funding schemes can offer.



Controlled Release Drug Delivery Systems

– *Dr Sarah Hudson, Chemical Engineering, MIT, Boston and MSSI, University of Limerick*

Upon coming towards the end of my postgraduate studies, I began to look around at further research options available to me as an Irish and EU young researcher. During my PhD studies, involving the development of novel mesoporous micro-particles for the immobilisation of proteins, I had come across Prof Langer's lab at MIT which focused on using novel nano- and micro-particles and degradable polymers and hydrogels for the controlled release of drugs in the body. Their work concentrates on the medical and biocompatibility difficulties of using novel nanotechnologies and polymeric systems in biotechnology and pharmaceutical industries.

While I wanted to learn more about controlled release drug delivery systems using novel materials, I also desired to remain in contact with the Irish University system, especially the Materials and Surface Science Institute at the University of Limerick which is a growing institute and offers great research opportunities and collaborations for young researchers. The Marie Curie Outgoing International Fellowship allows me to spend two years in a world renowned drug delivery lab but I will return for the third year (in November 2008) to the Materials and Surface Science Institute and apply what I have learned to materials and methods currently used there and potentially gain a foothold into growing biotechnological research areas in Ireland.

My project concentrates on practical biomedical applications using mesoporous materials, degradable polymers and nano particles. We are trying to rationally design materials, e.g. injectable hydrogels, for medical purposes. We are developing novel hydrogels that crosslink in situ in the body after injection, encapsulating drugs such as proteins, RNAi, pain relief medication, etc., releasing the drugs in a controlled fashion. Delivery systems using nano and micro particles of varying composition and structure are also being examined. Controlled release drug delivery systems require an overlap of material science with biochemistry, pharmacology and pharmacokinetics. We are currently developing delivery vehicles for the treatment of osteoarthritis in joints and delivery of local anaesthetics and materials for scaffolds for cell and tissue growth.



Photo: Dr Sarah Hudson

Real-time Recognition of Sign Language from Video Images

– *Dr Alistair Sutherland, School of Computing, Dublin City University*

Our aim is to research and develop a computer-based sign language translation system, which can recognise Irish Sign Language (ISL) and translate it to English text. Our system will be implemented on a standard personal computer connected to a colour video camera. Hand, face and body gestures will be recognised using image processing techniques. The system will have a vocabulary of over 1000 gestures and will incorporate an ISL grammar and syntax. The system will be trained and tested by native ISL signers.

We hired a bright Chinese researcher Han Junwei, who had previously worked in the University of Xian and Microsoft Research Labs in Beijing. He brought with him an expertise in colour segmentation of video images, which he was able to adapt to build a system, which would recognise human skin colour. The images on this page illustrate how the system can segment those regions, which represent human skin.

Sign Languages are the native languages of Deaf communities throughout the world. Sign languages are distinct languages in their own right with their own vocabularies and grammars. Up to now the Deaf have had to communicate with the Hearing either through an interpreter or through written forms of spoken languages, which are not the native languages of the Deaf community. This limits their access to information, education, employment, culture, participation in the community and legal and political

representation. A computer-based gesture recognition system would increase the opportunities open to the Deaf community throughout Europe.

The Marie Curie funding has had a beneficial impact on our School. The Fellow helped supervise a PhD student and passed on his expertise to other members of the group and to other groups, such as the Centre for Digital Video Processing, who have exploited his ideas in the field of video retrieval.

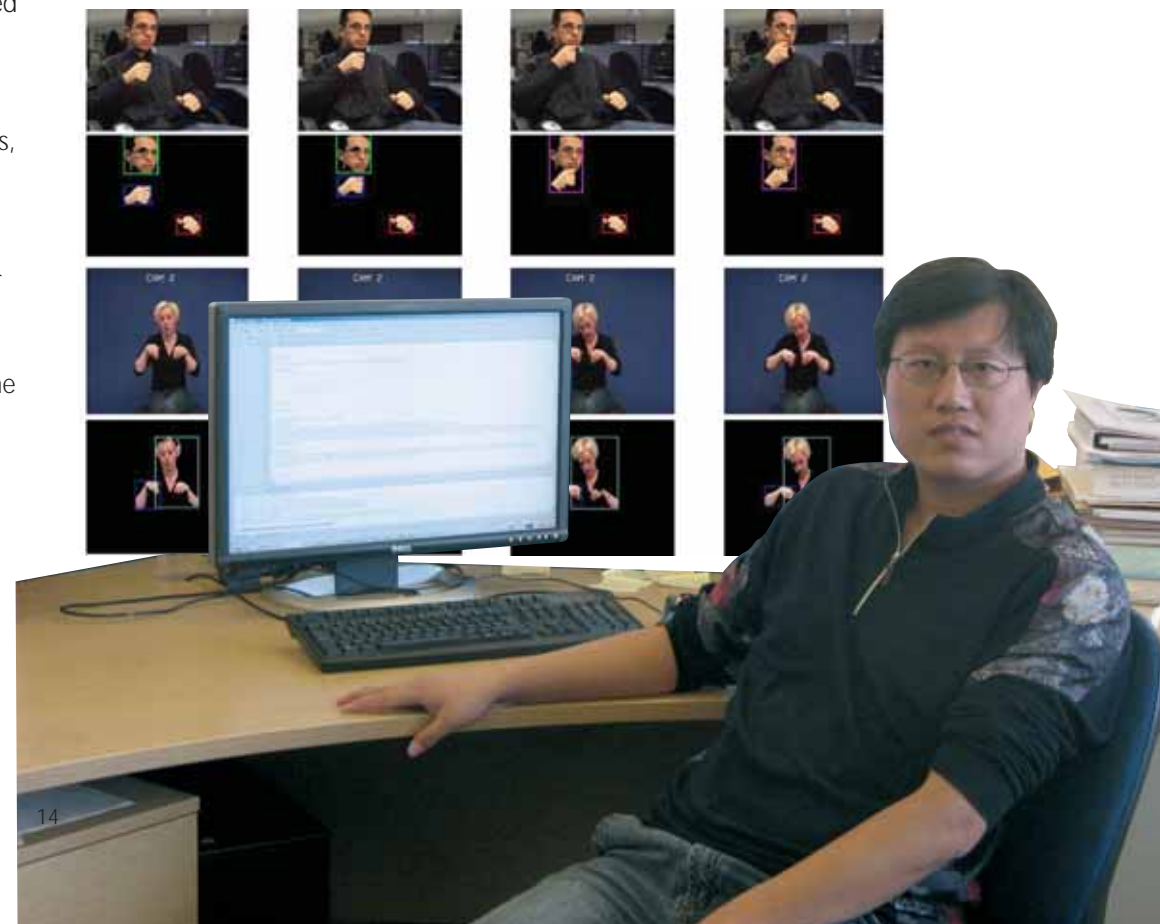


Photo: Han Junwei

Design of Novel Multi-Functional Materials based on Isopolyanions

– *Dr Tim McCormac and Dr Eithne Dempsey, on behalf of Tallaght Institute of Technology*

