

Programme

Innovation through Knowledge Transfer 2009: Research with Impact

2 December 2009, Hampton Court Palace

Chairs' welcome

We are very pleased to extend to all delegates and speakers a warm welcome to this First International Conference – *Innovation through Knowledge Transfer: Research with Impact – InnovationKT'09* at Hampton Court Palace, hosted by Kingston University and organised by KES International, Kingston University and the Institute of Knowledge Transfer.

Kingston University has developed a reputation for excellence, diversity and innovation in knowledge transfer. KES International is a knowledge transfer organisation providing high-quality conference events and publishing opportunities for the several thousand research scientists and engineers who form its membership. The Institute of Knowledge Transfer exists for those who are professionally engaged in making the exchange of knowledge more effective. Together, these bodies, influential through their work in knowledge transfer, have combined their efforts to provide a rare and welcome opportunity for those involved in the field to present their work.

Many knowledge transfer practitioners noticed a lack of opportunities for publishing papers on the subject. While there are remarkable success stories to be told of the benefits of knowledge transfer, they frequently do not fit the profile of papers accepted for current conferences, which are focussed more on research. Consequently, these stories often do not reach those who would be interested to hear them.

This inaugural InnovationKT conference provides an opportunity for presentation and publication on matters relating to all forms of beneficial university-business interaction. The conference has provided the opportunity to raise the profile of knowledge transfer, communicate interesting and significant outcomes, present new and innovative mechanisms, and help disseminate best practice.

InnovationKT'09 has attracted academics, business people, and knowledge transfer sponsors and professionals. It offers all those involved in knowledge transfer, or those who would like to be, a forum through which to discuss issues of common interest and learn from each other in a true spirit of knowledge exchange. The conference has significant and very welcome participation from international contributors.

Our call for papers resulted in a large number of submissions with 41 papers being accepted for presentation on the basis of quality and relevance to the conference. Abstracts of all presented papers are published in this conference digest. The conference proceedings, published by the prestigious Springer-Verlag publishing house after the conference, will contain book chapters formed from 30 full conference papers.

This conference has attracted over 120 registered delegates. The substantial number of high quality papers, and the large number of delegates attending, demonstrates the appetite for a conference such as InnovationKT. It is intended that InnovationKT'09 is the first in a regular series of conferences and a committee is being formed of those interested in shaping future InnovationKT events.

We appreciate the many people who have given their time freely to make this a success. We would particularly like to thank the Honorary Chairs, Sir Brian Fender (IKT) and Iain Gray (TSB), for lending their support to the conference and Sir Peter Scott, Vice Chancellor of Kingston University, for opening the conference. We thank the high-profile keynote speakers, Sir Brian Fender and Dr Claire Graves (RCUK), for informing delegates and provoking discussion.

We also acknowledge the members of the International Programme Committee who were essential in providing their reviews of the papers. We are very grateful for this support, which enabled us to ensure high quality papers. Important contributors to Innovation'KT were made by the authors, presenters and delegates without whom the conference could not have taken place. The staff at Kingston University and KES International worked hard to make this conference a success, and we thank them.

We hope that you will find Innovation KT '09 an interesting, informative and enjoyable experience.

Bob Howlett

Executive Chair, KES International

and

Charlene Edwards

Head of Knowledge Transfer, Kingston University

Conference Schedule

8.30	Registration and coffee in the Garden Room
9.20	Welcome from the conference organisers
9.30	Opening Address – Sir Peter Scott, Vice Chancellor, Kingston University
9.45	Plenary Session Speaker: Sir Brian Fender, IKT Innovation and Knowledge Transfer: the Role of the Individual Chair: <i>Iain Gray, TSB</i>
10.30	Coffee and walk to breakout rooms
11.00	Parallel sessions. A. Knowledge Transfer Case Studies (1) Chair: <i>Edward Friel, University of Ulster</i> B. Knowledge Transfer in the Arts and Community Chair: <i>Charlene Edwards, Kingston University</i> C. Innovative Knowledge Transfer Techniques Chair: <i>Sharon Phillips, University of Sussex</i> D. Strategic and Organisational Approaches to Knowledge Transfer Chair: <i>Prof Cecilia Zanni-Merk, INSA-Strasbourg, France</i>
13.00	Lunch
14.15	Plenary Session Speaker: Dr Claire Graves Title: RCUK's knowledge transfer and economic impact strategy Chair: <i>Iain Gray, TSB</i>
14.45	Break and walk to break-out rooms
15.00	Parallel sessions. E. Knowledge Transfer Case Studies (2) Chair: <i>Dr David Brown, Portsmouth University</i> F. Innovation and Enterprise Chair: <i>Dr Debbie Buckley-Golder, AEAT</i> G. Knowledge Transfer Methodology and Practice 1 Chair: <i>Deborah Lock, Kingston University</i>
17.00	Return to the Garden Room
17.10	Deborah Lock , Observations from the HE perspective
17.25	Closing comments from the conference organisers
17.30	Drinks reception and canapes
18.30	Event closes

**Please note this programme is subject to change.*

Session A: Knowledge Transfer Case Studies (1)

Chair: Edward Friel, University of Ulster

Paper No	Title	Author	Other Authors
InKT-003	Using Multiple Criteria Decision Analysis to aid the selection of Enterprise Resource Planning software: A case study	Mr Ross Parkhill (DMEM University of Strathclyde, Glasgow)	Professor Valerie Belton, Professor Umit Bititci, Miss Catherine Maguire, Mr Alan Roberts, Dr Marisa Smith
InKT-006	Applying the Structural Complexity Management to Knowledge Transfer in Small and Medium-Sized Companies	Dr. Maik Maurer (Institute of Product Development, TUM)	Mr Alexander Benz, Dr. Hermann Klinger
InKT-014	Establishing a Business Process Management System in a Telecoms Company	Dr Stewart Green (University of the West of England)	Mr Ali Abughoush, Mr Ian Beeson, Mr Tim Hill, Mr Justin Nwakacha
InKT-015	Critiquing Business Process Models to Facilitate the Identification and Selection of Optimal IT Systems	Dr Stewart Green (University of the West of England)	Mr Michael Back, Mr Stephen Batty, Mr Joe Jewell, Mr Martin Webber
InKT-030	Outcomes and Benefits of a Knowledge Transfer Partnership in Chemical Science	Dr Ian Bradshaw (Liverpool John Moores University)	Dr Neil Rosenburgh, Dr Linda Seton
InKT-013	Integrated Care e-Pathways using Formic Fusion for patients undergoing elective hip and knee replacements	Mr Mohammed Rizwan (Durham University & University Hospital Hartlepool)	Dr Eileen Scott, Dr Oliver Vogt

Session B: Knowledge Transfer in the Arts and Community

Chair: Charlene Edwards, Kingston University

Paper No	Title	Author	Other Authors
InKT-043	The margins of Art practise bordering on industrial development	Professor Stephen Hoskins (University of the West of England, Bristol)	
InKT-046	The Manifesto of Possibilities: Commissioning Public Art in Urban Environments	Dr Cameron Cartiere (Birkbeck, University of London)	
InKT-037	LCACE and the role and impact of Knowledge Exchange between the research base and the arts and cultural sectors in London.	Sally Taylor (London Centre for Arts and Cultural Exchange)	Evelyn Wilson (London Centre for Arts and Cultural Exchange)
InKT-042	Innovating Knowledge Transfer in the Social Sphere; a move to Knowledge Exchange	Miss Ceri Davies (University of Brighton)	
InKT-053	Enterprise Education as a Means of Developing Social Inclusion	Dr Martha Mador (Kingston University)	Mr Ben Walford
InKT-002	Outcomes from a cross sector knowledge transfer partnership: Heritage2Health	Ms Theresa Nash (Kingston University and St George's, University of London)	Ms Denise Forte, Mr Tom Clarke, Dr Pat Brown, Dr Heather Smith, Ms Catherine Bloodwoth

Session C: Innovative Knowledge Transfer Techniques

Chair: Sharon Phillips, University of Sussex

Paper No	Title	Author	Other Authors
InKT-041	Facilitating knowledge transfer to drive innovation in SMEs	Dr. Ileana Hamburg (IAT, FH Gelsenkirchen)	Prof Dr Mihnea Marin
InKT-005	The Use of Open Source Software Licensing in Academia	Mr Stephen Marshall (University of Glasgow)	
InKT-056	Knowledge transfer and management in networked open innovation environments: Innovation management from the viewpoint of a company	Dr Petra Turkama (Center for Knowledge and Innovation Research, HSE)	Ms Tuija Heikura
InKT-025	A Completely New and Free International Portal for Technology Seeking or Technology Marketing	Mr Mark Thompson (The University of Manchester Intellectual Property Ltd)	
InKT-049	Using Emotional Intelligence and NLP training to promote and sustain relationships within KTPs	Ms Ruth Slater (University of Central Lancashire)	Dr Ailsa Brotherton, Dr Christina Lyons, Dr Karen Whittaker
InKT-054	Innovative knowledge transfer mechanisms and the potential role for theatrical methods in the propagation of good data handling practice.	Mr Fintan Clear (Brunel University)	

Session D: Strategic and Organisational Approaches to Knowledge Transfer

Prof Cecilia Zanni-Merk, INSA-Strasbourg, France

Paper No	Title	Author	Other Authors
InKT-044	Occurrence and influencing variables of knowledge barriers in knowledge-intense domains	Dipl-Kfr Carolin Fiechter (Universität der Bundeswehr München)	Prof Dr Eva-Maria Kern, Mr Christoph Kuderna
InKT-052	Applied Imagination – Designing Innovative Knowledge Transfer Approaches	Dr Leon Cruickshank (ImaginationLancaster, Lancaster University)	Mr Martyn Evans, Ms Alison Mather
InKT-001	Knowledge Transfer Partnerships at the University of the West of England	Mr Gareth White (University of the West of England)	Mr Ian Freeth, Dr Xiaojun Wang
InKT-035	The InterAct Project: A unique collaboration between six leading UK PSREs	Dr Louise Sarup (IP Pragmatics Limited)	Dr Louise Byass, Dr Rupert Osborn
InKT-050	The Yorkshire Enterprise Fellowship Scheme	Dr Lindsay Georgopoulos (YTKO Consulting Ltd)	Dr Suzanne Emmett
InKT-033	CITE: Centre for Innovation & Technology Exploitation	Dr Tony Allen (Nottingham Trent University)	
InKT-034	Knowledge Transfer and the National Physical Laboratory	Mr Tim Jones (National Physical Laboratory)	Mr Phil Cooper, Mr Francis Tuffy, Dr Stuart Windsor

15.00–17.00 InnovationKT afternoon parallel sessions

Session E: Knowledge Transfer Case Studies (2)

Chair: Dr David Brown, Portsmouth University

Paper No	Title	Author	Other Authors
InKT-099	The Virtual Engineer	Dr David Brown (Portsmouth University)	Dr Farshad Fahimi, Dr Lee Fenney
InKT-058	StorePOINT: Revolutionising Art Work Production	Mrs Mary Thomson (Kingston University)	Mr Mark Alford, Mr Richard Thompsom, Mr Rick Z Xu
InKT-059	A Multidisciplinary Knowledge Transfer Partnership in Development of Lift Simulator	Professor Andrew Ordys (Kingston University London)	Mr Richard Burley, Dr Andrew Curley, Dr Jaroslaw Francik, Mr Adrian Godwin, Mr Piotr Smolenski
InKT-060	Using information systems to drive process change: an aerospace industry example from the Knowledge Transfer Partnership scheme	Dr Martin Wynn (University of Gloucestershire Business School)	Mr Raul Brandao
InKT-061	SME Supplier Management: An exercise in change management	Mr Russell Harbison (Buckinghamshire New University)	Mrs Shilar Bryant
InKT-045	Information management process sharing knowledge at worldwide steel company	Master Gabriela Alves (FEAD – Brazil)	Phd Jorge Neves

Session F: Innovation and Enterprise

Chair: Dr Debbie Buckley-Golder, AEAT

Paper No	Title	Author	Other Authors
InKT-009	The Scottish Innovation Ecosystem and KTP	Dr Alasdair Cameron (West of Scotland KTP Centre)	
InKT-018	Integral conceptual design workshop: Innovation by knowledge transfer and knowledge creation	Prof Ir Wim Zeiler (Technische Universiteit Eindhoven)	Ir Perica Savanovic
InKT-038	An evaluative inquiry of university innovation mentor facilitation of service innovation	Prof John Sparrow (Birmingham City University)	Ms Michele Mooney, Ms Krystyna Tarkowski
InKT-016	Knowledge Transfer Aspects of Project Portfolio Management	Dr Vladimir Stantchev (Berlin Institute of Technology)	Mr Andreas Discher, Mr Marc Franke
InKT-047	An Infrastructure for Innovation – A Regional Perspective	Mr Eddie Friel (Head of Business Liaison and Academic Enterprise)	Mr Tim Brundle
InKT-026	The LSBU Enterprise Associate Scheme – an Enterprising Approach to Entrepreneurship	Dr Sheila Grace (London South Bank University)	Dr Ed Tinley

