



**BUILT ENVIRONMENT  
RESEARCH INSTITUTE  
ANNUAL REPORT  
1 AUGUST 2009 - 31 JULY 2010**

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<b>CONTENTS</b>	<b>Page No</b>
1. Foreword from the Director of the Research Institute	5
2. Research Institute Members	9
3. Research Staff Members	11
4. Research Students	12
5. Research Publications	16
5.1 Conference Papers	23
6. Research Funding	29

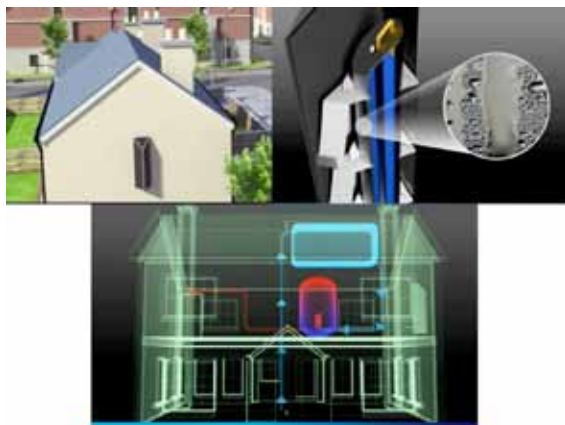
## I. FOREWORD BY THE RESEARCH INSTITUTE DIRECTOR



In spite of the uncertainties in the wider macro-economy and the potential impact of public sector cuts, the period covered by this Annual Report for the Built Environment Research Institute (BERI), August 2009 to July 2010 was again a year of considerable achievement by the Institute, its constituent research groups and, most of all, the various distinctions obtained by staff members. Over the period of this report, the Research Institute has been highly successful in achieving new grant income in what has become an increasingly difficult market. Several highly prestigious grants totalling circa £1.1M were obtained on top of the current portfolio of grants worth circa £5M. Fuller details of research grants received are outlined in Section 6 of this report.

Research students are an essential part of the activities of BERI. Over the period of this report, 71 research students were registered for either full-time or part-time study. In total there were 8 PhD candidates who graduated. The diverse range of topics being researched at PhD level highlights the unique position of the Institute spanning all disciplines within the Built Environment. This year also saw the development of cross-faculty research programmes at PhD level with the Research Institute Art and Design.

The Centre for Sustainable Technologies (CST) over the year actively pursued the objectives of its current funding portfolio with a significant increase in the number of quality journal paper outputs. Increased attendance at major international conferences as invited and plenary speakers demonstrates the growing reputation of CST. Furthermore, over the year major capital spends were initiated to enhance CST's facilities and further improve the research environment in which it operates. Increased collaboration both internally within BERI, internally within the University and externally is designed to realise wider cross-disciplinary funding applications broadening the research portfolio. Research infrastructure funding agreed under the Research Capital Investment Fund has facilitated the expansion programme not only in CST but also has beneficial effects throughout the Research Institute.



*The Presol concept combines two areas of in-depth research at Ulster/BERI i.e. solar thermal energy and energy storage. The unit is designed to maximise solar energy collection and storage while minimising night time losses, allowing simple domestic installation and use.*

In the Centre for Research on Property and Planning (RPP) various activities have enhanced the international profile. One example is the Property Tax subgroup's engagement in research in the areas of property tax modelling and Computer Assisted Mass Appraisal of property values. This has included work supporting policy in Northern Ireland, Uganda, Cairo, Bosnia, Mauritius and elsewhere. In order to carry out this work the team has developed extensive experience of dealing with large datasets of property related information and integrating this with a range of socio economic and other data aimed at assessing model options and finding solutions to complex problems in the urban environment. At a more local level, the past year saw the 100<sup>th</sup> issue of the Northern Ireland Quarterly House Price Index (NIQHPI) launched at a reception in the Belfast campus and attended by key decision-makers in government and private sector practice.



*From left: Mr Michael Kidd (Head of Business Banking UK, Bank of Ireland), Prof Alastair Adair (PVC Communication and External Affairs), Mrs Louise Brown (Lecturer), Mr Alan Shannon (Permanent Secretary of the Dept of Social Development), Prof Richard Barnett (Vice-Chancellor), Mr Paddy McIntyre (Chief Executive, NIHE), Prof Stanley McGreal (Director of BERI) and Prof Ian Montgomery (Dean of Faculty of Art, Design and the Built Environment). Launch of the 100<sup>th</sup> Issue of the Northern Ireland Quarterly House Price Index.*

The Fire Safety Engineering Research & Technology group (FireSERT) experienced significant growth in its core areas with research grants currently totalling £1.5M primarily in the areas of fire materials, fire modelling and structures. Major impacts of FireSERT over the year have been in the design of fire safe materials based on nanotechnology and chemistry such as applied to fire doors, the design of steel cellular beams and the prevention of buckling in elliptical steel columns. Moreover considerable progress has been achieved in modelling soot, smoke and radiation which primarily affect the toxicity and fire growth in major fire disasters. Research achievements were made possible by the dedication of PhD students and research associates as well as by the expertise of the lab working group consisting of four engineers. Publications in refereed journals, invited presentations and organized conferences by FireSERT staff have enhanced the international status of FireSERT over the academic year 2009-2010. In February 2010 FireSERT hosted an international conference culminating in a major live fire test to simulate how long steel cellular beams in modern office buildings react in a burning inferno.