The main reasons for applying for Marie Curie support was to bolster our research activities by attracting a top level scientist. Also we wanted to open our research up to EU scrutiny through appraisal from recognised experts within the field.

The input of a top level researcher from China and the resulting growth in our research has rendered our group more attractive to external researchers. Dr Lihua Bi has added her own expertise to our group thereby aiding in the exposure of our postgraduate researchers to novel ideas and processes and augmented their training during their studies. Also Dr Lihua Bi was the first postdoctoral researcher originating from China within our institute. This alone has brought added value to ourselves as a team and as an institute.

The project was based on the study of redox active solid state materials which possess wide ranging applications from molecular electronics to sensor technology. Over the past number of years this class of materials has been receiving widespread interest from the scientific community. This project has allowed us to design a novel class of redox active stable materials, based upon polyoxometallates, that could be surface manipulated. Through the use of modern synthetic techniques in conjunction with the application of modern electrochemical and surface based techniques, these materials have been developed within our group. The next step shall be to ascertain whether these materials possess applications in real world devices.

The impact of the Marie Curie funding has had substantial effect on our group:

- Our profile both nationally and especially internationally has been raised
- Our reputation within this scientific field has been raised
- There has been a dramatic rise in our traditional research indicators, such as, referred publications, funding secured, over the past two years

- Several collaborations have arisen from links formed during this project
- Winning this funding has made our team more competitive in terms of securing research funding
- The funds have aided us in attaining research centre status within our institute

The value of the research to science in general is that the results of our work have allowed the attainment of novel polyoxometallate based materials which both possess interesting redox and photochemical properties that can be effectively studied either in solution or in the surface immobilised state.



Photo: Dr Tim McCormac and Dr Eithne Dempsey, (Joint Coordinators of CREATE Research Centre)

EMG-based Characterization of Oscillatory Neuromuscular Drives

– *Dr Madeleine Lowery, Department of Electrical Engineering, University College Dublin*

I applied for a Marie Curie International Reintegration Grant shortly after returning to Ireland to take up a lecturing position in the School of Electrical, Electronic and Mechanical Engineering, University College Dublin. I had spent the previous five years in biomedical engineering research in the Rehabilitation Institute of Chicago and Northwestern University working on the development of neural interfaces for the control of artificial limbs.

The purpose of the International Reintegration Grant is to support researchers who have spent time working in research outside the European Union. The grant provides support during the initial period of reintegration to ensure continuity of their research program and transfer of skills developed abroad. In my case, the Marie Curie International Reintegration Grant will help me buy equipment to establish a new experimental laboratory in UCD and will provide support for a biomedical engineering PhD student to work in the area of neural control of human movement. In addition, it will enable me to travel to Chicago to maintain research collaborations with colleagues there. The new experimental laboratory and the data which will be collected will enable me to apply for funding for future studies in related areas.

The project which the grant supports is an interdisciplinary study, the aim of which is to provide insight into neural coupling between the central and peripheral nervous systems in humans. It is known that the neurons that control human movement exhibit rhythmic or oscillatory behaviour at a range of different frequencies. This rhythmic behaviour is disrupted in

neuromuscular disorders such as Parkinson's disease and following stroke. However, its origin and functional significance remain largely unknown. This project will use a combination of computational modeling and experimental methods to examine the characteristics of rhythmic neuromuscular drives. In addition, it will examine how these are manifest in the electromyographic signal. An improved understanding of the role and functional significance of neuromuscular drives, and more accurate methods of measuring and characterizing them, will enable researchers to more accurately interpret the changes that occur in healthy and diseased muscle states. This will ultimately lead to the development of improved rehabilitation and treatment strategies for a range of neuromuscular disorders including stroke, spinal cord injury, and neurodegenerative disorders.

Photo: Madelaine Lowery, (Lecturer, School of Electrical, Electronic and Mechanical Engineering) (centre) with Shashi Rajaram Nagarami, (PhD student), and Clare Davidson, (summer student), both of whom are working on the study funded by the Marie Curie Fellowship.



Individual Excellence – *“Creating a Reputation”*

The Marie Curie Actions not only provide excellent training and career development opportunities, but also aim at recognising and promoting excellence in research. In the 6th framework programme this aim was addressed in particular by the “Marie Curie Grants for Excellent Teams”, a highly competitive scheme providing funding for the establishment of an independent transnational research team, led by a researcher with the potential to achieve outstanding scientific results.

Ireland has been very successful in this scheme, with 6 of these highly sought after awards based in Irish Universities. In the 7th Framework Programme the Excellence Teams are no longer part of the Marie Curie

programme – instead the newly created European Research Council offers “Starting Independent Research Grants” which are quite similar in structure. However, the ERC scheme will provide funding for up to 250 teams per call, more than ten times the number funded under Marie Curie. An opportunity not to be missed for any researcher at the point of setting up his or her own research group!

“With the creation of the European Research Council (ERC), Europe is now greatly expanding support for outstanding researchers in all disciplines”

Dr Graham Love, Science
Foundation Ireland



Biodiversity Dynamics at the Triassic-Jurassic Mass Extinction Event

– *Dr Jennifer McElwain, School of Biology and Environmental Science, University College Dublin*

The Marie Curie Excellence Grant program provided me with an unmatched opportunity to return to Ireland from America in order to establish a research team investigating biodiversity responses to past global climate change at University College Dublin. Marie Curie funding will enable me to establish an exciting and novel plant growth chamber laboratory and a research program which aims to unravel the causes and consequences of the fourth greatest extinction event in Earth history that occurred 200 million years ago at the boundary of the Triassic and Jurassic periods.