Session G: Knowledge Transfer Methodology and Practice

Chair: Debbie Lock, Kingston University

Paper No	Title	Author	Other Authors
InKT-004	Exploring the Safety of Knowledge Transfer from University Hospital to “Real-Life” Doctor-Patient Treatment	Professor Simon Thompson (Bournemouth University)	
InKT-020	Knowledge Transfer for Supporting the Organizational Evolution of SMEs	Dr. Cecilia Zanni-Merk (LGECO – INSA de Strasbourg)	Dr Philippe Bouché, Dr Nathalie Gartiser, Mr Henri-Pierre Michaud, Dr Dominique Renaud
InKT-032	Knowledge-based New Product Development through Knowledge Transfer and knowledge Innovation	Assistant Professor Ming-Chang Lee (Fooyin University, Taiwan)	
InKT-055	Cross-Functional Collaboration, Knowledge Transfer and Product Innovativeness: Contingency Effects of Social Context	Associate Professor Dirk De Clercq (Brock University)	Assistant Professor Dimo Dimov, Assistant Professor Narongsak Thongpapanl
InKT-008	Marketing Knowledge Exchange: A Bespoke approach	Dr Alasdair Cameron (West of Scotland KTP Centre)	

Using Multiple Criteria Decision Analysis to aid the selection of Enterprise Resource Planning software: A case study

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BHC Ltd is a family owned SME which specialises in steel fabrication for the construction industry. Due to rapid growth over the past decade the company's current business software has evolved from a collection of semi-integrated individual packages and Excel spreadsheets. To help the company become more efficient during the current financial downturn and to ensure they are capable of future growth, BHC Ltd initiated a project with the University of Strathclyde to select and implement an Enterprise Resource Planning (ERP) solution.

This paper will provide a case study of BHC's ERP software selection process. In particular it will discuss how steel specific business requirements and organisational culture led us to use multiple criteria decision analysis (MCDA) when making a final software selection. The MCDA process that was followed is further discussed and includes the success that was achieved by using this approach.

Applying the Structural Complexity Management to Knowledge Transfer in Small and Medium-Sized Companies

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Retention and transfer of personnel knowledge represents a fundamental competitive factor for small and medium-sized companies (SMEs). A major problem is that increasingly unavailable specialists remain at a company for less time, but generate more complex knowledge during their time of employment. A methodical knowledge transfer designed for this specific problem situation of SMEs has to meet the requirements of high transfer frequency and short time slots for transfers while still maintaining a high quality of transferred knowledge. Knowledge transfer must be easy to implement. In cooperation with Festo we created an approach to knowledge transfer using methods of Structural Complexity Management. Advantages of the approach include its uncomplicated application and limited resource needs. Resulting analyses and visualizations allowed employees to focus on relevant knowledge aspects to be transferred effectively.

Establishing a Business Process Management System in a Telecoms Company

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²Gamma Telecom Ltd., Newbury, UK

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Gamma Telecom provide voice services and voice applications. But newer products are increasingly more complex, and the largely manual processes involved in order fulfilment are unable to perform effectively enough. As a result, Gamma Telecom and the University of the West of England (UWE), in a joint Knowledge Exchange Partnership (KTP) project, are investigating how to automate such product processes using Business Process Management System (BPMS) technology within a Service Oriented Architecture (SOA) development framework. A number of product processes have been automated, and the resulting experience and knowledge has been incorporated into a "meta-process", a process for capturing, modelling, analysing, and improving business processes, and for providing IT support for processes. It is suggested that a generalised form of this "meta-process" would benefit other companies wishing to pursue process automation.

Critiquing Business Process Models to Facilitate the Identification and Selection of Optimal IT Systems

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²Space Engineering Services Ltd., Bristol

In common with many SMEs, Space Engineering Services Ltd support a number of business process variants found in different parts of the organisation for achieving the same organisational goals using non-optimal IT. In order to address these problems, the capability to use Role Activity Diagrams (RADs) for organisational process modelling was introduced by this Knowledge Transfer Partnership (KTP) using three knowledge transfer mechanisms: a short course on RADs, expert feedback on the initial RAD models, and feedback on initial process elicitation efforts. The resulting learning was adopted and adapted by the KTP team into a process that is being used to improve many of the company's strategic processes, and also to identify optimal IT support for those processes. It is expected that this process would benefit many similar SMEs.

Outcomes and Benefits of a Knowledge Transfer Partnership in Chemical Science

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Knowledge Transfer Partnership (KTP) is a UK initiative to enable companies to benefit from the knowledge and skills within Universities. As well as improvements to competitiveness in companies and research in academia respectively, these schemes can also provide a wide range of other outcomes and benefits. An important criterion for a successful KTP partnership is that all three parties benefit from the programme. A recent chemically based KTP partnership between Liverpool John Moores University and Salt Union Ltd provided a range of benefits to the Company, University and Associate as described in this paper. The KTP between LJMU and Salt Union Ltd was a science-based programme, and incorporated a high proportion of investigative work.

At the start of the KTP, the company had begun to offer to the market a premium rock salt which had been treated with an agricultural by-product (ABP) that conferred enhanced de-icing performance and inhibited the corrosive effects of salt. The company wished to develop this product, and to explore the possibility of alternative ABPs that were predicted to increase profitability. As well as requiring the chemical expertise of the knowledge-based partner to address this objective, the embedding of a robust product development capability within Salt Union was a stated aim of the project. At the end of the KTP, the company had the ability to test, optimize and validate new and existing products. Ultimately, the transfer of knowledge to the company has resulted in the development of a research capability, optimised products and an increase in profits.

The KTP programme offers a unique training opportunity to the associate. In this case, the associate has gained commercial experience, enhanced qualifications and training, and at the culmination of the funded programme was appointed within the company group at managerial level. The associate has benefited from the experience gained from working within a commercial environment, and in this case, training in research methods, and the direct mentoring from an academic team. Further, the associate has gained experience and training which a purely academic post would not offer, and which would be difficult to obtain in a graduate position in an SME. This is reflected in the seniority of their current role within the company.

The academic staff from the knowledge based partner have developed their research standing, gained commercial awareness and provided enriched student learning opportunities in ways that are not possible during a standard undergraduate programme. The academic staff did not previously have formal research collaboration, but they have now established a collaborative partnership. Research has been developed in a number of ways, including undergraduate projects and as a component of a post-graduate research programme. Through working on the KTP programme, the academic staff were able to bring industrial relevance to their teaching. For instance, a number of case studies were developed for use in the teaching of undergraduate modules.

In recent years, only 2-3% of KTP projects have been associated with Chemical Sciences Departments in Universities and this was the first programme to be completed within the school of the academic staff. There is now improved awareness of KTP programmes within the academic school and this will encourage other academic staff to look for industrial partners. The KTP programme was mentioned in the university submission to the 2008 Research Assessment Exercise as a new source of income for the academic school and this enhanced the individual submission of the academic staff.

Following the formal close of the project, the knowledge base partner and company partner continued to work together.

Integrated Care e-Pathways using Formic Fusion for patients undergoing elective hip and knee replacements

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The objective of this research is to re-engineer data capture and analyze process of orthopaedic patients, involving multidisciplinary & cross-departmental healthcare records towards a unified Integrated Care e-Pathway (eICP) information system. The project will introduce a homogeneous, consistent and efficient way of capturing and querying of orthopaedic surgical patients' data across the relevant hospital departments and will complement other NHS (National Health Service)-wide initiatives on electronic health records. The chosen approach is a mix of intelligent re-designs of paper based pathways with an Optical-Character-Recognition (OCR) process via Formic Fusion Software, and a successive move towards routine electronic data capture which will be fully integrated with other hospital-based systems. Reports will be generated using Statistical Process Control (SPC) tools. So, it is a huge change management project involving culture change. A survey is conducted to study the attitude of clinical staff and service users towards implementing technology at the point of care (before and after implementing new technology). It also involves adopting lean principles which is termed as North East Transformation System (NETS). The research tracks the current status of National Program for IT (NPfIT), run by Connecting for Health (CfH).

Session B: Knowledge Transfer in the Arts and Community

Chair: Charlene Edwards, Kingston University

The margins of art practice bordering on industrial development

Professor Stephen Hoskins

University of the West of England, Bristol

One popular view of artists, spread by the media over many years, is of aesthetes with no commercial acumen and a distinct lack of time management! I daresay this popular view has also found resonance with many who work in an industrial context. Examples of this are manifold, from Tony Hancock's 1962 film the 'Rebel' to more recent commentary on Tracey Emin's unmade bed. The truth about artists is actually much closer to one of self-motivated individuals with good self-discipline and a wide-ranging approach to problem solving. This preconception in itself is not the fault of industry; even when dealing with design, the 2005 DTI Paper on Creativity, Design and Business performance states: "Over half of UK firms say design has no role or only a limited role to play in their business"¹. Why would they want to deal with artists?

So how does a Fine Art printmaking department qualify itself within the arena of developing industrial research projects? Partnerships forged between the Centre for Fine Print Research and industry, now constitute approximately a third of the research work we undertake. These partnerships have grown over the last ten years as the reputation of the Centre has increased. I am specifically referring to collaboration between artists and industry, which develops either new industrial product, or a process that assists the creative development of new markets and profit. There currently exist many Arts and Business and Arts and Science initiatives, which tend to favour the artist and arts practice, what I would like to cover here is the other way round where there are benefits to both parties, (Knowledge Exchange), but weighted more to the industrial benefits and outcomes.

The Centre for Fine Print Research specialises in the interface between arts and industry. Our experience of early printing technology and its 19th Century developments give us a fundamental overview of current print technologies and practises, allowing us to take a lateral approach that offers innovative solutions. For example we have run 4 successful KTP's (Knowledge Transfer Partnerships) winning the best 'transfer of technology' award in 2003. Over the years we have undertaken a series of collaborations with big business as well as Small to Medium Enterprises's (SME's). For example with Hewlett Packard our collaborations extend from colour science, through wide format printing to dissemination of research projects with schools.

This paper will highlight this approach and explain how a creative background can offer direct benefits to industry.

The Manifesto of Possibilities: Commissioning Public Art in Urban Environments

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The *Manifesto of Possibilities* is a statement of beliefs, concerns and recommendations about the commissioning of public art in urban environments. It was developed from research by Cameron Cartiere and Sophie Hope and is a knowledge transfer mechanism that aims to inspire reflection, discussion and cohesive action for all those involved in commissioning public art.

Increasingly people working in diverse aspects of contemporary urban society (from property developers to park wardens) are turning to the arts for new ideas, in regeneration, problem solving and community bridge-building. The development of the *Manifesto of Possibilities* provides a timely opportunity to address the uncertainties of commissioning art in such a context, together with a forum to explore academic research, discuss crucial concerns, and devise tangible solutions. Central to the project is that the Manifesto document enables this research knowledge to be presented in a meaningful way to key decision makers and practitioners in the field of public art with the aim of effecting change in the manner and methods in which contemporary public art is commissioned.

Recently there has been an infusion of new manifestos specifically focused on art in the public realm that call into question how knowledge transfer can be engaged in the public art process. This paper bridges the tradition of art manifestos of the past to current practices by exploring four contemporary public art manifestos: *An Open Letter to Arts Administrators*, produced and signed by 75 public artists across the USA (November 2006); *15-Point Unofficial Manifesto for Telling the Truth about Public Art*, by Jeannene Przyblyski, San Francisco Bureau of Urban Secrets (2006), *A Manifesto for the Public Realm*, produced at the Art U Need Artist Seminar led by the artist, Bob & Roberta Smith, Rochford, Essex, England (March 2007); and *The Manifesto of Possibilities: Commissioning Public Art in the Urban Environment* (2006–2008). Through a comparison of not only the content, but also how these different manifestos were developed, prepared and presented, this paper presents innovative strategies to navigate the maze of challenges, negotiations and compromises intrinsic in the public art profession.