*Unique Fire Test of Full Scale Compartment with long Cellular beams, FireSERT, Castledawson 27<sup>th</sup> February, 2010.*

The HySAFER (Hydrogen Safety Engineering and Research) centre has continued basic and applied research in hydrogen safety to underpin the international standing of the team. Projects that staff in the centre have been involved in over 2009-2010 include behaviour and interaction of non-reacting plane jets and downwards releases, pressure peaking effect and self-extinction of hydrogen flame in enclosures, full chemistry model to numerically simulate the dynamics of hydrogen spontaneous ignition in complex geometries like pressure relief devices at sudden releases, Rayleigh-Taylor instability in coherent deflagrations, sub-grid scale model for LES of deflagration-to-detonation transition. The centre organized a series of International short courses and advanced research workshops “Progress in Hydrogen Safety” (<http://hysafer.ulster.ac.uk/phs/>) over the past year. The HySAFER Centre participated in the preparation of a number of research proposals. Results of basic and applied research are supporting the development of an innovative safety valve for storage of compressed gases including hydrogen with PoC funding from Invest NI.



*4th European Summer School on Hydrogen Safety at the University of Corsica (September 2009)*

The period covered by this Annual Report has seen further growth in the size of the Research Institute with membership at the end of July 2010 of 58 staff, split between core (36) and associate (22) members. In addition the research base of BERI has benefitted significantly from the role of research staff. During the year, we were pleased to welcome new staff appointments into the Research Institute: Ming Huang, Alona Matinez-Perez, Nigel McConnell, Jayanta Mondol, Panagoita Pimenidou, Gavan Rafferty, Heather Ritchie, Donal Ryan and Shaleen Singhal. The expertise of staff members, new and existing, is reflected in the wide range of international, national, regional and local activities that they are involved in, with many requests to act as invited or keynote speakers, serve on editorial boards, sit on government committees and other activities.



*From left: Graham Chase (Chairman ATCM), Shaleen Singhal (BERI), Rob Edwards (Emerald Group Publishing Limited). Shaleen Singhal receiving the '2009 Emerald/EFMD Outstanding Doctoral Research Highly Commended Award' in London, June 2010.*

In summary, I would encourage you to read through this Annual Report on the activities of the Built Environment Research Institute, University of Ulster over the period August 2009 to July 2010. I look forward to receiving any comments or queries that you may have on research activities in built environment.

A handwritten signature in black ink that reads "Stanley McGreal".

Stanley McGreal  
Director, Built Environment Research Institute

## 2. RESEARCH INSTITUTE MEMBERS

Surname	Forename	Title	Position	Institute Status
<b>Adair</b>	Alastair	Prof	PVC (Communication & External Affairs)	Core
<b>Ali</b>	Faris	Prof	Professor in Structural Engineering	Core
<b>Berry</b>	James	Prof	Professor in Urban Planning & Property Development	Core
<b>Blair</b>	Neale	Dr	Lecturer	Core
<b>Boyce</b>	Karen	Dr	Lecturer	Core
<b>Boyd</b>	Jane	Dr	Lecturer	Associate
<b>Brennan</b>	Sile	Dr	Lecturer	Associate
<b>Brown</b>	Louise	Mrs	Lecturer	Associate
<b>Choi</b>	Seng-Kwan	Dr	Lecturer	Core
<b>Dahoe</b>	Arief	Dr	Lecturer	Core
<b>Davis</b>	Peadar	Dr	Lecturer	Associate
<b>Delichatsios</b>	Michael	Prof	Professor of Fire Dynamics and Material Flammability and Fire Modelling/Director of FireSERT	Core
<b>Eadie</b>	Robert	Dr	Lecturer	Associate
<b>Gray</b>	Paddy	Prof	Professor in Housing	Associate
<b>Griffiths</b>	Philip	Dr	Reader	Core
<b>Grissom</b>	Terry	Dr	Lecturer	Core
<b>Gunay</b>	Banihan	Dr	Lecturer	Core
<b>Haran</b>	Imelda	Dr	Lecturer	Associate
<b>Heaney</b>	George	Prof	Professor of Construction	Core
<b>Hemphill</b>	Lesley	Dr	Lecturer	Core
<b>Hewitt</b>	Neil	Prof	Professor of Energy/ Director of CST	Core
<b>Hine</b>	Julian	Prof	Professor of Transport	Core
<b>Huang</b>	Ming Jun	Dr	Lecturer	Core
<b>Huang</b>	Ye	Dr	Lecturer	Core
<b>Hyde</b>	Trevor	Dr	Lecturer	Core
<b>Joseph</b>	Paul	Dr	Lecturer	Core
<b>Kashyap</b>	Anil	Dr	Lecturer	Associate
<b>Keenan</b>	Michaela	Dr	Lecturer	Associate
<b>Lim</b>	Lay-Cheng	Dr	Lecturer	Core
<b>Lloyd</b>	Greg	Prof	Head of School of the Built Environment	Core
<b>Lyness</b>	John	Dr	Reader	Core
<b>MacIntyre</b>	Sean	Mr	Senior Lecturer	Associate
<b>Makarov</b>	Dmitriy	Dr	Reader	Core
<b>Martinez-Perez</b>	Alona	Mrs	Lecturer	Associate