The main objective of 'MassExtinct' is to investigate the causes and consequences of the fourth greatest mass extinction event in Earth history and to use an understanding of past biodiversity responses to global climate change to inform current conservation policy. Over 90% of plant species and 40% of land animals went extinct at the Triassic-Jurassic boundary. The Marie Curie grant aims to test numerous hypotheses on the potential causal mechanisms of this so-called 'mass extinction event'. Plant fossils collected on expeditions to East Greenland will be studied in detail to explore how the diversity, ecology and structure of ancient vegetation changed from the Triassic to the Jurassic. An understanding of how the vegetation responded to global warming and environmental degradation which characterizes this event globally will provide key insights into an important component of ancient ecosystems.

The grant will partially support the development of a state-of-the-art plant growth room laboratory at University College Dublin which will provide a means on investigating plant and animal responses to past and future predicted climatic and atmospheric conditions. The grant will also enable the establishment of a highly international research team at UCD which will

enhance international collaboration, human mobility and understanding of different cultures.

Using the past as a key for the future cannot predict which particular species will be more or less susceptible to extinction, as the species makeup of ancient vegetation in the Triassic and Jurassic was completely different from that of today. However, this type of approach can make powerful general ecological predictions that may also provide clues to the magnitude, scale and extent of any potential future changes in plant biodiversity.



Migrant Children

– *Dr Caitríona Ní Laoire, Department of Geography, University College Cork*

The Marie Curie Excellence Grant has been a wonderful opportunity for a researcher in my position, as it is aimed at experienced researchers who wish to move or have recently moved institutions, and it provides the opportunity to manage a research contract and to lead a research team. I sought Marie Curie funding to set up a research team in Ireland to explore the immigration and integration experiences of children and young people in contemporary Irish society.

The period since the mid-1990s has seen an unprecedented increase in immigration to the Republic of Ireland. This means that while the migrant population of Ireland is constantly changing, it is now also increasingly becoming a multi-generational population, with an emerging younger generation attending schools across the country and participating in various ways in Irish society. Too often the perspectives of children and young people have been left out in studies of migration, and the aim of this research is to understand the migration experiences of children and youth in different communities from their own perspectives, by using child-centred research methods, focusing on Ireland as an interesting example of a rapidly changing European society.

The Marie Curie Excellence Grant has meant that we have been able to attract an interdisciplinary and international research team to UCC, with expertise in child migration, children's rights, asylum issues, racism and transnationalism. It means that the team has the time and resources with which to conduct in-depth multi-disciplinary research across a number of different migrant communities in Ireland. The research will contribute to the international literature in the area of childhood and migration and will be of high value to policy-makers, practitioners and researchers across Europe.



Factors Influencing The Educational Inequality Of Young People: *A European And Comparative Perspective*

– *Dr Dorren McMahon, The Geary Institute, University College Dublin*

The education of young people is one of the great challenges facing European governments. A considerable amount of comparative research has already been carried out on national differences in average levels of educational attainment. However, the substantive focus of this project is on variation around the average in a cross-national European context.

The reason for applying for this Marie Curie Excellence Grant was that it allowed for the development of a trans-national project team under my leadership to concentrate on the different discipline perspectives contributing to educational inequality.

In recent years there has been the emergence of systematic cross-national data sets which permit much more rigorous cross-national research and provide one of the main sources for investigating our project. Explanations are divided into structural, cultural and policy types. This project has a series of outputs culminating in a major monograph. The outputs include a series of working papers on line, a dedicated website, the development of an information portal on educational inequality, seminars, conferences and peer-reviewed publications.

A major attraction of the Excellence Grant is that it has enormous potential for knowledge transfer in the best practices of European research. The combination of the Excellence Grant and the host institution is bearing fruits in that there is now an emerging synergy between the quality academic research of the project and policy/societal needs.



Transferring Knowledge – *“Building Research Capacity”*

One of the main features of the Marie Curie Actions is that they help not only individual researchers but also institutions to benefit from the structured exchange of knowledge. In the 6th Framework Programme the “Marie Curie Transfer of Knowledge Development Scheme” provided opportunities for universities, research centres and businesses to reinforce or develop new competencies through the recruitment of experienced researchers from another country, with a focus on less-developed EU regions. This was a highly successful scheme for Ireland – more than 40%

of the entire Marie Curie funding in the 6th Framework Programme was acquired within the framework of the Transfer of Knowledge Development Action.

“The Transfer of Knowledge programme has made a major contribution to expanding research capacity in the Science and Humanities in NUI Galway”

Professor Nicholas Canny,
Dean of Research,
NUI Galway



Doing Disability Research: *No longer researching about us without us*

– *Dr Patricia O'Brien, National Institute for Learning Disability, Trinity College Dublin*

The National Institute for Intellectual Disability (NIID) has three major aims that promote Education, Research and Advocacy relevant to the needs of children and adults with learning disability as well as family members. At the core of the work of the NIID is inclusive research practice and within this context two Marie Curie Actions have been awarded. The first has seen Dr. Kelley Johnson, RMIT University Melbourne, Australia appointed as an Incoming International Fellow (IIF) to lead the project, *No Longer Doing Research about Us without Us*. As part of this project people with learning disability are involved in learning about research skills as well as becoming involved in a series of research projects across Ireland. The aims of these projects are of importance to people with learning disability who previously have had research done to them rather than being part of the process. Research topics range from what it is like to be a student with a learning disability within a third level environment, to documenting how people with learning disabilities spend their free time, to evaluating community living within a group situation. Other people with learning disabilities are recording the details of their lives as part of learning about life history research.

To date the value of having a Marie Curie Incoming International Fellow (IIF) has been to raise consciousness not only within Trinity College but across other parts of Ireland of the need for research to focus on what people with learning disability, as well as other marginalised groups, see as relevant to their lives. At the same time inclusive research means people with learning disability having some ownership over the process, such as being on an advisory committee or engaged as a co-researcher.