LCACE and the role and impact of Knowledge Exchange between the research base and the arts and cultural sectors in London

Sally Taylor and Evelyn Wilson

Director and Senior Manager, LCACE

A case-study of LCACE (London Centre for Arts and Cultural Exchange) as a collaborative, consortium-based approach to Knowledge Exchange with the arts and cultural industries. The partners are: University of the Arts London, Birkbeck University of London, City University, the Courtauld Institute of Art, Guildhall School of Music & Drama, Goldsmiths, King's College London, Queen Mary, University of London and Royal Holloway, University of London.

It will firstly focus on the evolution and growth of the project since its inception five years ago, offering some insights into how LCACE is successfully building communities of interests in working with a variety of academic research bases. Secondly, it will present the key findings from a piece of research we recently commissioned to attempt to identify new ways of understanding and articulating the impacts of a small selection of LCACE seed-funded academic projects.

Key words: Knowledge Exchange, Arts and Cultural Industries, London, Impact Models

Part 1 – LCACE Background and Overview

How LCACE originated, its unique Partnership arrangement and how it has grown

LCACE (London Centre of Arts and Cultural Exchange) was established in 2004 as a result of a successful application to HEIF 2 made by Katharine Rabson of KCL with strong support and input from several individuals in the then often just developing innovation and enterprises offices at 5 of London's research institutions. The Partnership has expanded to 9 Universities during the HEIF 3 and 4 periods, as a result of the quality of our work, the perception of strong connections with the sector and the impact the institutions can make together rather than separately.

- The LCACE Seed Funds as a means to encourage academics to generate Knowledge Exchange activity

We will start by introducing the initiative, what it is and how it works and general observations, both positive and negative about this major part of the annual programme. We will then briefly present case studies of successful KE activity including 'Performing Medicine' from QMUL and Music for Milton Court from the Guildhall School of Music & Drama.

- The LCACE Programme

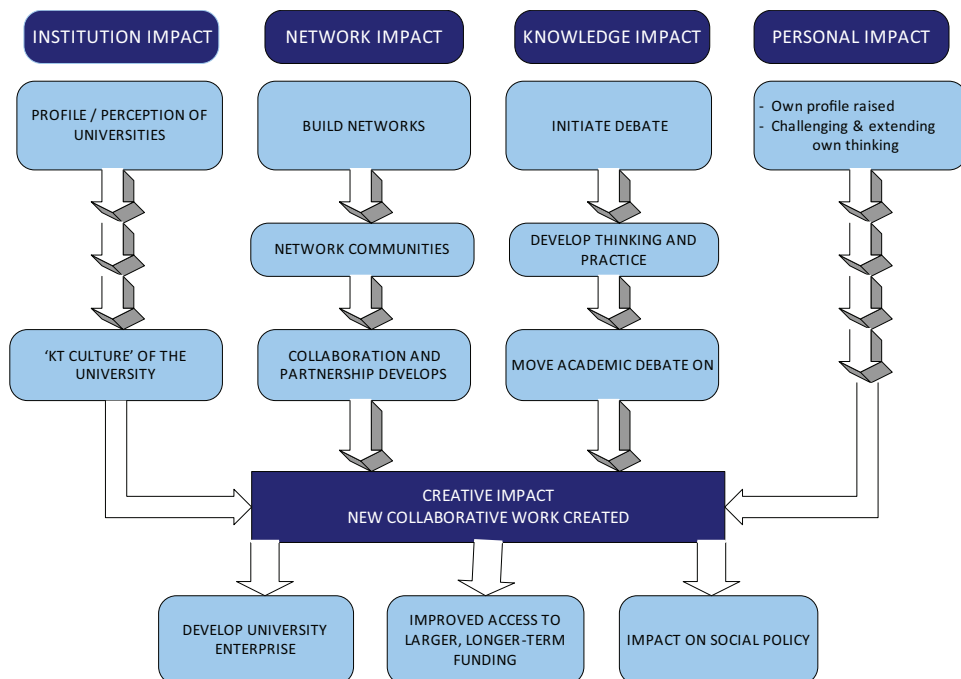
We will briefly outline the annual programme of networking and information events several of which are delivered now in conjunction with other bodies including Arts Council England, Museums, Libraries and Archives and the Independent Theatre Council. We will then look at the evolution of a more publicly facing programme with the development of our unique 'Inside Out' Festival that takes place in October 2009, the first festival to showcase what HE has to offer in this area.

Part 2 – LCACE and its emerging impacts

- Initial Impact assessments
- A brief overview of LCACE's early research into LCACE's impacts after the first phase of HEIF funding (focusing on Queen Mary, UoL) and again after Phase 2 across the LCACE partnership.
- The need for more detailed understandings of individual parts of the LCACE programme.

This section will present the outcomes of further more recently commissioned research into the impacts of a small selection of LCACE Seed-funded projects. It presents an overview of personal, institutional, knowledge and network impacts and how these may lead to creative impacts and feed into economic impact based on a model devised from LCACE research (see below)

Figure 1: Project Model of How Impact Develops¹



¹ This model is taken from a report prepared by Lucy Hutton of Step Ahead Research Ltd in response to a small commission from LCACE. Step Ahead were briefed by LCACE to look at ways in which we might think of moving beyond economic impact assessment by using an approach that would additionally reflect cultural, social and attitudinal impacts.

Innovating Knowledge Transfer in the Social Sphere; a move to Knowledge Exchange

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This paper will use the work of the Brighton & Sussex Community Knowledge Exchange (BSCKE) programme at the University of Brighton to provide a case study of an innovative and successful knowledge exchange programme. Located within the Community University Partnership Programme (CUPP), this groundbreaking initiative has been running since 2005 and aims to support mutually beneficial partnerships between communities and universities that tackle real community problems and engage with socially excluded groups. Between 2005 and July 2009 we also had a project fund to support this. The programme has its origins in knowledge transfer partnerships (KTPs); however it became clear that working in applied social research contexts that we would need to adapt the idea of the KTP approach. The complexity and often fast changing circumstances of stakeholders within the voluntary and community sector also meant that we could rely less on a 'company partner' contribution and a fixed associate role for each different project. The nature of engaging with communities and their 'knowledge needs' (which are rarely market driven) was also a departure from the KTP model. Due to these factors, we found that the responses to solving the issues that projects focused on required not just an academic knowledge base but also a community knowledge base that made it possible to work in and for communities. This set up a landscape of knowledge exchange in order to meet all partners' needs and thus this term is used to describe the paradigm within which these projects and processes sit.

This paper will outline the framework we have developed to support these projects highlighting successful outcomes. It will also consider key dynamics of community-university partnership practice and areas of tension or limitation that have acted on individual partnerships such as power, capacity and perception. The conclusion of the Hefce funded element of this work has resulted in over 30 partnership projects working with over 40 academics and 100 community organisations and networks. An increase in capacity of community partners and academics to engage with knowledge exchange work and recognise the benefits of such an approach has been one outcome of this process so far. This paper will explore the opportunity this creates for developing our now established knowledge exchange framework to re-connect with the characteristics of knowledge transfer models and what lessons we might learn from this long running approach to university partnership with business and industry.

Enterprise Education as a Means of Developing Social Inclusion

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This paper provides the background rationale for using enterprise education as a tool in developing Social Inclusion. The paper has been produced as an output from a KTP between Kingston University, and The Salvation Army. Social inclusion and exclusion as concepts have various definitions and are examined from several perspectives (Apospori & Millar 2003). Some key issues can be identified:

- social exclusion and inclusion are not absolute terms – they are relative concepts, and it is the space between them on a spectrum which is of interest for policy makers
- social exclusion has many inputs and aspects, including ethnicity, income, employment, gender, social arrangements, and housing.
- social inclusion / exclusion are dynamic concepts, and progress can be conceptualized towards greater or lesser inclusion for any individual over time.
- social inclusion work with any individual may need to address different inputs and aspects at different times.

The implication of these is that improving inclusion is an objective of many social programmes, and that these may address any aspect or factor contributing to greater exclusion.

The Salvation Army is deeply committed to serving need in the community. Research commissioned by the organisation indicates that the public recognize the organisation's "strong caring nature", "willingness to roll up our sleeves" and our striving to "understand...the needs of people today" (Salvation Army 2002). Alternative education is an area The Salvation Army made clear its intention to enter into with the 2008 formation of a Knowledge Transfer Partnership (KTP) between Kingston University and ALOVE UK. This partnership had the objective of "developing an alternative provision framework for engaging young people." The Change project, which has stemmed from the KTP partnership, is such a framework and represents a model to connect with young people outside of mainstream school.

Around 140,000 young people are of school age but outside of the school system in any academic year. Serving them represents a significant challenge for government and organisations sharing the goal of tackling disadvantage. 91% of these young people are between the ages of 11–15 and 69% are boys – unsurprisingly, then, the majority of work in the field is with teenage boys. That said, the image of the troublesome school-excluded teenage boy can obscure some of the diversity of the clients within the sector as only 50% of young people in alternative education have been excluded from school. The other 50% are not in school for a variety of reasons: they might have failed to gain a school place, they might have special educational needs, physical disabilities or psychological problems such that they can't or don't feel able to attend school.

There is a growing recognition of the need to develop social and emotional so-called 'soft' skills, alongside academic learning, in the provision of services to young people. For instance, one government report states: "These skills are known as social and emotional skills. They include young people's self-awareness; their ability to manage their feelings, their motivations, their level of empathy with others and their social skills. They help shape young people's self esteem... and the extent to which they take control of their own lives." (Department for Children Schools and Families 2007)

Extra-curricular activities are very much the cradle of soft skill development and also happen to constitute the mainstay of youth work provision, whether we're referring to youth clubs, schools work or church groups. However, in recent years a broadening out of the traditional classroom conception of school learning (for example, through trust schools) has taken place, blurring the distinction between curricular and extra-curricular learning.

Enterprise Learning compliments this educational trend by straddling the traditional hard skills/soft skills, curricular/extra-curricular conceptual divide and providing a mixed learning experience one might call 'practical learning'. To take one example, the learning outcome of 'understanding written communication' can be reached in the course of producing a promotional flier necessary to market one's goods. Conversely, practical enterprise tasks

necessarily require preparative learning in order to be successfully completed – so that, for example, goods which sell are those which have been properly priced because of prior market research.

Enterprise Learning is sometimes referred to as 'contextualized learning' because of its ability to provide a vehicle for imparting the knowledge necessary for curricular learning outcomes, such as those in basic literacy or numeracy. This is one of its main benefits. However, the risk of describing it thus is that one undervalues the context, that of realworld enterprise activities, by focusing only on the formal learning it helps to deliver. A large part of Enterprise Learning is the intrinsic value of the unique 'soft' skills it helps to deliver. According to a recent report on entrepreneurialism which sought to compile these generic competences, they include: living with uncertainty and complexity; learning by doing and problem solving; self-belief; improving emotional self-awareness, learning how to manage and read emotions and handle relationships and to recognize the value of hard work (CIHE, NCGE, NESTA, 2008).

Logically, if we can link soft skill development to better outcomes and Enterprise Learning to soft skill development, we ought to be able to link Enterprise Learning to better outcomes. It is this logic which led to the establishment of a partnership with Young Enterprise, the national charity. Alove and Young Enterprise worked together to provide a 6 week programme of alternative education to a pilot group of young people experiencing exclusion from school. The group started and ran a micro business, making and selling small items at fairs. The programme was enriched with small treats and experience days travelling to specific locations around London.

Although the number of students who completed the programme was small (4 in total), the programme showed promise, and the Salvation Army intends to continue to develop the programme and offer it to Local Authorities as a contribution to addressing social exclusion. The main challenges with the programme were the recruitment of appropriate students, and the overall cost per student of the programme.

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Facilitating knowledge transfer to drive innovation in SMEs

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Small and medium sized companies (SMEs) need to be innovative in order to survive in or to integrate into the international market. Survival and integration depend on the deployment of their knowledge environments/bases, on the acquisition and creation of new knowledge, on learning abilities and the efficient use of new technologies to manage internal and external knowledge flows. In this paper we firstly present eLearning which has the potential to support knowledge sharing, creation and transfer of individual and organisational knowledge through interactive methods of on-line delivery of information, collaborative procedures, targeted training and through blending with other education methods. Secondly we briefly describe Communities of Practice (CoPs) as proper environments for groups aiming at creating and sharing knowledge and solving practice problems and which can be used to facilitate the informal transfer of knowledge that drives productivity and innovation. We give as an example a project where we use eLearning 2.0 and procedures based on Web 2.0 techniques, to support knowledge sharing, knowledge transfer and networking in CoPs.