<b>Surname</b>	<b>Forename</b>	<b>Title</b>	<b>Position</b>	<b>Institute Status</b>
<b>McAnulty</b>	Ursula	Miss	Lecturer	Associate
<b>McCluskey</b>	William	Dr	Reader	Core
<b>McConnell</b>	Nigel	Dr	Lecturer	Associate
<b>McGreal</b>	Stanley	Prof	Professor of Property Research/Director of BERI and RPP	Core
<b>McIlveen-Wright</b>	David	Dr	Lecturer	Core
<b>McQueen</b>	Michael	Mr	Lecturer	Associate
<b>Molkov</b>	Vladimir	Prof	Professor of Fire Safety Science/Director of HySAFER	Core
<b>Mondol</b>	Jayanta	Dr	Lecturer	Core
<b>Nadjai</b>	Ali	Prof	Professor of Fire Structural Engineering	Core
<b>Novozhilov</b>	Vasily	Prof	Professor in Fire Dynamics	Core
<b>Odeyinka</b>	Henry	Dr	Lecturer	Core
<b>Peel</b>	Deborah	Dr	Senior Lecturer	Core
<b>Pimenidou</b>	Panagoita	Ms	Lecturer	Associate
<b>Rafferty</b>	Gavan	Mr	Lecturer	Associate
<b>Ritchie</b>	Heather	Ms	Lecturer	Associate
<b>Ryan</b>	Donal	Dr	Lecturer	Associate
<b>Singhal</b>	Shaleen	Dr	Lecturer	Associate
<b>Smyth</b>	Mervyn	Dr	Reader	Core
<b>Strong</b>	Alan	Mr	Senior Lecturer	Associate
<b>Thompson</b>	William	Dr	Lecturer	Associate
<b>Woodside</b>	Alan	Prof	Professor of Highway Engineering	Associate
<b>Woodward</b>	David	Dr	Reader	Core
<b>Yohanis</b>	Yigsaw	Prof	Professor of Building Services Engineering	Core
<b>Zhang</b>	Jianping	Dr	Lecturer	Core

BERI staff and status at 31 July, 2010.

### 3. RESEARCH STAFF MEMBERS

<b>Surname</b>	<b>Forename</b>	<b>Title</b>	<b>Position</b>	<b>Research Centre</b>
<b>Bragin</b>	Maxim	Dr	Research Associate	HySAFER
<b>Dave</b>	Ashok	Mr	Research Assistant	CST
<b>Fang</b>	Yueping	Dr	Research Fellow	CST
<b>Han</b>	Sanghoon	Dr	Research Associate	FireSERT
<b>Haran</b>	Martin	Dr	Research Fellow	RPP
<b>Hardy</b>	Maeliosa	Ms	Research Associate	RPP
<b>Kattakayam</b>	Thomas	Dr	Research Associate	CST
<b>Lyapin</b>	Rail	Dr	Research Associate	CST
<b>McIlhatton</b>	David	Dr	Research Associate	RPP
<b>McLarnon</b>	Dominic	Mr	Research Fellow	CST
<b>McPhillips</b>	Karen	Dr	Research Associate	CST
<b>Novaes</b>	Marcio	Mr	Research Associate	CST
<b>Ramani</b>	Alwar	Dr	Research Assistant	FireSERT
<b>Ramirez</b>	Miguel	Mr	Research Associate	CST
<b>Razvani</b>	Sina	Dr	Research Fellow	CST
<b>Saffers</b>	Jean-Bernard	Mr	Research Associate	HySAFER
<b>Suzanne</b>	Mathieu	Dr	Research Assistant	FireSERT
<b>Tretsiakova-McNally</b>	Svetlana	Dr	Research Associate	FireSERT
<b>Wingate</b>	Stephen	Mr	Research Associate	HySAFER
<b>Xing</b>	Yangang	Dr	Research Associate	CST
<b>Zacharopoulos</b>	Aggelos	Dr	Research Fellow	CST

## 4. RESEARCH STUDENTS

The following research students were registered on research degree programmes in the Institute during 2009-2010.

Student Name	Thesis Title
<b>Akashah, Farid W</b>	Fire risk simulation and assessment using multi-agent technology
<b>Akbar, Muhammad R</b>	Sustainable Technologies, Environmental Subsidies, End User Needs and Business Opportunities in the delivery of Zero Carbon Homes
<b>Akram, Waseem</b>	Car culture and city design
<b>Alexander, Gareth O</b>	Novel floor constructions to improve the performance and energy efficiency of ground source heat pump (GSHP) powered underfloor heating
<b>Alharbi, Talal</b>	Accessibility of public buildings for the disabled community in Jordan
<b>Ali, Sadiq</b>	Thermal / Mechanical / Electrical storage systems suitable for deployment in the Built Environment
<b>Amin, Md Shohel R</b>	Urban land market analysis
<b>Anderson, Mark T</b>	Biomass pelletisation, fuel variability and pelletisation for co-gassification process
<b>Arya, Farid</b>	Producing cheap vacuum glazing sheets which can be cut in different sizes
<b>Brown, Louise</b>	Time on the market for single family residential property: the UK perspective
<b>Bukhari, Syed</b>	Public transport network change and access to transport in low income households
<b>Byrne, Conor</b>	Dynamical System (lattice Boltzmann) Modelling of Compartment Fires
<b>Byrne, Orla M</b>	Investigation into the potential practical application of "smart growth" within an Irish case study
<b>Caldwell, Stephen</b>	A study into sustainable bitumen use
<b>Clarke, Mervyn C</b>	Strategic property performance management
<b>Colclough, Shane</b>	Thermal energy storage
<b>Dan, Nchelatebe N</b>	Solar thermal energy
<b>Dave, Ashok</b>	Techno – Economic assessment of novel IGCC systems with CO <sub>2</sub> capture
<b>Dixon, Andrew JP</b>	Experimental studies to investigate merging behaviour in a staircase
<b>Eni, Sabariah</b>	Research on regeneration areas
<b>Friel, Shaun</b>	Early life skid resistance
<b>Gamu, Faoziah</b>	Analysing real estate values in emerging economies. A case study of Nigeria
<b>Ghayur, Muhammad A</b>	Techno-economic modelling of bio-refinery concepts
<b>Golden, Saul</b>	Urban design decision support systems - assessment tools for successful urban civic space
<b>Goodfellow, Nathan K</b>	Cellular beams in fire: performance of cellular composite floor beams in fire situations
<b>Gore, Ricardo</b>	An investigation into the relationship between visual field/exposure and response time in a fire emergency
<b>Gunasekera, Sanwara</b>	Modelling the relationship between organisational and supply chain performance in the construction industry
<b>Hardie, Brian</b>	The behaviour of compartment masonry walls in fires