In addition, our Transfer of Knowledge (TOK) application was successful which will lead over the next four years to a number of international inclusive researchers transferring their knowledge to the NIID research team as well as associated Trinity staff. These researchers will work with the NIID team, inclusive of people with learning disability and family members, as a means of furthering the development of the team's capacity to implement a series of national projects relevant to the expressed needs of people with the lived experience of disability. The TOK project aims to build a disability research culture where Doing Disability Research means *No Longer Doing Research about Us without Us*.



Photo: Aisling O'Brien (student), Jan Mahon (student), Keith Giles (student), Sandra Tuchy (key worker), Kelly Johnson (Marie Curie fellow), Shane Byrne (student)

Atmospheric Chemistry: Crossing Transnational Boundaries Naturally

– *Professor John Sodeau, Department of Chemistry and Environmental Research Institute, University College Cork*

The study of our atmosphere is, by its very nature, international. Chemical emissions that we release to the air do not stay within our domain for very long; often they soon become the problem of some other country. Hence research into “air pollution” represents an excellent opportunity to collaborate with a variety of scientists based throughout Europe.

Such investigations are important because it has been estimated by the World Health Organization that exposure to fine particulate matter (PM) in outdoor air leads to about 100,000 deaths annually in Europe and that the effect of PM on life expectancy may be of the order of one to two years. As a direct result of the Marie Curie programme, four postdoctoral Fellows (an environmental scientist, a chemist, a biochemist and a computational expert) are currently trying to understand the very complicated story that Cork air tells us about particulate matter.

My specific interests have long been involved in understanding how chemicals in their particulate (or aerosol) form might change the delicate balance that our atmosphere has reached after millennia of evolution. And for that I need talented people to turn ideas into experimental action. The various Marie Curie schemes have been essential in bringing many young scientists from France, Italy, Spain, Norway, Germany and the UK to the CRAC (Centre for Research into Atmospheric Chemistry) laboratory in Cork. They have brought with them new outlooks, novel methodologies and a wide spectrum of cultural input to the even younger set of Ph.D. students who have been trained at UCC over the last six years. Without their

contributions my professional life would have been far less intellectually satisfying and productive.

The sponsored projects have also allowed us to study how various ozone-depleting species such as the halogens and nitrous acid are released from the polar snowpack: a field observation which has been known for several years but not understood. In addition the funding has also allowed us to develop a unique apparatus to investigate sulfuric acid aerosols and thereby establish the microscopic chemistry associated with “acid rain”.



Photo: David Healy (PhD student), Ian O'Connor (PhD student), Dr Jose Manuel Lopez Sebastioan (TOK fellow), Dr Emma Pere-Trepat (TOK fellow), Captain Pat Farnan (Harbour Master at Port of Cork)

LUCERNA: *New light on innovation data for enhancing regional competitive advantage*

– *Dr Paul Ryan, on behalf of the Centre for Innovation & Structural Change (CISC), NUI Galway*

This project is foremostly located within the Centre for Innovation & Structural Change (CISC), at NUI Galway, Ireland. CISC intends to build research capabilities through association with the University of Massachusetts at Lowell (UML), USA, and in particular through the secondment of Professor Mike Best, Director of the Center for Industrial Competitiveness at UML, to CISC as part of the Marie Curie Transfer of knowledge project.

The project will generate and embed a research capacity to gather, analyse, and disseminate very finely detailed innovation data in emergent and fast-changing high-technology clusters in Ireland. While the centrality of innovation to a Region's future socio-economic development is widely acknowledged and routinely emphasised in national and regional policy strategy statements, this policy priority is not currently matched in the Irish regions by an academic or policy research capacity for data gathering and integration, or for rigorous interpretative exercises which could inform policy. In this multi- and cross-disciplinary programme the principal disciplines involved are evolutionary economics, economic geography, management sciences, information systems, computer science and innovation studies. Professor Best argues that regional core competence is about distinctive regional technological capabilities that have been cumulatively and collectively developed across enterprises over time. Successful regions, like successful firms, have core competences or distinctive capabilities that impart competitive advantage. Like all capabilities, the regional variant takes time and teamwork to develop, is not easily imitated, and cannot be purchased in the marketplace.

Intense interest exists at the national and European level as to the potential for harmonizing the imperatives of economic growth and innovation.

Building innovation capacity is considered the key to the furtherance of the economic growth and job creation objectives for both Ireland and the European Union. Innovation is at the heart of the Commission's Framework Programme and in particular innovation networks and trans-regional cooperation. CISC at NUI Galway is principally concerned with these issues. Furthermore, the transfer of knowledge proposed in LUCERNA is expected to enhance significantly Ireland's capacity for meeting this challenge of innovation enhancement, in particular in the less favoured Border, Midland, West (BMW) region in which CISC is located. The lower base level of development in these regions means that there is an opportunity for appropriate policy interventions to make a significant impact on economic performance.

Photo: Paul Ryan (Project Leader) and Majella Giblin (Researcher)



An Egalitarian and Socially Inclusive Europe (ESIE)

– *Prof. Kathleen Lynch, The Equality Studies Centre, School of Social Justice, University College Dublin*

The UCD Egalitarian World Initiative (EWI) Network successfully secured a Marie Curie Transfer of Knowledge award in 2006. The proposal was ranked among the very best of all the social sciences applications in Europe. The aim of this four year programme is to develop the intellectual infrastructure for a more Egalitarian and Socially Inclusive Europe (ESIE) within University College Dublin (UCD). It is planned to make UCD a world leader in research, teaching and outreach on equality, social justice and human rights. The project will lead to the creation of a powerhouse for developing a strong intellectual infrastructure for a more social Europe.

The EWI offered an unusual and compelling vehicle for the Transfer of Knowledge programme. Hosted by the Equality Studies Centre in the School of Social Justice at UCD, and with a network of over 80 staff from UCD's five colleges, the EWI is an inter-disciplinary, university-wide initiative. Through the EWI, the Marie Curie project will serve to enhance institutional capacity in egalitarian theory, practice and equality sensitive research methodologies. It will have a profound effect on the life of the university, on Irish society and ultimately on Europe.