The Use of Open Source Software Licensing in Academia

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Open Source Software (OSS) is computer software in which the source code is freely available and included as part of the software distribution. A typical OSS license permits others to view, use, modify and redistribute the source code. It may also include a 'copyleft' clause, whereby all modifications and extensions to the original code must also be made available under the same terms. This paper considers the use of OSS licensing for university-originated software. It examines the advantages of OSS and the issues surrounding it from both the developer and the end user perspective, and also discusses how OSS can be used as a mechanism for knowledge transfer in academia. The implications of UK government policy on the use of OSS within government-funded research are explored and the suitability of each basic type of OSS license is also considered for three common licensing scenarios.

Knowledge transfer and management in networked open innovation environments: Innovation management from the viewpoint of a company

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Globalisation, democratisation of knowledge and extensive utilisation of developed information and communication technologies have enabled users to demonstrate increased power and influence over the content of available products and services (Gassmann, 2006). The business sector has widely acknowledged this paradigm shift while at the same time recognizing that the autonomous activities of single organizations cannot produce those radical, cross-disciplinary and architectural innovations required to respond to customer needs (Calanstone & Stanko, 2007). For ICT innovation in particular, dealing with the fundamental unpredictability of products and services usage, a crucial challenge has been identified in establishing more open and networked forms of collaboration between industrial, governmental, academic stakeholders on the one hand, and user communities on the other hand, all along the innovation process.

Companies have begun to build innovation networks with other companies, the academia and public organizations. The concept of open innovation networks builds on the assumption that new methods, strategies, business models and increased level of user involvement are needed in order to achieve a better success rate for service and product innovations. Yet the recent experiences in that respect have proven that in such open or networked innovation environment, stakeholders are confronted with a number of specific challenges related to lack of competences, diverse expectations and cultures, conflicting public and private objectives, various measuring and benchmarking methods, as well as to obstacles in interoperability and integration of solutions. The diversity of partners, expectations and objectives make communication and knowledge transfer processes very challenging.

When the previously mentioned challenges have been overcome and knowledge sharing is achieved, few companies can capitalize on the data or knowledge since a systematic way to assess the economic and organizational value of open source development and external intellectual assets in their operating environment still waits to be developed. This challenge is emphasized by the enormous quantities and lack of structure of the data. Thus in these open environments there is identified need for sustainable mechanisms, concepts and models for knowledge management and transfer, as well as for the classification and synthesis of various data inputs.

In this paper we address this identified open innovation challenge from the company perspective, and based on research conducted in recent European Commission funded projects (Target, C@R, COLLABS), propose a conceptual framework for knowledge transfer, classification and management in collaborative open innovation environments. This framework explores the knowledge transfer and management models from various viewpoints, focusing on:

1. The knowledge categories and management
2. Bridging knowledge and innovation
3. The partners and phases of innovation in networked open innovation environments

The framework is built upon the cyclical model for multi-stakeholder open innovation, and it features a knowledge classification model applying Paul A. Samuelson's Public goods theory (Samuelson, 1954; Lanzara & Morner, 2005) to intellectual assets (Figure 1). The concept is further elaborated by examining companies innovation capabilities by applying Marchland, Kettinger and Rollins (2001) Information orientation model (2001) for each phase of innovation and each knowledge category.

A Completely New and Free International Portal for Technology Seeking or Technology Marketing

Mr Mark (R) Thompson

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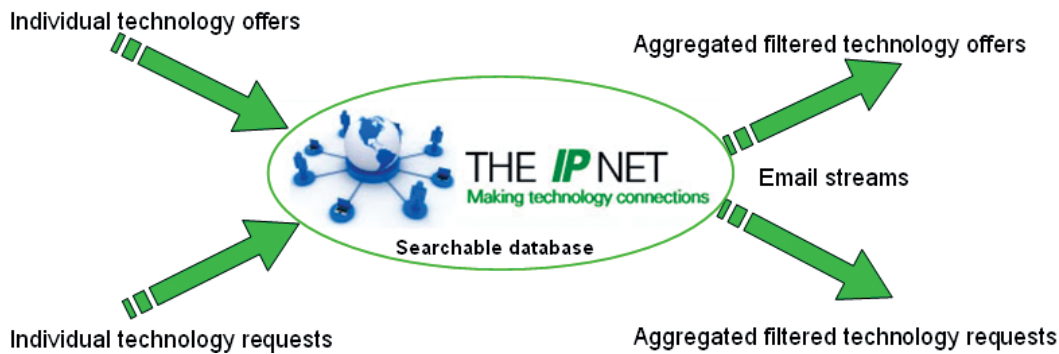
IP Net – The First FREE and Easy to Use Technology Portal

IP Net lets users (technology/solution providers and seekers)

- Market their technologies/solutions internationally for free
- Advertise(announce) technology/solution needs for free
- Subscribe to a feed of quality technology offers/solutions, and /or a feed of well-defined problems ie technology/solution requests in a very efficient and tailored way
- Have a personal control panel to administer their marketing information contents uploaded, giving them a self-control of how it is marketed
- Open to anyone, anywhere who wants to either market or seek technologies/solutions

From a technology/solution providers point of view

- Based on a new lean way of describing technology offerings/solutions, IP Net lets anyone market internationally their technologies to a large number of technology seeking professionals in corporates and SMEs.
- Any technology/solution provider anywhere can use the system. There are no costs or middle men (other than initial moderation for quality purposes)
- Once registered on the system, providers can upload their technology/solution information into a very simple web form. IP Net then markets the information directly (principally by email) to subscribing technology/solution seekers in a format that has been proven to be very effective and popular in a large scale pilot over the last 18 months
- All the information entered is all very "light touch", focusing on the **function/application/problems to be solved** of the technology in industry terms, and takes very little time to input
- Interested subscribers(technology/solution seekers) can respond directly to technology/solution providers
- Providers receive a monthly email report, showing web hits for each of their technologies/solutions and how many enquiries they have had.
- The IP Net system now has 20 multinationals subscribed to the site, so any IP added to the system is automatically marketed to these people in an efficient email format
- The data entered is also made visible on the web site in a very powerful free access portal, and the data is page ranked on search engines



From a technology/solution seekers point of view

- Whether actively seeking a specific technology or an engineering solution to a defined problem, or simply wishing to be “open” to receiving technology offers/solutions of specific types, IP Net offers both types of approach
- The system allows any organisation looking for technology/engineering solutions to advertise their needs/problems for free, anonymously if they wish. As well as by posting the information on the web site, IP Net selectively markets technology/solution requests to technology/solution providers, mainly universities, industrial companies and professionals in various sectors/fields, by e-mail.
- Seekers advertising technology needs/problems on the system receive a monthly report showing web statistics for their postings, and the number of leads they have received through the system
- As well as being suitable for large companies to use, the system is the first that is also specifically designed to also appeal to SMEs, R&D institutes, science park/incubators – etc in need of technologies/solutions.
- The system is also a new efficient way to receive a quality feed of technology offerings/solutions from a very wide range of technology/solution providers internationally. The focus of the data is industry/application terms, and seekers can, if they wish, design keyword filters to ensure they only receive specific types of offers
- Seekers can choose to receive the data either via very efficiently formatted emails, RSS or view on line. The online portal is easier to use and more intuitive than any existing system
- The system has been piloted successfully with over 100 corporates in the last 18 months and was enthusiastically received
- There are no middle men in the whole process, ie seekers can initiate a direct contact with technology/solution providers.
- As of September 2009 IP Net was already host to the IP from 20 universities

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Using Emotional Intelligence and NLP training to promote and sustain relationships within KTPs

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This paper describes how the University of Central Lancashire has used emotional intelligence and NLP training to improve communication, build rapport and unit their Knowledge Transfer Partnership (KTP) teams. Knowledge Transfer is not something new; everybody engages in Knowledge Transfer in one way or another. Not always successfully however; especially within a team of diverse individuals. Anecdotal evidence from previous KTPs indicates that where projects fail, it is usually because relationships have broken down or do not develop appropriately. Experience to date shows that a heavy investment in partner relationships is required for KTPs to be successful. By focusing on partner relationships, it was possible to identify areas where skills development might be useful. It was agreed that a supportive training programme to enable partners to develop their relationship skills might help to sustain the partnerships. Several training models were considered before the bespoke training provided by Alchemy was selected which focused on improving emotional intelligence and communication and how to improve these within the KTP teams so that they progress effectively.

Innovative knowledge transfer mechanisms and the potential role for theatric methods in the propagation of good data handling practice

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This is a position paper that argues for the use of 'theatric methods' as an effective means of disseminating what to some might be regarded as complex and 'ostensibly dull' information, and in this case 'good data handling practice'. Protection of data in an electronically-mediated economy is critical both for a firm's trading integrity and for its competitive advantage. However standard training on data security is thought to be wanting given the complexity of the subject matter and the manner in which it is traditionally delivered. Additionally any system protecting data security should be tempered with the observation that its strength is 'only as good as its weakest link'. Thus this paper seeks to proffer an alternative approach for the propagation of good data handling practices, one that exploits theatric methods in order to make critical learning memorable. Though the methods described here are designed to be deployed as a means of raising awareness of security issues, they could be applied equally as well with other objectives in mind where the imaginations of groups of individuals need to be harnessed such as 'effective electronic collaboration across supply chains' or 'effective customer care in an electronic realm'.

Session D: Strategic and Organisational Approaches to Knowledge Transfer

Prof Cecilia Zanni-Merk, INSA-Strasbourg, France

Occurrence and influencing variables of knowledge barriers in knowledge-intense domains

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Especially innovation processes require in-depth knowledge and thus depend on the quality of knowledge transfer within these processes. Accomplishing a multi-case study, the influencing variables and the occurrence of knowledge barriers in innovation projects of the German Armed Forces are analyzed with a special focus on cross-organisational and cross-functional knowledge transfer. Based on a conceptual study on the incidence of knowledge barriers in project work, data on knowledge barriers in seven departments of the German Armed Forces are gathered to empirically test the impact of theoretically derived influencing variables size, heterogeneity, physical proximity, culture of team meetings and preoccupation with knowledge management. The identified knowledge barriers and their correlations with potential influencing variables are discussed in order to give statements about occurrence and characteristics of knowledge barriers in innovative and knowledge-intense domains as well as to deduce possible approaches to prevent knowledge barriers by adapting relevant influencing variables.

Applied Imagination – Designing Innovative Knowledge Transfer Approaches

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This paper describes a new approach to the creation of innovative knowledge transfer (KT) activities. This is achieved through the close collaboration of three business schools with a strong record of excellence in KT research and application (Lancaster University, Manchester University and Liverpool University) together with one of the UKs leading centers for design research (ImaginationLancaster, Lancaster University). Operating under the name of IDEAS (Innovation Design Entrepreneurship and Science) this collaboration is active in a wide range of innovation and KT activities. Here we describe how we have applied creative thinking research to the creation (design) of new KT activities and processes. This is achieved through the presentation of a conceptual model; two cases studies of the application of this model and a discussion of future projects and applications.

Knowledge Transfer Partnerships at the University of the West of England

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This paper outlines the range of Knowledge Transfer Partnerships (KTPs) undertaken by The University of the West of England and discusses two typical cases in detail. It presents the planned and unplanned benefits that have been identified and realized. Successful KTPs are capable of becoming serial events and as such should be viewed as long-term, even lifelong, relationships between university and local organizations. Their value therefore lies beyond the immediate deliverables of the current or initial project. In addition to the organizational improvements we identify the value of KTPs to those employed by the programme in the form of formal qualifications and transferable skills. Furthermore, we discuss the research opportunities that KTPs provide and the associated benefits for the university and organization involved, as well as other possible advantages for academics and university students. We also identify the challenges that universities face in attracting and supporting future KTPs.

The InterAct Project: A unique collaboration between six leading UK PSREs

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InterAct is a unique partnership between six leading UK government research organisations:

- Centre for Environment, Fisheries and Aquaculture Science (Cefas)
- Defence Science and Technology Laboratory (Dstl)
- The Food and Environment Research Agency (Fera)
- Health and Safety Laboratory (HSL)
- Health Protection Agency (HPA)
- Veterinary Laboratories Agency (VLA)

The InterAct project is funded by the UK Department for Innovation, Universities and Skills (DIUS) and was first established in 2005 with four of the partners – Dstl, Fera, HPA & VLA. The project was expanded in October 2008 to include Cefas and HSL and received funding for a further 3 years. InterAct was established to capture the synergies derived through combining the IP, know-how and R&D services of these multi-disciplinary world-class institutes. It is achieving this through identifying technology clusters comprising technologies, IPR and know-how which span across the partner organisations. The technology clusters represent commercial opportunities for novel products and services, new businesses, or enhanced R&D capacity.