<b>Student Name</b>	<b>Thesis Title</b>
<b>Harrison, Justin</b>	Sustainable communities - mapping and measuring the balance of trade-offs
<b>Hillis, Colin JG</b>	Transport security and terrorism
<b>Hinch, Martin</b>	The liquidity crisis within real estate markets
<b>Kamruzzaman, Md</b>	Public transport network change and access to transport in low income households
<b>Kashyap, Poonam</b>	Innovative storage systems suitable for deployment in the Built Environment
<b>Keatley, Patrick</b>	Dynamic techno-economic analysis of power generation systems
<b>Keenan, James J</b>	Modelling and LES of vented hydrogen-air deflagrations
<b>Kelly, Hugh F</b>	24-hour cities: advantages in commercial real estate investment
<b>Khamkanya, Thadsin</b>	Analysis of the holistic approach to workplace environments, management systems and new technologies in meeting corporate end-user requirements
<b>Lewis, John</b>	Innovation in construction procurement – case based reasoning and artificial intelligence techniques
<b>Lytvyn, Inna F</b>	Techno-economic modelling of all-Ireland energy system
<b>Lytvyn, Iurii V</b>	Novel Evacuated Glazing System
<b>Mahmoud, Moataz</b>	Design, access and security in public transport infrastructure (an integrated assessment tool for sustainable public transportation)
<b>McAlister, Michael P</b>	Development of a nett zero carbon campus for Omagh College of Further and Higher Education
<b>McAllister, Barry</b>	Quantified risk assessment for health care facilities
<b>McClements, Sharon</b>	Selection of consultants based on trust
<b>McCord, Michael J</b>	Modelling affordability in housing markets
<b>McDermott, Rodney PJ</b>	Sustainable Communities Modelling
<b>McGrath, John</b>	Interchange and travel choice: implications for mode shift
<b>McIlhagga, John</b>	Existential explorations of architecture
<b>McKeown, Paul J</b>	Legislative and operational issues for sustainable urban drainage systems
<b>Mellor, Kate</b>	Slippery surfaces: photography, architecture and the cityscape of seduction
<b>Millar, Philip</b>	A Spatial Rationale for engineering Performance of Highway Surface Materials based on Digital Photogrammetry
<b>Moorehead, Donagh</b>	Tradable heat - Using Northern Ireland as a demonstrator for resource mapping, demand mapping and transport concepts for capturing and utilising waste heat without traditional infrastructure investment
<b>Moss, John</b>	Sustainable Rural Communities –A Carbon Model
<b>Murray, Aaron</b>	A study in traffic planning
<b>Naili, El-Hadi A</b>	Behaviour of composite floor structures in fire
<b>Nase, Ilir</b>	Impact of quality led design on real estate value and performance
<b>Nichols, Emma</b>	Chemically-enhanced water mist suppression of fires
<b>Novaes, Marcio F</b>	Oilseed rape as a potential feedstock for domestic boilers
<b>O'Brien, Vincent</b>	Development and performance evaluation of nano-encapsulated solar concentrating panels and their potential for modular construction techniques
<b>Oyedele, Joseph</b>	Capital markets and innovative vehicles for financing infrastructure
<b>Paul, Damasén</b>	Characterisation of Solar Concentrating Systems for Photovoltaics and their Impact on Performance

<b>Student Name</b>	<b>Thesis Title</b>
<b>Quigley, Denise</b>	Achieving an optimum balance across capital, life-cycle and environmental costs
<b>Quinlan, Patrick D</b>	Enhanced integrated collectors storage solar water heaters
<b>Quinn, Matthew V</b>	Heat pumps digital compressor
<b>Rahma, Doheim</b>	Development of a performance-based approach in fire codes in Egyptian architecture
<b>Rahman, Sazzadur</b>	Knowledge-based cost model for optimising the selection of product and technology for building design
<b>Ramos, Reynaldo</b>	Mixed use development: practice, potential, feasibility and performance
<b>Redpath, Gwyneth M</b>	Risk mapping of minor ('B' Class) roads in rural Northern Ireland, to examine the reasons for the high proportion of collisions resulting in death or serious injuries, especially to young drivers
<b>Rolfe, Angela</b>	Integrated wind-compressed air energy storage system with combined heating and cooling
<b>Saffers, Jean-Bernard</b>	Principles of hydrogen safety engineering
<b>Salehi Kouhestani, Mohammad</b>	Investigation on advanced heat pumps in domestic appliances
<b>Samsudin, Salfarina</b>	Exploring the role of land administration in supporting sustainable land use management
<b>Scullion, Thomas</b>	Performance of axially restrained steel columns subjected to severe fire
<b>Shah, Nikhil K</b>	Vapour compression heat pumps driven by advanced engine concepts and incorporating heat recovery
<b>Shamsudin, Zarina</b>	Privatisation of property development in Malaysia: negotiation frameworks and equity sharing
<b>Shi, Zhongchuan</b>	Development of advanced application method for structural fire protection using innovative insulation material
<b>Sultan, Zahid</b>	Managing transport demand and sustainable transport
<b>Ukleja, Sebastian S</b>	Production of smoke and CO in enclosure fires
<b>Yao, Wei</b>	Radiation modelling for fires
<b>Zanjiri, Yasser</b>	Urban regeneration policies towards a sustainable urban space development in Tehran
<b>Zbikowski, Mateusz</b>	Hydrogen deflagration-to-detonation transition and its mitigation technologies