Twelve world-class researchers will be recruited to UCD for periods varying from three months to one year to work with the EWI network and its thirteen research clusters. In addition, fifteen UCD staff will spend time at centres of excellence throughout Europe that are partners in the project. These include Oxford and Cambridge Universities as well as the Universities of Kent, Brighton, Leeds, Pisa and Trondheim.

Photo: Dr Mary Darmanin, (Senior Lecturer, Faculty of Education, University of Malta, Marie Curie Incoming Fellow under the Transfer of Knowledge Programme), Dr Pauline Faughan, (EWI Co-ordinator), Ms Mary McEvoy, (Marie Curie Work Programme Administrator, Equality Studies Centre, UCD School of Social Justice), Ms Elaine Phelan, (Researcher, UCD)



BurnQuest: Towards a World Class Combustion Chemistry Centre

– *Prof. John Simmie, Environmental Change Institute, National University of Ireland, Galway*

We have been successful in two Marie Curie applications; one for Host Fellowships in 2002 and one under the Transfer of Knowledge programme in 2005. Both of these have enabled us to recruit postdoctoral and more senior researchers which has, and will increasingly, help us to achieve our goal of a 'World Class Combustion Chemistry Centre'.

Success in Marie Curie schemes is beneficial far beyond the purely financial; it validates your research group as one of the leaders in Europe and essentially puts you on the world map.

So what is a Combustion Chemistry Centre interested in? The chemical details of what happens when a 'fuel' (petrol, diesel, biofuel, hydrogen, etc.) burns either in an internal combustion engine to power cars, or in a gas turbine to produce electricity or even in an incinerator to detoxify waste and produce heat.

To do this work we have highly specialised home-built equipment found nowhere else in the world in one laboratory allied to expertise in the simulation of the combustion event in a variety of environments such as premixed laminar flames, shock waves, jet-stirred reactors, etc. Understanding the chemical details allows one to predict what species will be coming out the exhaust pipe apart from carbon dioxide and water of course and whether these will impact negatively on humanity or the environment.

Photo: From left to right: Stephen Dooley, Dr Emma Silke, Dr Guillaume Vanhove, Darren Healy, Prof. John Simmie, Gráinne Black, Wayne Metcalfe at 31st Combustion Symposium in Heidelberg



Study of the Molecular Mechanisms of Cell Migration

– *Prof. Dermot Kelleher, Institute for Molecular Medicine, Trinity College Dublin*

Within the Institute for Molecular Medicine at Trinity College Dublin, we have developed significant expertise in high content screening. This is a form of technology which allows us to perform high quality digital imaging of cells, either on a fixed time basis or in real time and to perform digital analysis of imaged material. This technique can be performed with rapid throughput, using systems that would permit the analysis of approximately 350 samples in one run. The attraction of this technology is that it allows extremely complex analysis to be done in an objective, unbiased and rapid way. In addition, it allows the analysis of cellular signalling events that are responsible for many of the functions of cells that may be perturbed in diseased states.

Our reason for seeking Marie Curie funding was to couple this technology to a second powerful technology for use in analysis of human cells. This is the use of small inhibitory RNA molecules to specifically block the production of individual protein molecules within cells. In this context, therefore, it is possible to analyse a range of such inhibitory molecules and to screen for those which have functions in blocking specific cellular events, such as cell proliferation or cell death, for example. The ability to perform analysis of large libraries of siRNA compounds provides an opportunity for the development of whole genome screening at a functional level. Hence, if the analysis could be done with sufficient accuracy and throughput, it would be possible to screen potentially 40,000 genes using an siRNA library, covering the entire genome. Hence, we have requested funding for the Transfer of Knowledge grant to allow us to incorporate such a screening capacity into our high content platforms. Such a provision will provide us with the ability to screen

for molecules that interfere with immunological events and could potentially have a role in inflammatory diseases, such as arthritis or ulcerative colitis.

In addition, the ability to screen for molecules that would block proliferation has clear implications for malignancy. Hence, this funding has the capacity to have an enormous impact on the scale of the research which we are undertaking. If the programme is set up in order to develop a technological approach for application of such siRNA molecules to high content screening, it is possible to answer extremely complex questions in one screening run.