This project is not just about 'traditional' technology and knowledge transfer. Much of the technology exploited by the project is not patented but falls under the wider definition of IP. The project exemplifies creative exploitation of IP, for example combining different IP, extracting value from trademarks and know-how, exploiting proprietary reagents and facilities and growing or creating new services offerings, whilst recognising the government sensibilities that apply to the partner PSREs.

As well as the normal issues that exist in the technology transfer process InterAct has had to overcome the additional challenges of working with six different organisations each having a distinct culture and diverse research base. To address the concerns of all parties and to encourage openness and collaboration events such as workshops focussed on technology areas, informal canteen events promoting the project, one-on-one meetings with researchers and regular meetings at the partners sites have been held.

InterAct presents a successful model for commercialising government research across different business fields that include Agricultural, Food, Human Health and Environmental applications. In the first three years of the InterAct initiative 15 exploitation vehicles, encompassing 11 new licences, 3 new commercial service offerings and one spin out company were successfully completed and the second term of InterAct is now underway. InterAct has also led to the joint marketing of VLA, Fera and HPA proficiency testing (PT) services leading to enhanced sales income.

The returns from these exploitation vehicles include up front fees, milestone payments, royalties, VC investment, provision of services, reimbursement of past patent costs, preferential consumable pricing and free equipment. The total return on investment for the first three years of the project is estimated to be greater than 150%.

Examples of licensing deals facilitated by the InterAct partnership include:

- License of a portfolio of PCR tests to Major Diagnostic Co.
 - Royalties, technology access fee, ongoing R&D, milestone payments, free equipment, reduced consumables
- License of AI and NDV tests to Major Diagnostic Co.
 - Up front payment, royalties, bonuses, equipment, on-going R&D
- License of plant virus test (as a service) to service company.
 - Royalty agreement

Other less tangible outputs of the InterAct partnership include better cooperation between the partners which was led to spreading of good practice, sharing of resources, collaboration on new developments and better cooperation between scientists. There is a greater understanding between the partners of each others organisations and an increased commercial outlook by all of the organisations.

InterAct continues to bring complementary groups of IP assets to the market through licensing, joint venturing and other routes and has established an ongoing legacy of projects that are actively being progressed by the partners.

The Yorkshire Enterprise Fellowship Scheme

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Objectives

The Yorkshire Enterprise Fellowship (YEF) is designed to help university researchers create a business based on their research by providing practical, tailored and pragmatic advice, support and training to post-doctoral scientists from the 9 Universities in the Yorkshire and Humber region. The programme will accelerate the commercialisation of research from the participating universities and embed an entrepreneurial culture within the scientific community.

Prior Work

The scheme builds on the highly successful Bioscience Yorkshire Enterprise Fellowship (BYEF) scheme launched in 2004, which resulted in 9 new spin out companies being established from a cohort of 29 researchers. For a public sector investment of £1.2m, the scheme levered over £4m of additional funds.

Approach

The programme is fully supported by Yorkshire Forward, the Regional Development Agency for Yorkshire and the Humber, to a value of £2.3m. YTKO Consulting Ltd are managing the scheme following their success managing the BYEF scheme.

Fellows selected to join the programme (on a part time basis) have access to a fully-managed proof of concept support scheme, offering a tailored science and business development programme. Over the course of the programme (2007–2010) a total of 65 Fellowships will be completed across the eligible disciplines of biosciences, chemicals and healthcare technologies. YEF offers a unique package of support, including:

- Up to £10,000 direct support to progress the science or technology;
- A specialist enterprise and personal development programme delivered by experienced professional trainers. Topics include business finance and accounting, IP management and leadership skills;
- A personal business mentor;
- A dedicated extra-net and online project management facility;
- Assistance to find investors and signposting to other funding sources.

Best Practice

Project teams are built that consist of the fellow, a business mentor, a representative from the relevant University technology transfer office and a project monitor from YTKO on behalf of the YEF fellowship. Each personal business mentor is selected for the relevance of their background to a specific project. Project teams meet together quarterly to discuss progress, brainstorm new ideas and discuss the business plan. Fellows and mentors meet together more regularly and the mentor submits monthly reports. A tailored business plan is generated for each individual fellow and the most common outcomes are:

- Formation of a spin-out company.
- Obtaining a licencing deal from one or more industrial partners.
- Formation of a research and development collaboration with industry.
- Successfully securing further funding or investment to pursue commercialisation.

Team interaction between quarterly meetings is facilitated by an online project management facility, to which all team members have access.

Results

The pilot programme (2004–06) resulted in the set up of 9 new high-tech businesses from 29 Fellows. The target for the current programme is 20 new ventures. The aim is to achieve £3M of levered funds by the end of YEF in March 2010, and over £1M has already been secured to date.

Case Studies

From the pilot programme, one outstanding success was Cizzle Biotechnology Ltd, which spun out from the University of York in 2005. The company raised seed-corn funding in 2006 and more than £0.5M additional investment in 2008 and has now generated lung cancer specific lead molecules and related candidate diagnostics. Cizzle now plans to expand research and development activities and is also in discussion with a large pharma company for collaborative activities.

An example of a project that did not result in commercialisation was that of an Enterprise Fellow at the University of Leeds who developed smart protein technology. The technology progressed well and the fellow engaged fully with the fellowship, securing an interested party in licensing the technology. However, the negotiations were halted following delays in patent filing and failure of a funding application to DTI on a technicality.

Conclusions

From assessments of the BYEF pilot programme by independent consultants and fellow's feedback, it is clear that these schemes fill an identifiable gap in significantly enhancing the commercialisation of university research as a means to enhance UK productivity and economic growth. The methodology developed would be readily transferable to other disciplines and regions.

Centre for Innovation & Technology Exploitation (CITE)

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The Centre for Innovation & Technology Exploitation (CITE) is an innovative technology transfer unit that has been jointly established at the Nottingham Trent University (NTU) with the aid of funding from NTU, the East Midlands Regional Development Agency (*emda*) and the European Regional Development Fund (ERDF). Using a unique innovation ladder of support, the CITE has successfully engaged with several small-to-medium enterprises (SMEs) throughout the East Midlands region with a view to facilitating the transfer of Intelligent Systems research knowledge from academics in the School of Computing & Technology at NTU to the participating SMEs. This paper provides a concise history of the conception, creation and early years operation of the CITE. The paper concludes with a personal reflection on lessons learnt during this four year process, acknowledgement of contributions made to this process by the authors colleagues and a signposting of future directions for the CITE.

Knowledge Transfer and the National Physical Laboratory, UK

Phil Cooper, Tim Jones, Francis Tuffy and Stuart Windsor

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This paper describes NPL's distinctive role in knowledge transfer as a result of its dual role as both a Public Sector Research Establishment and a Research and Technology Organisation.

"For the UK economy to succeed in generating growth through productivity and employment in the coming decade, it must invest more strongly... in the knowledge base, and translate this knowledge more effectively into business and public service innovation". (HM Treasury Science & Innovation Investment Framework 2004–2014)

The level of funding dedicated to assisting with this translation of knowledge from public sector investment in research to industry has increased substantially over the past decade in the UK. As noted in Lord Sainsbury's report 'Race to the Top' in 2007, this investment has resulted in a rapid increase in the amount of *knowledge transfer* from British universities to industry (HMT 2007, p55).

However, there are widely different definitions of the term 'knowledge transfer', and a tendency in public policy and the academic literature to focus on knowledge transfer between university research and industry, rather than considering other types of organisations that also generate knowledge and see knowledge transfer as a fundamental part of its mission, such as nationally funded government laboratories.

This paper reviews the literature on definitions of knowledge transfer and looking at work that has already been done in the area of knowledge transfer in US national laboratories to set the background for discussion. It then describes the drivers for knowledge transfer at the National Physical Laboratory (NPL) – one of the UK's national laboratories – and uses a new contextual framework for understanding and managing the range of knowledge transfer activities that are provided in response to those complex drivers. Finally, example case studies of successful knowledge transfer at NPL are presented, which have been chosen and contextualized by consideration of this framework.

Session E: Knowledge Transfer Case Studies (2)

Chair: Dr David Brown, Portsmouth University

'The Virtual Engineer'

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1.1 Concept and objectives

1.1.1 Problem scope and background – competitive pressures in manufacturing

Manufacturing industries in the Britain exist within the global economy and their long-term viability depends on their ability to compete in the global market. To remain competitive in this environment manufacturing companies, particularly those in the traditional manufacturing sectors, must find new ways to reduce costs and increase production rates.

Many of the largest manufacturers have already addressed the cost issues by simply relocating their manufacturing facilities to emerging nations such as China, India and South America, where labour and energy costs are significantly lower than within Britain and the European Union; others have tried to cut their wages bill by reducing the numbers of expensive skilled engineers that they employ. Over time this last item has had a cumulative effect, so that it has become increasingly common for European product manufacturing companies to employ no skilled engineers at all. Maintenance is now routinely outsourced to specialist firms.

The falling demand for skilled engineering graduates has caused a decline in the number of universities offering engineering courses. Now the lack of graduate engineers is itself a problem, particularly within the traditional disciplines of mechanical, electrical and control systems engineering. This makes essential contract engineering and maintenance services more expensive and difficult to source than ever before, and it places a disproportionately heavy burden on small to medium-sized manufacturers who cannot achieve the economies of scale made by the larger companies and who can ill-afford the increasing cost.

Another problem for EU manufacturers is the cost of energy. Manufacturing, by its very nature, is an energy-intensive industry and energy costs are often the single largest controllable operating expense in the manufacturing process. High energy usage is not only expensive, it adversely affects the environmental sustainability of the process itself. As green issues increase in importance, public opinion is turning against those industries which are seen to be wasting energy resources. It is essential that machinery is correctly operated and maintained if optimum efficiency levels are to be achieved but this requires a skilled workforce.

At the same time, the pressure to continually increase production rates is placing increasing demands on manufacturing machinery. Machinery is expected to operate at higher speeds and for longer with fewer scheduled downtime periods for maintenance. These demands, combined with a lack of in-house skilled maintenance staff, have made machine maintenance problems a key issue in European manufacturing. In many highly-automated factories, unscheduled downtime due to machine failure is the biggest problem facing plant managers and this, along with the associated problems of increased scrap production, directly increase costs.

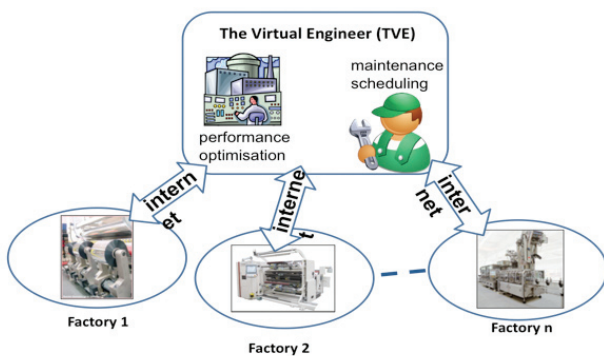
So these are the dilemmas faced by manufacturers in the EU. They are under pressure to decrease costs but this means investing in increasingly complex and expensive machinery. They need skilled engineers to maintain this machinery but these engineers are expensive to employ and difficult to find. Customers want more products at lower prices but manufacturers are finding it increasingly difficult to meet these demands, especially the SMEs who cannot achieve the economies of scale made by the larger companies. Consequently, EU manufacturers are increasingly losing business to non-European manufacturers in countries where engineers are plentiful, labour costs are low and climate change is not seen as an issue. If manufacturing is to survive in Europe and America, we must find a way to compensate for this lost engineering skills base and at a cost that struggling SMEs in particular are able to afford.

1.1.2 Aims and key issues of the Project – re-establishing competitiveness

To address these problems, our aims is to investigate and develop a low-cost means of providing expert engineering support to manufacturers, in particular SMEs who make up the vast majority of manufacturers within the Britain.

It is our intention to implement an Artificial Intelligence (AI) system that can simultaneously provide high-level engineering expertise to multiple production installations across multiple market sectors. It will enable machines to self-diagnose and self-optmise their performance by monitoring their operation, identifying and predicting changes in their performance, interpreting the meaning of those changes in real-terms that can be understood by low-skilled machine operators, and compensating for the changes to sustain optimum production performance and optimum energy utilisation. This system will be called **The Virtual Engineer (TVE)** (Figure 1).