#### **Graduated December 2009**

<b>Student Name</b>	<b>Thesis Title</b>
<b>Beji, Tarek</b>	Modelling soot and carbon monoxide in enclosure fires
<b>Stephen, Raphael C</b>	Application of computer assisted valuation in Grenada
<b>Vaganay, Marie</b>	The safety impact of public roads on child pedestrians/ reducing child pedestrian casualties

## Graduated July 2010

<b>Student Name</b>	<b>Thesis Title</b>
<b>Davis, Peadar</b>	An empirical analysis of property tax policy options and the potential for using a banded approach
<b>McIlhatton, David</b>	Spatial planning – cellular automata urban growth modelling
<b>Peel, Deborah</b>	Towards the construction of a productive research and teaching nexus in the Built Environment
<b>Said, Rosli</b>	Evaluation of housing finance system: Assessing impacts on the housing market in Malaysia
<b>Tepe, Bulent</b>	Evaluation of pre-treatment process in powder painting in the automotive industry

## 5. RESEARCH PUBLICATIONS

- Adair, A, Berry, J, Haran, M, Hutchison, N and McGreal, S (2009) Urban Regeneration: opportunities for property investment. IPF Research Programme. pp 53.
- Adair, A, McGreal, S and Brown, L (2009) Northern Ireland Quarterly House Price Index for Q2 2009 Report 99. pp 8.
- Adair, A, McGreal, S, Brown, L and McIlhatton, D (2009) Northern Ireland Quarterly House Price Index for Q3 2009 Report 100. pp 8.
- Adair, A, McGreal, S, Brown, L and McIlhatton, D (2010) Northern Ireland Quarterly House Price Index for Q4 2009 Report 101. pp 8.
- Adair, A, McGreal, S and McIlhatton, D (2010) Northern Ireland Quarterly House Price Index for Q1 2010 Report 102. pp 8.
- Adair, AS, Berry, JN, Haran, ME, Lloyd, MG and McGreal, WS (2010) Impact of the Recession on the Property Market in Northern Ireland: Contractual Non-Compliance. *Local Economy*, 25 (2). pp. 131-142.
- Adair, AS, Lloyd, MG, Berry, JN, Haran, M, McCord, M and McGreal, WS (2010) Mortgage Market Liquidity in Northern Ireland: Constraints and Misconceptions. University of Ulster Real Estate Initiative. pp 28.
- Agyenim, F, Hewitt, N, Eames, P and Smyth, M (2010) A review of materials, heat transfer and phase change problem formulation for latent heat thermal energy storage systems (LHTESS). *Renewable and Sustainable Energy Reviews*, 14 (2). pp. 615-628.
- Alexander, P, Clement, P, Agge, DG, Grail, J, Berry, J, McCord, M, McIlhatton, D and Singhal, S (2009) Nationwide Business Improvement Districts Survey 2009 (UK and Ireland). BIDs. pp 52.
- Ali, F, Nadjai, A and Choi, S (2010) An Experimental and Numerical Study on the Behavior of High Strength Concrete Columns in Fire Subjected to High Restraint. *Journal of Structural Fire Engineering*, 1 (1). pp. 1-16.
- Ali, F, Nadjai, A and Choi, S (2010) Numerical and experimental investigation of the behavior of high strength concrete columns in fire. *Engineering Structures*, 32 (5). pp. 1236-1243.
- Bakirtzis, D, Delichatsios, MA, Lioudakis, S. and Ahmed, W (2009) Fire retardancy impact of sodium bicarbonate on ligno-cellulosic materials. *Thermochimica Acta*, 486 (1-2). pp. 11-19.
- Bakirtzis, D, Ramani, A, Delichatsios, MA and Zhang, J (2009) Structure of the condensed phase and char of fire-retarded PBT nanocomposites by TGA/ATR in N<sub>2</sub>. *Fire Safety Journal*, 44 (8). pp. 1023-1029.
- Baraldi, D, Kotchourko, A, Lelyakin, A, Yanez, J, Middha, P, Hansen, OR, Gavrikov, A, Efimenko, A, Verbecke, F, Makarov, D and Molkov, V (2009) An inter-comparison exercise on CFD model capabilities to simulate hydrogen deflagrations in a tunnel. *International Journal of Hydrogen Energy*, 34 (18). pp. 7862-7872.
- Boyce, K (2009) Human Behavior in Merchantile Occupancies, *Fire Protection Engineering*. Summer Edition, pp 22-26.
- Brennan, S, Bengaouer, A, Carcassi, M, Cerchiara, G, Evans, G, Friedrich, A, Gentilhomme, O, Houf, W, Kotchurko, A, Kotchurko, N, Kudriakov, S, Makarov, D, Molkov, V, Papanikolaou, E, Pitre, C, Royle, M, Schefer, R, Stern, G, Venetsanos, AV, Veser, A, Willoughby, W and Yanez, J (2009) Towards minimising hazards in hydrogen and fuel cell stationary applications: Key findings of modelling and experimental work in the HYPER project. In: *Hazards XXI: process safety and environmental protection in a changing world*, 58. pp 399-410.

Choi, S, Han, S, Nadjai, A, Ali, F, Kim, S and Choi, J (2009) Performance of shear studs in fire. In: Applications of Structural Fire Engineering, Czech Technical University in Prague. pp 6.

Delichatsios, MA (2009) An inter-comparison exercise on the capabilities of CFD models to predict the short and long term distribution and mixing of hydrogen in a garage. *International Journal of Hydrogen Energy*, 34 (14). pp. 5912-5923.

Delichatsios, MA and Tofilo, P (2010) Thermally induced stresses in glazing systems. *Journal of Fire Protection Engineering*, 20 (2). pp. 101-116.