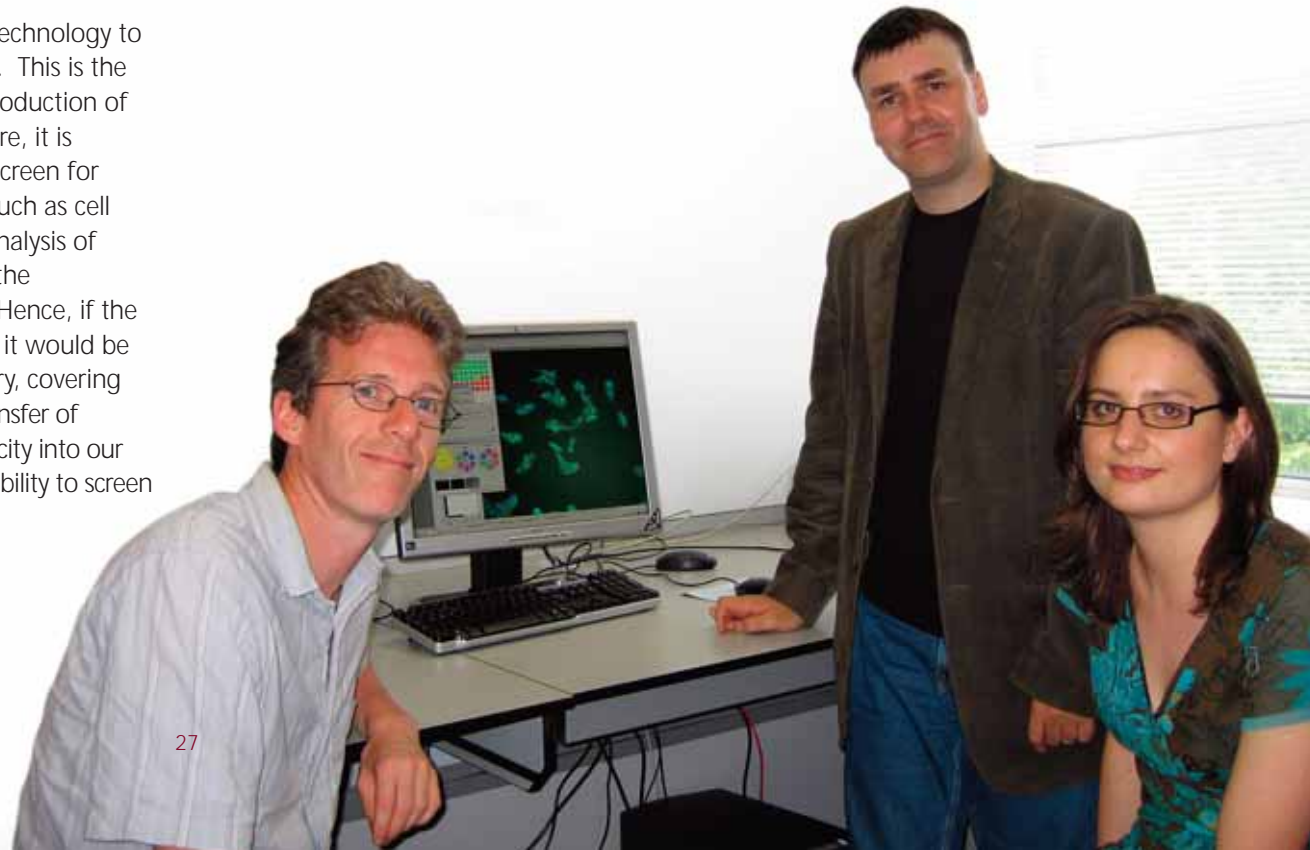


Photo: Dara Dunican, Anthony Davies (Host fellows)
and Emily Bennett (incoming MC fellow)

Development of Technologies to Identify Signalling Pathways Involved in Lung Disease Processes

– *Dr Shirley O'Dea, Biology Department, National University of Ireland, Maynooth*

The decision to apply for a Marie Curie Transfer of Knowledge Grant for the Biology Department at NUI Maynooth was made following a seminar by the IUA on the topic of Marie Curie funding opportunities. Personally, I was keen to find an accessible route into the 6th Framework Programme. At a Departmental level, several members of our multidisciplinary staff were in the early stages of establishing and equipping a Proteomics Facility. The Marie Curie TOK Grant appeared to be an ideal vehicle with which to obtain significant funding for the Department, enabling us to rapidly come up to speed on proteomics technologies.

The project involves a consortium of staff members with a range of expertise including lung cell biology, virology, microbiology, immunology and bioinformatics - but all with an interest in lung disease. The goal is to develop proteomics and lipidomics as platform technologies to expedite identification of the key intracellular signalling pathways involved firstly in normal lung repair processes and subsequently in three major respiratory disease processes: human parainfluenza viral infection, *Aspergillus fumigatus* fungal infection and asthma. Bioinformatics techniques will be developed in parallel and applied as a novel approach to increasing understanding of lung signalling networks. Identification of these key pathways and interaction networks will significantly enhance understanding of lung disease development processes and, crucially, will provide novel strategies for intervention with treatment and curative regimes.

World-class senior researchers with proteomics and lipidomics expertise are now being recruited through this Marie Curie TOK Grant. These researchers will establish platform technologies that will significantly enhance the research

capabilities of the associated research groups within the Department in terms of expertise, techniques, resources and research outputs. In addition, the recruited researchers will be involved in teaching under-graduate and post-graduate students who will benefit greatly from the opportunity to learn about state-of-the-art technologies.



Photo: Two undergraduate summer students, Anna Lenard and Sinead Brien, who carried out proteomics-based projects under the supervision of Dr Bernadette Moore, Marie Curie Fellow.

Galway Lab for Biomedical Data Mining

– *Dr Michael Madden, Laboratory for Biomedical Data Mining, National University Ireland, Galway*

The goal of this project is to establish and develop a new interdisciplinary research lab for Data Mining in Biomedical Science in the National University of Ireland, Galway. This is a new area of research expertise for the university. It will integrate and extend research being conducted here by several separate research groups.

Data mining involves a range of techniques that are concerned with extracting interesting knowledge from datasets that are typically large and unstructured. This knowledge can take the form of rules, patterns, structure or associations that summarise the whole dataset or relate to specific aspects of it. To be interesting they must be non-obvious, comprehensible, meaningful and potentially informative or useful.

We applied for funding under the Marie Curie Fellowship programme for Transfer of Knowledge Host Development Scheme (ToK-DEV), as it ideally suited our aims. This programme supports academic institutions seeking to develop new areas of expertise and improve their research potential. This is achieved through hosting of postdoctoral researchers, who bring with them specialist skills and knowledge related to the new area of expertise being developed, and through research training secondments by the project participants to other institutions abroad, so that they can acquire new knowledge and bring it back to be absorbed and embedded in the university.

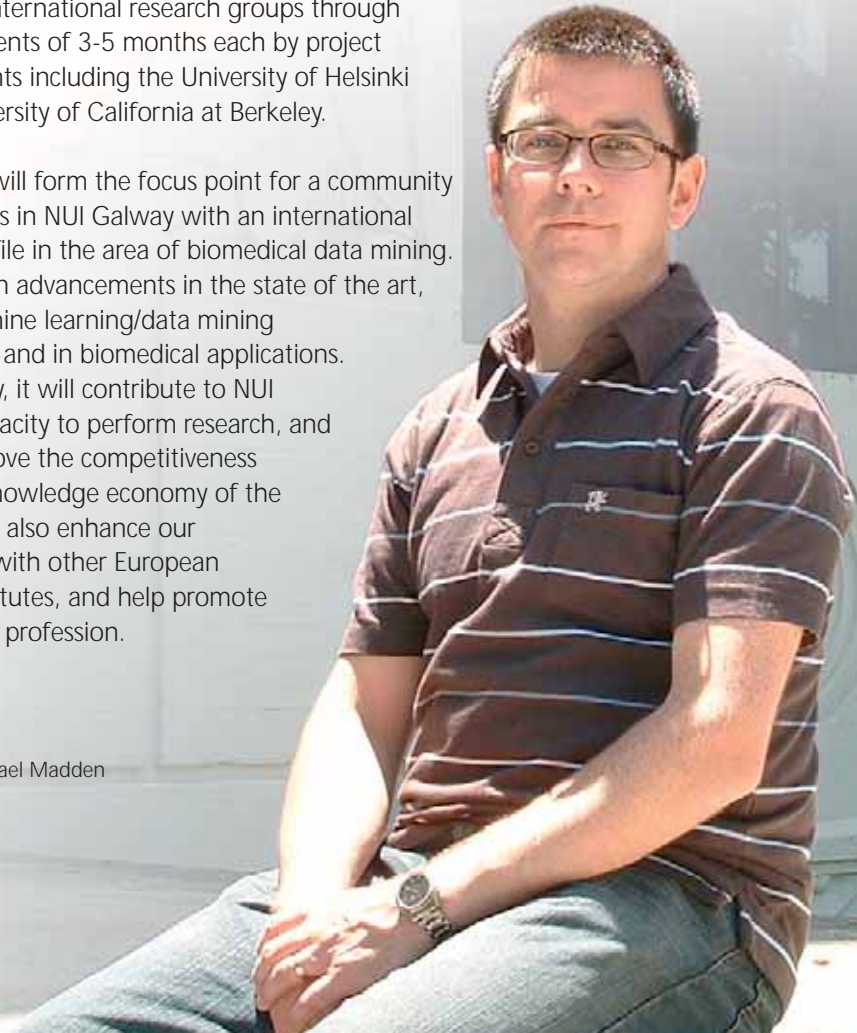
In our case, the project goal will be achieved through three principal work components:

1. Inward knowledge transfer, involving three experienced researchers conducting research for two years each into data mining for each application stream

2. Embedding of knowledge in the university and dissemination to the wider community, through seminars, publications, and a new website of tools and technologies for biomedical data mining
3. Development of research collaborations with leading international research groups through secondments of 3-5 months each by project participants including the University of Helsinki and University of California at Berkeley.

This project will form the focus point for a community of researchers in NUI Galway with an international research profile in the area of biomedical data mining. It will result in advancements in the state of the art, both in machine learning/data mining technologies and in biomedical applications. More broadly, it will contribute to NUI Galway's capacity to perform research, and help to improve the competitiveness within the knowledge economy of the region. It will also enhance our interactions with other European research institutes, and help promote research as a profession.

Photo: Dr Michael Madden



Partnerships – *“Bridges between Academia and Industry”*

In order to facilitate the conversion of research outcomes into innovation and economic impact, it is essential to foster a culture of collaboration and exchange of knowledge between universities, institutes of technology and public research institutions on the one hand, and private enterprises including SMEs on the other. The Marie Curie Industry-Academia Partnership Scheme provides financial support for the intersectoral exchange of staff across national borders. The aim of the action is the

development of strategic and long-lasting partnerships between the academic world and the world of enterprise, aiming at the establishment of sustainable collaborations of mutual benefit.

“it is essential to foster a culture of collaboration and exchange of knowledge between universities, institutes of technology and public research institutions on the one hand, and private enterprises including SMEs on the other.”

Dr Imelda Lambkin
Director of the FP7
National Support Structure



Development of Technologies for Advanced Treatment of Metal Alloy Surfaces

– *Aidan Kennedy, SIFCO Turbine Components Ltd, Cork*

SIFCO is a Cork based engineering company with about 100 employees. The company's business is the technology of gas turbine engines, in particular the repair, manufacture and coating of key components of these engines. It's a high technology business, with customers constantly requiring improvements – in particular improved protective coatings for turbine blades which are exposed to extreme conditions of thermal and mechanical stress while in service in these engines.

SIFCO needs to keep up with or ahead of the latest technological advances in order to retain its customers and to attract new customers. To this end we wished to develop strong links with outstanding centres of research expertise in surface coatings of advanced alloys. Therefore we applied to the Marie Curie Programme to support our proposal to build industry/academia partnerships with three Universities – Cranfield University (England), the University of La Rochelle (France) and Trinity College Dublin. The title of our project is "Development of Technologies for Advanced Treatment of Metal Alloy Surfaces with Applications in the Gas Turbine and Medical Implant Sectors". The project will involve the secondment of 12 researchers between SIFCO and the 3 University partners to carry out agreed, relevant research projects over a 4 year period.

We expect the project will have a very positive impact on the company by exposing key members of our engineering staff to the latest research developments in 3 Universities all of which have well established international reputations in relevant technical fields, and also by infusing new thinking into the traditional "in house" processes and approaches to technology development within SIFCO.

The project will provide jobs and advanced training in applied research for 4 researchers who already have more than 4 years research experience. It will also provide technology transfer opportunities for 8 senior researchers from the 4 participant organisations. In the medium term it will help SIFCO to compete in a very competitive global market by enhancing the company's image as a developer of new technologies.



Drug - Drive Testing

– *Dr Ian Muirhead, Biosensia, Cork*

There is a major growing societal problem of drugs of abuse driving particularly in Europe, the USA and Australia. Drug driving is in many areas more prevalent than drink driving and it is now believed that drugs of abuse are a contributing factor in up to 25% of fatal road accidents. Governments worldwide are aware of this problem and are introducing legislation for roadside testing for impairment under the influence of drugs. Detecting traces of the drug directly in oral fluid (saliva) has been identified as the best method of detection for roadside testing as it is easy to collect.

Biosensia has combined its expertise in polymer micro-fluidics and micro-optics systems with the development of drugs of abuse Molecular Imprinted Polymers (MIPs) at Cranfield University (UK) to produce a laboratory prototype of a hand-held instrument which uses disposable polymer chips containing MIPs to detect drugs of abuse to the ppb (parts per billion) level in saliva. This is world leading scientific and engineering research in terms of MIPs performing in saliva and a world leading technological platform development in terms of MIPs in disposable point of use sensor technology.

Through the Marie Curie Industry-Academia Partnership, Biosensia will be able to accelerate further research and development of a range of drugs and drug metabolites that can be detected using the combination of micro-fluidic and MIP technology. The resultant product and technology platforms developed by this multidisciplinary project could have major health safety and societal benefits for Europe.

The resulting strategic partnership that the Marie Curie funding enables is not only synergistic and complementary but will be valuable for its contribution to breaking barriers between traditional industrial and academic sectors. The considerable transfer of staff can only lead to improved co-operation and mutual understanding between academia and industry. Winning the Marie Curie Grant has given our company a further seal of approval with customers, development partners and Venture Capitalists.