Figure 1: The Virtual Engineer



TVE is designed to collect the knowledge of highly skilled engineers and utilise it to enable low-skilled operators to operate and maintain their machinery with maximum efficiency. The immediate output of this project will enable manufacturers to:

1. increase machine operating speeds
2. increase machine utilisation time
3. maximise the energy efficiency of the machine
4. improve product quality by sustaining optimum machine setups
5. reduce scrap product production.

The Virtual Engineer will provide for them a significant advantage when competing with low-cost non-British and non-European manufacturers in the global market.

This paper will provide results from an actual machine system showing the effectiveness of the Algorithms for predicting faults.

The effective collaboration between industry and the University via a KTP scheme and ongoing research will be highlighted.

StorePOINT: Revolutionising Art Work Production

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This paper describes an innovative system to automate the workflow for translation of artwork text, developed through a KTP partnership between Kingston University and StorePOINT International Ltd, an artwork automation and localisation company situated in Hampton Wick. The 'POINTandGo! Localise' system is a web-based application available to managers, clients, artwork developers and translators for document and graphic artwork translation/trans-creation. It has already produced significant savings in cost and time through the automation of the workflow process and the use of translation memory whilst improving the quality of the final piece. But it is the use of contextual translation memory which is unique to this system that has the potential to revolutionise the way in which artwork produced in multiple languages is produced in the future. The project is an example of how vision and ideas from the business partner have come together with skills from the University and KTP Associate to create an interesting and unique product that will not only bring added value to the company but also to the whole area of artwork production.

A Multidisciplinary Knowledge Transfer Partnership in Development of Lift Simulator

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Lerch Bates Limited are consulting engineers specialising in short range transportation systems for moving people and materials. Projects include the Taipei 101 Financial Centre and the new Burj Dubai Tower, which is the world's tallest tower, completed in 2008. As the building are becoming more and more complicated, so are the transportation systems in them. Lerch Bates decided to join forces with Kingston University to develop a computer simulation system for lift design. This system is strategic to the company, not only in terms of its reputation as the world-leading consultant in people transport systems, but also in terms of cost efficiencies realisable both to internal staff and the architect / developer of a given project.

This paper addresses the work done within the Knowledge Transfer Partnership for designing building passenger vertical transportation systems. This was a multidisciplinary project, requiring knowledge transfer in the areas of dynamics, control systems, development of dynamic simulation systems and computer graphics/visualization. The design and specification of lift systems for large buildings is a very complicated process, with a wide range of variables that need to be evaluated in order to design a system that will deliver acceptable performance. Such evaluation is performed with the help of computer simulation software. The limited functionality of the currently existing programs for lift simulation however prompted the project to pursue the development of a new system, suitable for the demands posed by modern building designs and improved control algorithms. The project provided the calculation and simulation modules together with the generation of the visual simulation and building information model.

Using information systems to drive process change: an aerospace industry example from the Knowledge Transfer Partnership scheme

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This paper explores the growing role of shop floor systems in overall information systems strategy and how the Knowledge Transfer Partnership scheme was used to implement an integrated suite of shop floor systems in a major aerospace company. It also focuses on the significant process change that accompanied the introduction of new systems and the benefits this has brought to a company that has to meet large scale orders for aero engine components sometimes placed several years in advance. The paper also illustrates how shop floor engineering systems can be integrated with mainstream corporate systems.

SME Supplier Management: An Exercise in Change Management

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The problems facing a manufacturing SME in the current UK economic climate are many and varied. This paper describes the experience of a Knowledge Transfer Project (KTP) Associate and her academic supervisor working for a customer centric company in a dynamic manufacturing environment. With issues ranging from quality of the product itself, supplier relationships, a 'no questions asked' returns policy and a sometimes indifferent manufacturing workforce the paper sets out the problems encountered, the solutions offered and then implemented. Beyond the quick win solutions the real value of the project was a change in attitude which has allowed awkward questions to be asked, considered and not swept back under the carpet. Early indications are that the KTP project has been of major benefit to the company on a number of fronts.

Information management process sharing knowledgeat worldwide steel company

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This paper aims to present specific features concerning types of information management in the Continuous Improvement area of the Americas Long Carbon sector in ArcelorMittal, the largest steel company in the world. The aim is also learn what the informational resources (products and processes) related to continuous improvement in ArcelorMittal Americas are and describe how the process of managing information related to continuous improvement area actually happens. The methodologies adopted in this research were: a survey, a documentary research and a bibliography search as data collection techniques. The study has conducted a quantitative non-probability research with professionals involved with the processes, products and services improvement from Long Carbon Americas at different management levels. The study was based on theoretical models of Davenport (1998) and Choo (2006) and tried to understand how the efficient management of information can aid in decision making in organizations. The result of documentary research revealed the existence of initiatives throughout the different units in Americas and also revealed corporate tools for information management which could significantly help knowledge transfer. However, none of the corporate programs was presented in solid form in field research, as a recognized program for managing information. The results of field research indicate the need for a structured and formalized model of information management that responds to users in adequate time, while alert to the need for policies that encourage the sharing of information related to the improvement of processes, products and services.

Session F: Innovation and Enterprise

Chair: Dr Debbie Buckley-Golder, AEAT

The Scottish Innovation Ecosystem and KTP

Alasdair Cameron

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This presentation will outline the Innovation Ecosystem in Scotland and the contribution the UK-wide Knowledge Transfer Partnership programme makes. The unique operation of Knowledge Transfer Partnerships across Scotland will be described with analysis of the industry sectors and types of knowledge exchange that occur. A new closer working relationship between Scotland's Innovation Partners will be commented on and how this is helping drive sustainable economic growth.

Knowledge Transfer Partnerships (KTP) is Europe's leading programme helping business to improve their competitiveness and productivity through the better use of knowledge, technology and skills that reside within the UK knowledge base. KTP is funded by the Technology Strategy Board with 17 other funding organisations including the Scottish Government.

KTP in Scotland is facilitated through four KTP Centres: the West of Scotland KTP Centre based in Glasgow; the East of Scotland KTP Centre based in Edinburgh; the Tayside KTP Centre based in Dundee; and the North of Scotland KTP Centre based in Aberdeen. Together these Centres support all twenty of Scotland's Higher Education Institutes and many of Scotland's Further Education Colleges. The Centres work closely together through the KTP Scotland Group and regularly meet with the KTP Advisors in Scotland, AEA and the Scottish Government, as the local funding organisation.

Scottish Enterprise is Scotland's main economic development agency responsible for enterprise, innovation and investment. In the delivery of services to businesses, Scottish Enterprise focuses on identifying and responding to the needs of a number of key industry sectors. These key sectors are: Life Sciences; Energy; Creative Industries; Financial and Business Services; Food & Drink; and Tourism. Scottish Enterprise has also identified other growth sectors that they will support as they make a specific contribution to Scotland's economy, including Chemical Sciences, Aerospace Defence & Marine, Construction, Textiles and Forest Industries.

The KTP Scotland Group has recently undertaken a mapping exercise to examine how the current Scottish KTP portfolio of 130 projects relates to Scottish Enterprise's industry sectors. The presentation will outline the important role KTP plays in a number of sectors and the opportunity that exists in others. The nature of the knowledge exchange occurring within each of the sectors is explored and the geographic spread of activity in relation to business and academic partner is examined.

Scottish Enterprise has recently established an Innovation Partners Forum which encourages a number of Scotland's innovation support organisations to come together to share best practise. The current Partners include: Scottish Enterprise; KTP in Scotland; Interface, the knowledge connection for business; Intellectual Assets Centre; and the Innovators Counselling and Advisory Service for Scotland (ICASS). The presentation will highlight the methods used to share best practise including cross referrals and the production of Innovation Journey case studies that demonstrate how support from multiple Partners can translate an idea into a growing innovation-rich business.

Integral conceptual design workshop: Innovation by knowledge transfer and knowledge creation

Wim Zeiler, Perica Savanovic

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Innovation in the Building Industry is necessary to meet the new demands of society. In order to enhance team design in the most crucial phase for innovation, the conceptual design phase, a design method is proposed: Integral Design. This design method uses morphological charts which are transformed to a morphological overview as a framework for reflection on the design process itself by the design team and their stakeholders (project managers, clients). This design method supports creation of innovative building design concepts by design knowledge transfer and knowledge creation based on the 'concept space' and 'knowledge space' of the Concept-Knowledge (C-K) theory of Hatchuel and Weil. To reach for organizational/cultural innovation as well as product and process innovation, the design method was developed in cooperation with the Dutch Society of Architects, BNA, and the Dutch society of consulting engineers, ONRI. One of the main results achieved is the inclusion of the method in workshops for the Royal Institute of Dutch Architects' permanent professional development program. Already more than 200 professional participated in these workshops.

Over the past four years the Integral Design approach has been tested in a series of 5 workshops, typically including around twenty participants and lasting for two or three days. A total of 124 designers participated in the workshop series, in which 74% of the designers were present during all of the days. Directly at the end of the workshop the participants were asked to fill in a questionnaire on the importance of the use of morphological overviews within the design process and on the concept of the workshops themselves. The participants had to rate the answers between 1 (very poor) to 10 (excellent). The average results were then determined; they varied between 7,5 to 8,1.

At the TU Eindhoven an Integral Design method (ID-method) has been developed. In workshops with experienced professionals a first prototype of the ID-method was developed integrating four key elements: design team, design model, design tool and design setting. Within the ID-method the structured presentation of object-design-knowledge is guided by using morphological charts. The underlying assumption of the method is that the exchange of knowledge of different disciplines will lead to a better shared understanding of the task but at the same time guarantee the benefits of a heterogeneous team to generate a broad variety of solutions. The design method supports knowledge transfer and knowledge creation which stimulates innovation on product and process level.

The ID-method was developed and tested in practice in cooperation with the Dutch society of Architects and the Dutch society of consulting engineers. In 2006 the Institute of Dutch Architects decided, based on the acquired positive results from the evaluations of the workshop participants, to include the ID-method in their Academy for permanent profession development. An ID-method course will be facilitated by the Dutch Society for Building Services Engineers and will start in second half of 2009. Through this the ID-design method stimulates innovation in Dutch building industry on an organizational and cultural level.

An evaluative inquiry of university innovation mentor facilitation of service innovation

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This study explores how knowledge transfer can operate through a process consultation approach and how a participative approach towards training and development can enable university academics to work as innovation mentors.

Birmingham City University was one of five experimental projects funded by HEFCE which aimed to demonstrate the potential benefits to the economy of third-stream-focused HEIs. Fifty BCU academic staff were trained as Innovation Mentors for regional SME, public sector and third sector organisations to enhance their service innovation. The project title was Service by Design (SbD). Encouraging staff to become more aware of consultancy and knowledge transfer principles within this process was sensed to be potentially valuable. *Evaluative inquiry* (Preskill and Torres, 1999) combines action research and evaluation with questioning and debating the value of what people do in organisations through dialogue, reflection, asking questions and clarifying values, beliefs and knowledge with regard to an issue or

problem. Staff engaged in an evaluative inquiry of the preparation for innovation mentoring. The evaluative inquiry also sought to capture the processes and perceptions of interactions with client organisations, together with the reflections of mentors upon development needs.

Key issues that were highlighted in the initiative were: i) The ongoing reflections, group discussions, project adaptation and impact evaluation *evolved* through the evaluative inquiry process. This highlighted the important principle that 'prescriptive' approaches towards mentor development and client support can have shortcomings, and that 'situated' and 'responsive' configuration of support is essential. ii) The project demonstrated clear developments in mentor knowledge, skill and confidence in consulting. iii) Significant impact of the approach upon client organisation performance and *capability* was identified. The project demonstrated how initial client expectations together with mentor competence in enabling them to see ways forward were key factors in trust development, and this trust enabled entrepreneurs to experiment within, and thereafter more radically transform, their organisations.

The conclusions are that service innovation can be a powerful catalyst for transformational change. A mentoring (as opposed to expert consulting) model can facilitate innovation and also enhance *innovativeness and agility*. Evaluative inquiry provides a useful methodology to help universities develop their approach and capability.

Knowledge Transfer Aspects of Project Portfolio Management

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Knowledge transfer has a particular relevance for enterprises with large research and development (R\&D) departments. Project Portfolio Management (PPM) is a discipline often applied to structure and align R\&D activities. Typical functions of such standardized process are project data repository, project assessment, selection, reporting, and portfolio re-evaluation. In this work we discuss how PPM can benefit from knowledge transfer activities and suggest some specific knowledge transfer tasks within the PPM process. This enhancement is based on a knowledge and learning strategy and process in the context of PPM. We also evaluate the applicability of these extensions at different stages of the PPM process.