Delichatsios, MA, Lee, Y and Tofilo, P (2009) A new correlation for gas temperature inside a burning enclosure. *Fire Safety Journal*, 44 (8). pp. 1003-1009.

Dobriansky, Y and Yohanis, Y (2010) Cyclical reverse thermosiphon. *Archives of Thermodynamics*, 31 (1). pp. 3-32.

Eadie, R, Perera, S and Heaney, G (2010) An in-depth analysis of e-procurement use in UK construction organizations: In: Proceedings of the 6th International Conference on Innovation in Architecture, Engineering & Construction (AEC). pp. 466-476.

Eadie, R, Perera, S and Heaney, G (2010) Identification of e-procurement drivers and barriers for UK construction organisations and ranking of these from the perspective of quantity surveyors. *Journal of Information Technology in Construction*, 15. pp. 23-43.

Eadie, R, Perera, S and Heaney, G (2010) Identification of key process areas in the production of an e-capability maturity model for UK construction organizations. In: Proceedings of the 6th International Conference on Innovation in Architecture, Engineering & Construction (AEC). pp 413-426.

Eadie, R, Perera, S and Heaney, SG (2010) A cross-discipline comparison of rankings for e-procurement drivers and barriers within UK construction organisations. *Journal of Information Technology in Construction*, 15. pp. 217-233.

Fang, Y, Hyde, T, Eames, PC and Hewitt, N (2009) Theoretical and experimental analysis of the vacuum pressure in a vacuum glazing after extreme thermal cycling. *Solar Energy*, 83 (9). pp. 1723-1730.

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## 5.1 Conference Papers

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- Akashah, F, Zhang, J, Delichatsios, MA, Wang, H and Nadjai, A (2010) Agent based risk assessment of fire safety systems with automated event tree analysis, Fire Safety International conference, Jordanstown, February 2010.
- Akashah, FW, Zhang, J, Delichatsios, MA and Wang, H (2010) Agent Based Risk Assessment of Fire Safety Systems with Automated Event Tree Analysis, 8th International Conference on Performance-Based Codes and Fire Safety Design Methods, Lund, June 2010.
- Ali, F and Nadjai, A (2010) Mechanical Properties of Concrete with Polypropylene Fibres under Normal and High Temperatures. International Fire Safety Workshop, Jordanstown, February 2010.
- Allam, A and Nadjai, A (2010) Finite element modelling of structural steel frame in fire, Fire Safety International conference, Jordanstown, February 2010.
- Beji, T, Ukleja, S, Zhang, J and Delichatsios, MA (2010) Observations on Flame behaviour in Corridor and Tunnel like Enclosures Fires, 6th International Seminar on Fire and Explosion Hazards, Leeds, April 2010.
- Brennan, S, Makarov, D, and Molkov, V (2010) Dynamics of FLAMMABLE hydrogen-air mixture formation in an enclosure with a single vent, 6<sup>th</sup> Fire and Explosion Hazards Seminar, Leeds, April 2010.
- Bukhari, S, Hine, JP, Gunay, B and Blair, N (2010) Transport Disadvantage and Public Transport Network Change: A case study of Belfast, 12<sup>th</sup> World Conference on Transport Research, Lisbon, July 2010.
- Choi, S, Han, S, Nadjai, A, Ali, F and Choi, JY (2010) Performance of shear studs in fire, Fire Safety International conference, Jordanstown, February 2010.
- Davis, P and McCluskey, WJ (2010) An Empirical Analysis of Simplified Valuation Approaches for Property Tax Purposes 17<sup>th</sup> Annual Conference of the European Real Estate Society, Milan, June 2010.
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- Funami, Y, Novozhilov and Shimada, T (2010) Unsteady Internal Ballistics of Hybrid Rocket: Quasi-1D Simulation, Asian Joint Conference on Propulsion and Power 2010, Miyazaki, March 2010.
- Funami, Y, Novozhilov, V and Shimada, T (2009) Quasi-1D Simulation of Hybrid Rocket Flow with a Fast Chemistry Non-premixed Flame Model, Sixth International Conference on Flow Dynamics, Sendai, November 2009.
- Funami, Y, Novozhilov, V, Nakagawa, I and Shimada, T (2010) Regression Modeling of Paraffin-based Hybrid Rocket Fuels for Internal Ballistics Simulation, Forty-Sixth AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Nashville, July 2010.
- Goodfellow, N, Nadjai, A, Ali, F and Choi, S (2010) Finite element modelling of composite cellular floor beams at ambient temperatures and in fire scenarios, Fire Safety International conference, Jordanstown, February 2010.
- Gray, P (2009) Accommodation Standards for Travellers, Equality Commission, Belfast, December 2009.