Photo: Ian Muirhead, (VP Business Development) and Gabriel Crean, (CEO Biosensia) holding a swab cartridge and testing unit.

Axiom: Automated Extraction of Image Object Metadata

– *Dr Anil Kokaram, www.sigmedia.tv, Trinity College Dublin*

Marie Curie funding was sought because the programme allows laboratories to concentrate on research and has a broad remit to encourage the interchange of young researchers. This fit well with the objectives of a growing research group. The Industry-Academia Partnership (IAP) programme was attractive because it provided a simple mechanism to allow a closer connection to industry at the heart of our work area. Allowing recent doctoral graduates from Sigmedia to have work experience in a high profile company in the film industry gives them the perfect start to their career and makes Sigmedia an attractive proposition for those looking to start research careers.

The Sigmedia Laboratory has successfully applied to the Marie Curie Programme since 2000. We have been funded through both the Research Training Network (RTN) and the IAP Programme. The MOUTIR project (Models for Unified Multimedia Information Retrieval) investigated new ways of searching digital media content. The idea was to extract audio and visual features such as loudness, pitch, shape and colour, and combine them to create summaries of content, or to allow users to query content in a way that they had never been able to before. Our publications and demonstrations can be seen at www.moumir.org.

Axiom, an IAP project, involves collaboration between www.thefoundry.co.uk and Sigmedia. Axiom exploits the underlying knowledge in video feature extraction that we possess to create a smart indexing scheme for media used in digital cinema post-production. The Foundry, based in Soho, London will use our expertise so that when digital artists edit a film they will be able to “find all shots like this one” or “find shots with fire” without needing to index the data manually. Several of the latest blockbuster movies including Lord of the Rings, The Matrix, The X-Men etc use technology heavily influenced by work in Sigmedia. See www.sigmedia.tv for demo video and audio.

Marie Curie funding fills a gap left by other forms of research funding in that research travel is encouraged and well financed in this programme. Through the Marie Curie programme, Sigmedia can provide a kick start to the industrial research careers of its graduates, Sigmedia staff are able to attend all the international conferences in film and video processing, and has been able to employ post-doctoral researchers regularly over the last 6 years.



Photo: Dr Anil Kokaram with the 'Oscar' received by Sigmedia at the Scientific and Technical Academy Awards Ceremony, Los Angeles, February 2007.

Bivalves from Farm to Fork

– *Dr Julie Maguire, Daithi O'Murchu Marine Research Station, Cork*

Scallop aquaculture is constrained by the annual inconsistency in the quantity and quality of the wild seed supply. Differences in the quality and condition of the subsequent fully grown scallops provide processors with a raw material very different from other food materials used in modern processing industries. With the increased demands for shellfish products due to their healthy image, improvements in food technology and product development are required. This project will integrate multi-disciplinary resources from bivalve hatchery production and on-growing to seafood processing by considering a “total food chain” approach on all research, training and technology transfer levels. The objective of the project will be to develop an economically viable and environmentally sustainable genetic breeding programme for scallops in order to produce seed in a hatchery to supplement the inconsistent wild seed supply.

Even though we have an enormous amount of hands on experience and numerous successes in research and development, our ability to further develop and integrate novel technologies was limited due to economic and time constraints. In addition we did not have the specific competency in the area of quantitative genetics and breeding programme design which will be acquired through the transfer of knowledge from the research fellows and through participation in the research process.

As mentioned earlier the group intends to facilitate a multi-disciplinary research programme through the recruitment of experienced researchers to develop an environmentally sustainable hatchery breeding programme. The aim of the programme is to increase the growth rate and survivability of scallops using state-of-the-art hatchery and on-growing techniques.

The direct benefits to the five partners; Daithi O' Murchu Marine Research Station, Institute of Marine Research (Norway), Institute of Aquaculture (Norway), Fastnet Mussels (Ireland), Alma Mater Studiorum Università di Bologna (Italy) will be the new multi-disciplinary competencies acquired

through the transfer of knowledge. SME partners will acquire an understanding in experimental design, analytical techniques, statistical analysis, data interpretation and ethical issues and communication techniques. University/Research partners will understand the needs of the aquaculture and processing sectors from an industry perspective regarding socio-economics, national and EU food legislation, practical knowledge and various site specific husbandry practices.

Declining wild fish stocks are creating the need for efficient farmed production methods and improving aquaculture is a central theme of the new Common Fisheries Policy. Aquaculture has frequently created employment in financially depressed peripheral coastal regions where jobs historically have been lost due to mechanisation of agriculture and fisheries. Increased aquaculture and processing would secure employment in these areas where the economy is fragile.





The Irish Marie Curie Office at the Irish Universities Association is the National Contact Point for the European Commission's People (Marie Curie) Programme in Ireland. The office provides advice and support to researchers, research active organisations and companies in preparing their proposals for submission and in managing their Marie Curie Projects.

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The Irish FP7 National Support Network comprises 33 national contact points and national delegates from ten Irish organisations, of which the IUA is one. The National Director, Dr Imelda Lambkin, is based at Enterprise Ireland which is the organisation mandated to coordinate Ireland's participation in FP7. The network offers assistance to participants in FP7 in the form of advice on participation and financial incentives. Visit www.fp7-ireland.com for more information and contact details of the members of the National Support Network.

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To facilitate the movement of researchers to and from Ireland and to improve the supply of information on research expertise in this country, two key services have been put in place:



The Researcher Mobility Network is a European Commission initiative, offering a dedicated support and advisory office for researchers, research active organisations and industry in every European country. The Irish Network's online portal www.researchcareersireland.com offers practical advice and information on visas, work permits, job opportunities and much more. Companies and universities advertise their R&D vacancies on this portal and identify suitable candidates according to their recruitment requirements.

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An Roinn Fiontar, Trádála agus Fostalochta
Department of Enterprise, Trade and Employment



www.researchcareersireland.com
expertiseireland.com provides a fast and effective gateway to the island's knowledge base. It is an advanced online portal, which combines, in one searchable database, up-to-date details of more than 5000 expert profiles as well as funding information, technology transfer and collaborative opportunities for the island of Ireland.

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