An Infrastructure for Innovation – A Regional Perspective

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Introduction

The University of Ulster has embarked on a £500m reinvestment programme to establish world class infrastructure for Teaching & Learning and for Research & Innovation. This paper outlines the impact of the redevelopment of the University's physical estate on the conduct of applied research, the commercialisation of research outputs and the transfer of knowledge into industry.

Economic Policy Context

The Infrastructure for Innovation through Knowledge Transfer is, understandably, ever changing. From a UK Higher Education perspective one of the most notable recent events was the merger of the Department for Innovation Universities and Skills (DIUS) with the Department for Business Enterprise and Regulatory Reform (BERR), which clearly placed the Higher Education Sector alongside Business at the centre of Government thinking in its economic development mission.

The economic challenges facing the Northern Ireland economy have been the subject of extensive debate. A number of factors have been identified as inhibiting regional economic growth. For example, in terms of employment, the economy has proportionately the smallest private sector of any UK region. It is also poorly structured, with a bias toward lower value added sectors (agriculture, construction, retail) and low levels of productivity relative to other UK regions. In recognition of these challenges, the NI Executive, in its Programme for Government (2008/09 – 2010/11), has placed the economy as its top priority. The accompanying Budget has allocated new resources to economic development programmes. On 1 December 2008, the Northern Ireland Minister for Enterprise, Trade and Investment, Arlene Foster MLA, launched an Independent Review of Economic Policy being led by the Vice Chancellor of the University of Ulster, Professor Richard Barnett.

Total Research and Development expenditure in Northern Ireland in cash terms was £319.2m in 2006, of which £155.4m (48.7%) was spent by businesses, £150.1m (47.0%) by the Higher Education sector and the remainder was other government expenditure. There was a rise of £16.8m (5.5%) in cash terms in Northern Ireland total R&D expenditure between 2005 and 2006 to £319.2m. In real terms, in 2006 the Northern Ireland Business sector accounted for a greater share of total R&D expenditure (48.7%) than the Higher Education sector (47.0%) for the first time.

Given the low levels of R&D and business productivity in Northern Ireland, and the current effects of the economic downturn, the University has amongst its core aims to provide leadership in innovation and regional engagement. A series of measures are being taken to ensure that the University fosters research with economic relevance and incentivises the exploitation of research outputs.

The University of Ulster's Economic Outreach

Ulster is the largest university on the island of Ireland and incorporates four main campuses: Jordanstown, Belfast city centre, Coleraine and Magee. It has a major direct and indirect impact on the economy and community in Northern Ireland. It employs over 3400 staff and has an annual turnover in excess of more than £197m.

As a customer-focused and friendly university, students are at the heart of what Ulster does. Students are educated in an environment where knowledge is created, tested and shared with enthusiasm and commitment. A flourishing research culture underpins our impressive performance in the 2008 RAE. Ulster moved up 18 places to joint 45th out of 132 universities, placing Ulster in the top-third of UK universities. Ulster achieved three top-three positions in **Biomedical Sciences; Celtic Studies; and Nursing.**

Ulster's Office of Innovation engages with companies, social enterprises and community groups. Its regional economic orientation ensures high levels of knowledge transfer making Ulster Ireland's largest academic consultancy business and giving it the most successful cross-border knowledge transfer programme. Ulster has also established a track record of success in building routes to market for its technology and intellectual property. In the past year, Ulster started more companies than any other university across Ireland, it managed over \$43m of Intellectual Property (IP) Licences and over 180 patents are currently available to industry within the University's IP portfolio.

An Infrastructure for Innovation

A recent NESTA report² highlights the need for High tech companies to 'locate the key parts of their operations in knowledge and information-rich regions where there is a concentration of the research, creative individuals and infrastructure needed for innovation.' The report goes on to highlight a number of factors for the development of a 'Connected University' including having the relevant university policies and structures in place, developing networks to facilitate engagement, enhanced staff development and having structures in place to promote and reward collaboration. This emphasises the need for the development of appropriate infrastructure to support innovation and the development of a supportive regional system for Knowledge Transfer is a vital part of that infrastructure.

Ulster has an ambitious and innovative strategic development plan for its four campuses, located across Northern Ireland. An investment of £500m is planned that will include a landmark building in the heart of Belfast, increased student numbers in Londonderry and new subjects at Coleraine. Within the University's estate, research spaces and enterprise zones will be established, which will be coupled with initiatives led by the University's Office of Innovation.

The Research Spaces model will establish inter-disciplinary teams on each campus focused on the opportunities presented by market and technological shifts, which have potential to ensure the future health of the Northern Ireland economy. The University also envisages that the physical developments will be supported by a linked support infrastructure. The support infrastructure, the bulk of which is in place, will provide access to funding on a competitive basis as well as relevant legal, technical and commercialisation expertise.

To ensure outreach, enterprise zones will also be established to allow businesses, students and staff to interact with the outputs of Ulster's research and to access the University's knowledge and Intellectual Property. These spaces will be designed to encourage businesses to enter and allow them to engage fully with the expertise the University can offer. They will also offer a platform for the marketing of relevant University Intellectual Property.

Ulster is also extending this strategy outside the University's physical estate. The University of Ulster, in partnership with the Western Health and Social Care Trust and Derry City Council, has developed a unique Clinical Translational Research and Innovation Facility, the primary objective of which is to reduce both the time to market and the costs associated with research and development of innovative health technologies, medical devices and therapeutics. The project was officially opened on 29 April 2009 but has already attracted a number of start-up projects focusing on a range of subjects including respiratory health, medical devices diagnostics, and a health related software venture. Additionally C-TRIC will host an island-wide survey, being conducted by four universities across Ireland, into ways of tackling osteoporosis, Alzheimer's disease and stroke. The Impact of the development of C-TRIC is already clear through increased interest from both the Trust and University staff as well as local industry. For example, it was noticeable that applications to a discretionary fund for research projects from Trust and University staff increased by approximately 60% between 2007/08 and 2008/09, despite much more stringent applications criteria.

² The Connected University – Driving Recovery and Growth in the UK Economy
Michael Kitson, Jeremy Howells, Richard Braham and Stian Westlake

The LSBU Enterprise Associate Scheme – an Enterprising Approach to Entrepreneurship

Dr Sheila Grace and Dr Ed Tinley

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This short paper outlines a novel approach geared towards helping entrepreneurial graduates to develop their own business.

The Need:

Through its well established and successful product design courses in engineering, sport and environment, LSBU final year students create a diverse array of projects each year, many with commercial potential. The Enterprise Associate Scheme is designed to provide support to those entrepreneurial students who have both the desire and qualities to explore this potential. Prior to the introduction of the Scheme, these ideas, talents and opportunities remained undeveloped.

The Opportunity:

Higher Education Innovation Funds (via HEFCE) provided the catalyst for the scheme which was launched in September 2005. As well as the necessary financial resource for the Scheme, HEIF had previously allowed the University to build its professional skills in key areas such as IP management and Business Development. In 2006, an MSc in Enterprise by Learning Contract was incorporated as part of the Scheme. The MSc was modelled on a similar programme previously developed for LSBU's KTP Associates. The exploration and development of the Enterprise Associate's commercial project provides the practical element of the MSc.

Entrepreneurial Student + Enterprise Associate + + In-House Expertise + HEIF



+ Potential Commercial Idea MSc in Enterprise

The opportunity offered to the Associates is an intensive and full support programme with both significant financial and resource investment from the University. It features a flexible approach which includes business development coupled with personal development through the MSc. Using the product commercialisation as the main practical module, the MSc includes optional M level courses in business, marketing, intellectual property and technical product development. The Associates are encouraged to select courses to complement the needs of their fledgling businesses. Additionally, if the Associate decides that starting a business is not the best career option for them, then after two years they have gained an extremely useful MSc that incorporates elements of business and product development.

Operation and Features of the Enterprise Associate Scheme:

Students may apply in their final undergraduate year or as alumni and if shortlisted, are invited to 'pitch' their idea to a 'Dragon's Den' style interview board which includes external experts. Associates are selected on the strength of their entrepreneurial enthusiasm and their product potential. Selected Associates receive a bursary for 2 years, a small working budget, access to business and technical professionals and mentors, access to the University's workshops, financial and professional support with protecting any IPR and assistance with obtaining pre-commercial finance. They are provided with office space and equipment in a creative entrepreneurial environment within the University's central Research and Business Development Office which is located in South Bank Technopark which also houses the University's business incubator. The University also meets their MSc tuition fees and assists them into the incubator at the end of their Associateship. In return for its significant financial and resource investment, the University expects full time commitment by the Associate in pursuing the commercial potential of their project. In addition, the Associate assigns their IPR to the University, largely for two reasons, to ensure protection of the IPR and to access finances through, for example, Proof of Concept funds. At the end of the 2 years the University will exclusively license or consider assignment back to the Associate's company depending upon the business case. The University also takes a 10% stake in Associate's company.

Enterprise Associate Scheme Outcomes:

Since its genesis in September 2005, 16 Associates have enrolled onto the Enterprise Associate programme. Of these, 11 have gained Proof of Concept funds totalling £266,000. Of the 7 that have to date completed the programme, all have incorporated companies. The first 4 Associates recruited all gained their MSc this year. One company, About Time Design Ltd, has successfully raised over £950,000 of private investment having previously rejected investment from the four of the Dragons on Dragons Den. Three of the start-up companies are trading with a combined turnover in the last year exceeding £200,000. The range of businesses emerging from the Scheme spans novel engineering products through to publishing, from environmentally friendly structural materials to fashion. The number of new jobs created in providing employment for the Associates themselves and for employees currently numbers 10. A number of Associates have been successful in winning prizes for their product concepts including the Best New Product concept at the Ideal Homes Show in London in 2008 and 2009. About Time Design Ltd has also won numerous awards including the 2008 Lambeth Business Award for Innovation.

Benefits to the University:

The benefits to the University in initiating and supporting this scheme have been many. The commendation from HEFCE for its HEIF4 Strategy included reference to the strong support the University provides to student entrepreneurship. The Scheme has attracted considerable interest from a variety of public and private organisations. It has led to a plethora of articles in both specialist and the popular press. Collectively these have added to the University's reputation for being a supportive entrepreneurial university. The Scheme has raised the awareness of the University's senior management to student entrepreneurship and has increased the appreciation of academic staff associated with the Scheme of the challenges, issues and processes involved in starting up and running a new company.

Knowledge Transfer Aspects:

The Scheme encapsulates a range of both conventional and non-conventional Knowledge Transfer (KT) processes including HEI2Business, Business2HEI, HEI2HEI and Business2Business. The former involves the knowledge Associates acquire through their taught MSc modules as well as the guidance they receive from the University Research and Business Development staff on commercialisation of their product. Business2HEI occurs when the projects have required outside expertise from business and HEI2HEI occurs when the Associate requires University expertise from outside LSBU. As an example, the Associate starting up About Time Design, invented a device to automatically turn off taps when baths were about to overflow which is now on sale in Europe and USA. There was 2 way KT between the Associate and LSBU. There was knowledge transfer from the Associate to prototype and manufacturing companies via his designs and the experience he gained led to advice to other Associates. A second example is the Associate who launched a fashion line. She attended short courses at London College of Fashion (HEI to business) on launching her own fashion label which enabled her to design for manufacture. The development of a hydrofoil kite board by a third Associate has involved consultancy work with two additional Universities and there has been KT with a design company. The Associate's development work involved hydrodynamic calculations for design. This research interest and enjoyment of teaching has led to his appointment as a lecturer at LSBU producing a cycle of student to Enterprise Associate to businessman to lecturer and which will enhance the enterprise knowledge within the LSBU teaching staff and students and encourage further KT and Entrepreneurial activity.

Conclusion:

Although The Enterprise Associate Scheme is successful in nurturing entrepreneurial talent of graduates so that the process or product commercialisation within graduate spin out companies is derisked and the success rate is improved. However, the knowledge transfer effects and impact reach much further than initially envisaged.

Session G: Knowledge Transfer Methodology and Practice

Chair: Deborah Lock, Kingston University

Exploring The Safety Of Knowledge Transfer From University Hospital To "Real-Life" Doctor-Patient Treatment Environments

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Knowledge transfer (KT) is widespread across most university interfaces particularly between university and industry and increasingly with hospitals and other medical/patient environments. As KT becomes more varied and diverse, safety implications become more abundant and more diverse. There is a responsibility and an increasing importance for examining the qualifications and experience of the end-user and the extent of possible misuse or dangers of the commercial product. The question over whether a product successfully transfers from academia to industry or "real-life" application is no longer key; rather, whether or not essential knowledge successfully transfers with the product.