- Gray, P (2009) Futures Issues facing Housing in NI, Northern Ireland Housing Forum, Belfast, December 2009.
- Gray, P (2009) Housing in Belfast. Liverpool Mutual Homes Board and Staff, Belfast, October 2009.
- Gray, P (2009) The Problems of Supply for Housing in UK, International Federation of Housing and Planning Working Group on Housing and Urban Settlements, Bucharest, October 2009.
- Gray, P (2010) Challenges Ahead, Chartered Institute of Housing National Conference, Harrogate, June 2010.
- Gray, P (2010) Innovative Approaches to Teaching, Learning & Assessment, Newcastle Upon Tyne, May 2010.
- Gray, P (2010) Skills in the Housing Profession: Have Your Say, Chartered Institute of Housing National Conference, Harrogate, June 2010.
- Gray, P (2010) The Governance Review and its Impact, OneCIH Conference, Birmingham, April 2010.
- Gray, P (2010) The Private Rented Sector in NI, Landlords Association of NI, Belfast, January 2010.
- Gray, P, Hayden, A, Mc Anulty, U and Jordan, B (2010) The Private Rented Sector: North and South of Ireland: From divergence to Convergence, Comparative Housing Research Conference, Delft, March 2010.
- Gray, P, Hayden, A, Mc Anulty, U and Jordan, B (2010) The Private Rented Sector: North and South of Ireland, European Network for Housing Research Conference Working Group, St Marienthal, February 2010.
- Gray, P, Jordan, B, Hayden, A, Mc Anulty, U and Jordan, B (2010) The Private Rented Sector: North and South of Ireland, European Network for Housing Research Conference, Istanbul, July 2010.
- Grissom, TV, Berry, JN and Lim, LC (2010) Development valuation: impacts of uncertainty, risk and capital structure, 17<sup>th</sup> Annual Conference of the European Real Estate Society, Milan, June 2010.
- Grissom, TV, Hemphill, LA and Lim, LC (2010) The Valuation of Exhaustible Resources – Discounting Strong and Weak Form Sustainability, 26<sup>th</sup> Annual Conference of the American Real Estate Society, Naples, Florida, April 2010.
- Grissom, TV, Lim, LC and Eriksson, C (2010) The potential for effective diversification strategies between the UK and Irish property markets, 17<sup>th</sup> Annual Conference of the European Real Estate Society, Milan, June 2010.
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- Ishiko, K, Novozhilov, V and Shimada, T (2009) A Numerical Simulation Using Hyperbolic Tangent Approximation Model for Diffusion Combustion in a Laminar Boundary Layer on a Flat Plate, Sixth International Conference on Flow Dynamics, Sendai, Japan, November 2009.
- Ishiko, K, Novozhilov, V and Shimada, T (2010) Numerical simulation of diffusion combustion in a turbulent boundary layer considering reaction progression, Forty-Sixth AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Nashville, July 2010.
- Joseph, P (2010) Thermal stabilities and flammability characteristics of some fibre-forming polymers, Fire Safety International Workshop, Jordanstown, February 2010.
- Kamruzzaman, M and Hine, J (2010) Identifying Rural Transport Disadvantage Using a Multi-Day Travel Diary. 42<sup>nd</sup> UTSG Conference, Plymouth, January 2010.

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- Kashyap, AK, Berry, JN and Grisham TV (2010) Impact of Sustainability Attributes on the Performance of Prime Office Market in the National Capital Region of Delhi, 17<sup>th</sup> European Real Estate Society Conference, Milan, June 2010.
- Khuzaimah, A and Lim, LC (2010) Foreign ownership of residential properties and Malaysia My Second Home programme (MMSH), 5<sup>th</sup> International Real Estate Research Symposium, Kuala Lumpur, April 2010.
- Kupke, V, Rossini, P and McGreal, WS (2010) A multivariate study of medium density housing development and neighbourhood change within Australian cities, 16<sup>th</sup> Pacific Rim Real Estate Society Conference, Wellington, January 2010.
- Lloyd, MG (2009) The Best Commission, sustainable housing futures and emerging options for change Northern Ireland Housing Forum Conference, Castlereagh, December 2009.
- Lloyd, MG (2009) Effective planning in the public interest and in the new politics of austerity, Chartered Institute of Housing Conference 'Planning Reform: What Impact for Housing and Communities', Belfast, September 2009.
- Lloyd, MG (2009) Local government and structures, Planning Summer School, Elected Members' School, Exeter, University of Exeter, September 2009.
- Lloyd, MG (2009) The Best Commission and a future sustainable housing future in Northern Ireland, NHBC Northern Ireland and Isle of Man Meeting, National House Building Council, Belfast, October 2009.
- Lloyd, MG (2010) Beyond academic interest in community regeneration, Scottish Urban Regeneration Foundation 2010 Annual Conference "Sustaining and reinventing community regeneration", Edinburgh, University of Edinburgh, March 2010.
- Lloyd, MG (2010) Climate change: one solution – move away from regulatory to spatial planning, Town and Country Planning Association and Friends of the Earth Conference 'Climate Change: why it will transform the values, ambitions and delivery of the planning system in Northern Ireland', Belfast, February 2010.
- Lloyd, MG (2010) Planning backwards: Future urban planning challenges - places and people or property and profit? Universidad Politecnica de Madrid, Madrid European Seminar 'Urban and Regional Planning Challenges in the 21<sup>st</sup> Century', Madrid, May 2010.
- Lloyd, MG (2010) Planning matters: Re-casting regulatory and institutional reforms in Northern Ireland, University College Dublin Planning School Research Seminar, Dublin, February 2010.
- Lloyd, MG (2010) Regulatory and institutional reforms in Northern Ireland, University of Cambridge, Department of Land Economy Seminar, Cambridge, February 2010.
- Lloyd, MG (2010) Spatial planning on the island of Ireland: the co-operation priorities, Fifth Annual International Centre for Local and Regional Development (ICLRD) Conference 'Preparing for economic recovery: Planning Ireland, North and South, Out of Recession'. Enniskillen, January 2010.
- Lloyd, MG (2010) The Future of Housing in Northern Ireland Northern Ireland Housing Executive Housing Management Conference, Castlereagh, May 2010.
- Lloyd, MG (2010) The future of Northern Ireland's housing system, Agenda NI Housing Conference 'Meeting Northern Ireland's housing needs: delivering more with less', Belfast, March 2010.



- Lloyd, MG and Peel, D (2010) Streamlining land use planning practice in Northern Ireland: a new institutionalist perspective? International Academic Association on Planning, Law, and Property Rights Fourth International Conference, Dortmund, February 2010.
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- Martinez-Perez, A (2009) Belfast: New networks aimed at overcoming conflict and creating the new shared cities. Networks Architecture and City Space Symposium, Edinburgh, November 2009.
- Martinez-Perez, A (2009) New Urbanism and its applied method in urban design practice to American and British Cities, Urban Design Research: Method and Application International Conference, Birmingham, December 2009.
- Martinez-Perez, A (2010) Spaces in Rome in the film *Belly of an Architect* by Peter Greenaway, School of Museum Studies Narrative Spaces International Conference, Leicester, April 2010.
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- Shaleen, S, Berry, J and McGreal, S (2009) Evaluating city competitiveness, regeneration and property-led business strategies through case study of cities in India and the UK, 10<sup>th</sup> International Congress, APSA, Ahmedabad, November 2009.

- Sultan, Z, Hine, JP and Berry, J (2010) Household Location Choice and Travel Behaviour: A Review of International Evidence, World Conference on Transport Research, Lisbon, July 2010.
- Taltavull, P, Dueñas, R and McGreal, WS (2010) TOM and House Prices: Evidence from Spain During the Immigration Period, Twenty-Sixth Annual Meeting American Real Estate Society, Naples, Florida, April 2010.
- Wan Nor Azriyati, Noor Rosly Hanif, Peel, D and Lloyd, MG (2010) Gates, Guards and Gemeinschaft? International Academic Association on Planning, Law, and Property Rights Fourth International Conference, Dortmund, February 2010.
- Yao, W, Zhang, J, Nadjai, A, Beji, T and Delichatsios, MA (2010) Global soot modelling in turbulent jet flames, Fire Safety International conference, Jordanstown, February 2010.
- Yohanis, Y (2010) Thermal and economic performance of long-term under ground solar energy storage, World Renewable Energy Technical research conference, New Delhi, April 2010.
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- Zhang, J, Delichatsios, MA, McKee, M and Ukleja, S (2010) Burning Behaviour of Intumescent Coating and Nanoparticles Applied on Flaxboard, Interflam 2010, Nottingham, July 2010.
- Zhang, J, Delichatsios, MA, McKee, M and Ukleja, S (2010) Numerical Study of Burning Behaviours of Flaxboard with Intumescent Coating and Nanoparticles, 6th International Seminar on Fire and Explosion Hazards, Leeds, April 2010.
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## 6. RESEARCH FUNDING: NEW AWARDS NOTIFIED - 1 AUGUST 2009 - 31 JULY 2010

Research Institute Member	Title of Award	Funding Body	Value
<b>Adair, Prof AS Berry, Prof JN Haran, Dr M McGreal, Prof WS</b>	The future of Private Finance Initiative and Public Private Partnership	R.I.C.S.	£20,000
<b>Ali, Prof FA Nadjai, Prof A</b>	Behaviour of axially restrained steel columns with elliptical sections subjected to severe fire	E.P.S.R.C	£230,434
<b>Blair, Dr N Brown, Mrs L</b>	Rural Restructuring and Economics Diversification	I.C.L.R.D.	£4,452
<b>Blair, Dr N Adair, Prof AS</b>	Rural restructuring and economics diversification - extension	I.C.L.R.D.	£1,282
<b>Blair, Dr N</b>	Embedding Employability within Urban and Regional Planning Education through Professional and Institutional Engagement in Malawi	The British Council	£59,700
<b>Davis, Mr PT Lim, Dr LC McCluskey, Dr WJ</b>	Using CAMA to model energy efficiency in Housing	Energy Savings Trust	£20,000
<b>Delichatsios, Prof MA Zhang, Dr J</b>	ENFIRO - Life Cycle Assessment of Environment-Compatible Flame Retardants	C.E.C. - Framework 7	£333,887
<b>Hine, Prof JP</b>	Rural Transport for older people in the North and South – understanding and meeting their needs	The Centre for Ageing R&D in Ireland (CARDI)	£4,287
<b>MacIntyre, Mr SC</b>	Environmental Health Symposium	CIEH (NI Directorate)	£1,000
<b>McCluskey, Dr WJ Davis, Mr PT Lim, Dr LC</b>	Real Estate Tax Technical Support and Training	Booz & Company (M.E) LTG	£31,800

<b>Research Institute Member</b>	<b>Title of Award</b>	<b>Funding Body</b>	<b>Value</b>
<b>McCluskey, Dr WJ</b>	Property Tax Reform in Northern Ireland; A case study of strategy, implementation, performance & lessons	Lincoln Inst of Land Policy	£8,900
<b>McGreal, Prof WS McAnulty, Miss U</b>	Private Rental Index 2010	N.I.H.E.	£15,000
<b>McGreal, Prof WS Adair, Prof AS McIlhatton, Mr D</b>	Resale performance of former Housing Executive Property 2010	N.I.H.E.	£10,000
<b>McGreal, Prof WS Adair, Prof AS McIlhatton, Mr D</b>	Analysis of Private Housing Market Performance 2010-2011:- Northern Ireland Quarterly House Price Index	N.I.H.E.	£15,000
<b>Molkov, Prof V Makarov, Dr DV</b>	Safety valve for high pressure hydrogen storage	Invest Northern Ireland - Proof of Concept	£100,912
<b>Odeyinka, Dr H</b>	Modelling risk impacts on the variability between Tender Sum and Final Account.	R.I.C.S. Educational Trust	£6,000
<b>Peel, Ms D Hemphill, Dr L Singhal, Dr S</b>	Top Down or Bottom Up? Governance at the relevant scale	The British Council - Alliance 2010	£2,400
<b>Smyth, Dr MA Hewitt, Prof NJ</b>	A solar accelerator design for small scale bio energy production	Invest Northern Ireland - Proof of Concept	£102,959
<b>Woodward, Dr WDH Woodside, Prof AR</b>	Variation of the friction characteristics of road surfacing materials with time	NDP - National Roads Authority	£130,833