Knowledge Transfer for Supporting the Organizational Evolution of SMEs A Case Study

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This article describes the research project MAEOS that has been launched six months ago for a three year duration. The goal of this project is the modelling of the support of the evolution of Small and Medium Enterprises (SMEs).

The developed models will constitute the foundations of a knowledge based system that will permit consultants to improve the effectiveness of their missions thanks to the implementation of theoretical and practical domain knowledge. To do this, the main part of this work is devoted to the modelling of knowledge coming from management sciences. Depending on their origin, this knowledge may be close, complementary and sometimes contradictory. Unlike the current trends, which are to create a homogeneous Knowledge Base (KB) covering the domain of a problem, our choice is different. It is to keep to a maximum the plurality of each KB with their field of interest, constraints and richness.

The interest and the difficulty of this project are to combine a large variety of sources and origins of knowledge around SME topics. The innovative results come when some parts of these different KBs are combined. The main outputs of this project are a set of methods and software tools for analysis and diagnosis of SMEs.

The software tools must be able to evolve according to the state of the art on SMEs and, in particular, their administrative or legal.

Knowledge-based New Product Development through Knowledge Transfer and knowledge Innovation

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This paper develops and presents the concept of knowledge-based new product development in an effort to explain the role of knowledge in new product development and the process of innovation management. Due to advances in science and technology and the rapid changes in the market, a product's life cycle has become much shorter than it was before. A new product strategy is an important activity that helps enterprise to survive and make continuous improvements. Most enterprises have placed great emphasis on shortening the time for a new product coming into the market. The aim of this paper provides the integration of knowledge management value and innovation management to introduces a strategic management approach towards knowledge innovation as a source of sustainable competitive advantage.

Cross-Functional Collaboration, Knowledge Transfer and Product Innovativeness: Contingency Effects of Social Context

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A contingency perspective is used to examine how social capital influences the relationship between cross-functional collaboration and product innovativeness. Three dimensions of organizations' internal social context (social interaction, trust, and goal congruence) conducive to high-quality knowledge transfer are argued to increase firms' ability to convert cross-functional collaboration into product innovativeness. Several research hypotheses are tested based on a sample of 232 firms. It is found that the relationship between cross-functional collaboration and product innovativeness is amplified at higher levels of the three social capital dimensions. The study's implications for the role of knowledge transfer and social capital in exchange relationships are discussed.

Marketing Knowledge Exchange: A Bespoke approach

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This presentation will outline the bespoke approach that the West of Scotland KTP Centre has developed to promote linkages between Businesses and the academic research base that exists in the West of Scotland. The Centre facilitates the involvement of seven Higher Education Institutions and two Further Education Colleges in the West of Scotland with the UK-wide Knowledge Transfer Partnership programme. A recently implemented marketing strategy mixes existing UK branding with more bespoke content, across a range of mediums, to create a comprehensive suite of material that is used to promote the Knowledge Transfer Partnership programme to both businesses and academics.

Knowledge Transfer Partnerships (KTP) is Europe's leading programme helping business to improve their competitiveness and productivity through the better use of knowledge, technology and skills that reside within the UK knowledge base. KTP is funded by the Technology Strategy Board with 17 other funding organisations including the Scottish Government. The West of Scotland KTP Centre has been developing successful KTPs for over thirteen years. During that time the Centre has helped establish over 220 projects and generated more than £20m of KTP Grant. A number of the Centre's partnerships have gone on to win KTP awards at a Scottish and UK level. The West of Scotland KTP Centre is the largest Centre in Scotland, with a portfolio of 50 active KTPs and is recognised as one of the leading Centres in the UK. The Centre has formal agreements with the Universities of Strathclyde, Glasgow, Glasgow Caledonian and the University of the West of Scotland as well as Glasgow School of Art, the Royal Scottish Academy of Music and Drama and the Scottish Agricultural College (Ayr). In recent years UK and Scottish Government have been keen to see KTP increasingly used by the Further Education sector and the Centre now has formal relationships with Central College Glasgow and Motherwell College.

The Centre's approach to managing its relationship with all 9 of its partners will be outlined and how the use of a single key contact in each of its partner institution has been used to create a transparent and efficient method of working. The importance of strategic engagement will be discussed and the use of regular meetings both at an individual level and involving all Partners will be highlighted. The role of the West of Scotland KTP Centre Advisory Board will be described and how it has contributed to a clear strategy for the Centre and continued focus and commitment for KTP at the highest possible level within the partner institutions. The presentation will also highlight how a close working relationship with individual academics encourages them to bring prospective partners to the Centre where the project idea can be discussed and the suitability of KTP as a method of support assessed. The role of the Centre's team of Business Development Officers will be described and the methods deployed to uncover potential KTP opportunities explored. A close working relationship with the KTP Advisors in Scotland and further afield allows the Business Development Officers to add real value and bring their experience of a wide variety of KTPs to each new project idea. The additional services that the Centre provides to support each funded KTP will also be outlined. The West of Scotland KTP Centre actively seeks feedback from the partners and the methods used will be discussed as will the types of data captured.

Over the last year the West of Scotland KTP Centre has created a suite of material used to promote KTP to both academic and business participants and this will be explored during the presentation. The focus of the activity is the West of Scotland KTP Centre website (www.ktpws.org.uk) which was launched in April 2009. The site closely mirrors the UK KTP website (www.ktponline.org.uk) allowing locally relevant material to be hosted with links to more generic UK material. A number of innovative features have been incorporated to make it as simple as possible for businesses and the Centre's academic partners to access the information they require. This presentation will describe how enquiry forms, RSS feeds and web-based case studies, including video, have been deployed to great success. To complement the Centre's online presence a selection of bespoke print material has been created to showcase each of the Centre's partners and their previous involvement with KTP. This presentation will also outline the steps the Centre has taken to instigate the formation of an online KTP community using social networking sites such as LinkedIn.

KES International (KES)

KES International (KES) is a worldwide association for researchers providing opportunities for knowledge transfer, networking, publication and beneficial interaction. The focus of KES was originally Intelligent and Knowledge Based Systems. However, KES has recently broadened its areas of activity into renewable energy, through links with the World Renewable Energy Network/Congress, and Knowledge Transfer through a developing link with the Institute of Knowledge Transfer.

Formed in 2001, KES regularly provides networking opportunities for Intelligent Systems researchers and practitioners through one of the largest conferences of its kind. KES produces an academic journal and a book series, both published by leading Netherlands scientific publisher, IOS Press. On an occasional basis KES may organise tutorials and summer schools, and other ventures, for example, e-publishing.

KES conferences have been held since 1997. In 1997, 1998 and 1999, the conferences were in Adelaide, Australia. In 2000 the conference was in Brighton, UK; in 2001, Osaka, Japan; in 2002, Crema near Milan, Italy; in 2003, Oxford, UK; in 2004, Wellington, New Zealand; in 2005, Melbourne Australia; in 2006, Bournemouth, UK; in 2007, Salerno, Italy; in 2008, Zagreb, Croatia. In 2009 it the conference will be in Santiago, Chile and in 2010, Cardiff, Wales, UK. Delegate numbers have grown from about 100 in 1999, to the present figure of approaching a thousand each year. The conference attracts delegates from many different countries, in Europe, Australasia, the Pacific Rim, Asia and the Americas. In addition to its annual conference, KES also organises symposia on specific technical topics, for example, Intelligent Decision Technologies, Agent and Multi Agent Systems, and Intelligent and Interactive Multimedia Systems and Services.

For the first time, in 2009, KES held a conference on Sustainability in Energy and Buildings, looking towards the use of smart techniques in buildings to improve energy efficiency. In collaboration with the Institute of Knowledge Transfer and Kingston University, KES offered the first international conference on Innovation through Knowledge Transfer as a much-needed opportunity for knowledge transfer professionals and practitioners to publish on their activities.

Published by IOS Press in the Netherlands, the KES Journal has joint Editors-in-Chief Dr R.J. Howlett (University of Brighton) and Professor Bogdan Gabrys (University of Bournemouth). There are Associate Editors in the UK, the US, Poland, Australia, Germany and Czechoslovakia. The Journal accepts academic papers (articles) from authors in many countries of the world and has approximately 600 subscribers in about 50 countries.

KES International is headed by the KES Executive Board consisting of Executive Chair Dr R.J. Howlett, Founder and Chair (International Relations) Professor Lakhmi Jain and Chair (Academic Affairs) Professor Bogdan Gabrys. The Executive Board takes advice from an Advisory Group made up of about a dozen prominent researchers from various countries.

KES is an independent association, operated on a not-for-profit basis, from a base in the U.K. A number of universities around the world contribute to the organisation, operation and academic activities of KES.

Involving several thousand researchers drawn from universities and companies world-wide, KES is in an excellent position to facilitate international research co-operation and generate synergy in the area of applied artificial intelligence.

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Charlene Edwards



Head of Knowledge Transfer at Kingston University, Charlene is responsible for the KT team, which has facilitated over 50 collaborative KT projects and secured more than £5.5m in funding since 2003. Charlene has been instrumental in the diversification of knowledge transfer at Kingston University. Notable achievements include KTPs with Historic Royal Palaces (Tudor social history), The Salvation Army (social inclusion, alternative education) and ESRC Government Placement Fellowships with the Kingston Metropolitan Police (mapping and engaging the local BME community). Charlene secured a three-year Arts and Humanities Knowledge Transfer Fellowship with the Natural History Museum to develop an oral history programme. She has carved out a niche in what funders are calling 'unusual' projects, and helped Kingston to develop a reputation for excellence, diversity and innovation in knowledge transfer.

Sir Brian Fender



Sir Brian Fender has been an active member of the Knowledge Transfer industry for most of his career having been Chief Executive of the Higher Education Funding Council for England from 1995–2001 and Chairman of BTG plc from 2003–2008. Prior to that he was Vice-Chancellor of Keele University, Associate Director and Director of the Institut Laue-Langevin in Grenoble, France and Chairman of the Science Board of the UK's Science and Engineering Research Council. He is a graduate and Fellow of Imperial College. He is a Director of Higher Aims Ltd, a private consultancy involved in higher education and research management. Sir Brian is a Fellow of the Institute of Physics and the Royal Society of Chemistry and a Companion of the Chartered Management Institute. He has honorary degrees or fellowships from 12 universities and colleges.

Dr Claire Graves



Dr Claire Graves has worked for the Research Councils since 2000, and in the Research Councils UK (RCUK) Strategy Unit for the last two years, previously covering research policy. Since June she has had responsibility for the co-ordination and strategic delivery of the cross-Council Economic Impact agenda.

Dr Bob Howlett, MIET, MBCS



Director, Virtual Knowledge Solutions Ltd Executive Chair, KES International Dr Bob Howlett was until recently Reader and Head of the Smart Systems Laboratory at the University of Brighton. He is now concentrating on his company, which provides services for academic conferences, KTP mentoring and support, international funding guidance and technical consultancy. He is the Executive Chair of KES International, facilitating knowledge transfer and research in areas including intelligent systems, sustainability, and innovative knowledge transfer.

Through management of over 20 collaborative industrial projects, directorship of the Brighton University KTP Centre, and chairmanship of the KTP National Forum, he is nationally recognised in knowledge and technology transfer, and the commercialisation of research.

Deborah Lock



In her role as Executive Director of Enterprise at Kingston University, Deborah is responsible for leading the institution's enterprise agenda. She manages the department, which covers business and commercial services, knowledge transfer, enterprise education, student enterprise and project support. Deborah has oversight of all University HEIF-funded positions such as those in Careers & Employability, the Academic Development Centre and the University Secretariat. In July 2009 she was elected to the Council of the Association for University Research & Industry Links (AURIL).

Sir Peter Scott



Professor Sir Peter Scott has been Vice-Chancellor of Kingston University since January 1998. Previously he was Pro Vice-Chancellor and Professor of Education at the University of Leeds. He was also the Director of the Centre for Policy Studies in Education. From 1976 to 1992 he was Editor of *The Times Higher Education Supplement*. Before that he was a reporter and then a leader writer on *The Times*. He has a First in modern history from the University of Oxford (Merton College). He was also a Visiting Scholar at the Graduate School of Public Policy at the University of California at Berkeley, while holding a Harkness Fellowship awarded by the Commonwealth Fund of New York.

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