



**BUILT ENVIRONMENT
RESEARCH INSTITUTE
ANNUAL REPORT
1 AUGUST 2013 - 31 JULY 2014**

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I. FOREWORD: RESEARCH INSTITUTE DIRECTOR



It is a great pleasure to present the Annual Report for the Built Environment Research Institute (BERI) for the academic year 2013-2014. With a portfolio that includes external research funding received from the Seventh Framework Programme (FP7), the Engineering and Physical Sciences Research Council (EPSRC), government departments/agencies and the private sector it has been a year of considerable achievement coupled with many new applications for research funding submitted to the European Commission's Horizon2020.

In this foreword, we briefly review the activities of the four research centres within the Built Environment Research Institute: the Fire Safety Engineering Research and Technology Centre (FireSERT), the Hydrogen Safety Engineering and Research Centre (HySAFER), the Centre for Sustainable Technologies (CST), and the Centre for Research on Property and Planning (RPP). The main report provides details of academic and research staff in the Research Institute, details of PhD projects and graduating PhDs, publications and conference papers delivered by staff in BERI and information on new research funding notified during the year. Given the diversity of this research base, BERI's activities embrace many different constituencies, audiences and networks with users and beneficiaries embracing policy-makers, companies, the business sector and the wider community.

FireSERT focuses on three core activities: fire dynamics, fire material chemistry and fire protection; structural fire engineering; and human behaviour and risk analysis in fire. Overriding themes in FireSERT are the fire safe design of lightweight materials and assemblies (cellular beams, new composite concrete, façade assemblies, aircraft composites), the development of environmentally friendly halon free fire retardants, numerical fire modelling of enclosures and large scale fires, human behaviour in merging and refuge areas and automated fire risk assessment. Research regarding blast resistance led to the establishment of the spinout company Vifkon Ltd.



Professor Michael Delichatsios receiving the Howard Emmons Award at the 11th International Association Symposium on Fire Safety, February 2014, University of Canterbury, New Zealand.

FireSERT staff presented several papers in various scientific conferences. In particular, five papers were presented at the prestigious 11th IAFSS meeting in New Zealand where Professor Delichatsios presented the plenary lecture and was awarded the Howard Emmons award prize.

Over the year 2013-2014, HySAFER has been successfully progressing the delivery of four major European and two EPSRC projects related to hydrogen safety. In the European infrastructure for hydrogen and fuel cells project (www.h2fc.eu) HySAFER research demonstrated the importance of fixing heat release rate not temperature in the bonfire test. This result will be used for correction of the next version of Global Technical Regulations on the Safety of Hydrogen and Fuel Cell Vehicles. The 3rd European Technical School on Hydrogen and Fuel Cells attracted more than 60 international participants (<http://h2fc.eu/technicalschool>). Within the HyIndoor project (www.hyindoor.eu) the thrust was on research in support of European Guidelines on inherently safer use of hydrogen indoors. In particular, an analytical model of passive ventilation was developed and validated against experimental data, new correlations for vented deflagrations were built and regimes of indoor jet fire were investigated, including modes of self-extinction and external flame.

HySAFER champions hydrogen safety research in the UK through EPSRC SUPERGEN Hydrogen and Fuel Cell Hub (www.h2fcsupergen.com) and EPSRC Challenge project on Integrated Safety Strategies for Onboard Hydrogen Storage Systems. A new model for blast wave decay from high-pressure hydrogen storage tank rupture in fire is under development, which is able to reproduce experimental data on blast wave from stand-alone and under-vehicle tank rupture. Two projects funded by Fuel Cell and Hydrogen Joint Undertaking: European Hydrogen Emergency Response Training Programme (www.hyresponse.eu), and Support to Safety Analysis of Hydrogen and Fuel Cell Technologies (<http://h2fc.eu/susana>) have been at the core of HySAFER's research programme over the year.

CST again has enjoyed a highly successful year with a focus on developing new larger projects. These include the Interreg IVA SPIRE (Storage Platform for the Integration of Renewable Energy) (£2.93M grant) and RCUK i-STUTE (an interdisciplinary Centre for Storage, Transformation and Upgrading of Thermal Energy). At the same time CST has continued to progress existing projects in its research portfolio namely the Science Foundation Ireland Charles Parsons Energy Research Award and FP7 projects EINSTEIN and MERITS. There has been



European Technical School (H2FC project) held in Rethymnon, Crete, Greece, 23-27th June 2014.

extensive activity in seeking new funding sources through Horizon 2020 with a number of projects going forward in energy storage, solar and clean fossil fuels.

The demonstration of new advanced heat pumps and energy storage systems in relation to the ongoing Terrace Street, a retrofit project funded by the DEL Research Capital Investment Fund (RCIF) and have been to the forefront of CST's activities over the year. Providing a test vehicle for developing new energy technologies and assessing economic and social impact, Terrace Street is evaluating strategies in terms of environmental impacts and energy consumption illustrating how retrofitting can make a positive impact on fuel poverty and demonstrate pathways to a low energy future. Further illustration of successful innovation is the first of the "Solacatcher" models (solar water heater) that are emerging from the new spin out company Solaform Ltd that has been launched from the research within CST.



Launch of SPIRE project on 1st April 2014 at Titanic Belfast

In RPP, research has continued with European partners on three FP7 projects BESECURE, COBACORE and HARMONISE concerned with issues relating to urban security and critical infrastructure with research commencing on a further FP7 funded project INTACT. The analysis of property markets has remained a central core of the centre's research with quarterly reports produced on the Northern Ireland housing market in conjunction with the Northern Ireland Housing Executive (NIHE) and the Bank of Ireland and twice yearly reports on the rental market with NIHE. Our partnership with the Investment Property Databank saw the launch of the second report in December 2013 on the performance of the commercial property in Northern Ireland.

On an international perspective, research on the complementarity of global and local valuation standards and the potential for harmonisation within both emerging and established markets namely Brazil, China, the USA and the UK was released by the Royal Institution of Chartered Surveyors (RICS) at MIPIM in March 2014 where the final report was debated with an audience of influential international real estate professionals. Subsequently the research was launched in London at a breakfast event in May 2014 with the valuation, investment and banking sectors. RPP also completed the second phase of the RICS commissioned research on PPPs. The report titled "The Global Infrastructure Challenge: The Role of PPP in a New Financial and Economic Paradigm" was launched by RICS in London, October 2013. Subsequently the report formed the basis of events in Washington June 2014 sponsored by RICS Americas and the World Bank which examined the role of Public Private Partnerships within

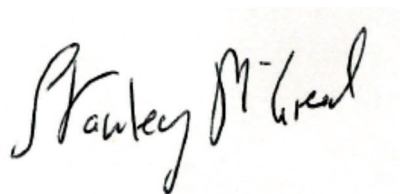
the confines of the US infrastructure challenge. Advocating increased efficiency across the procurement process as well as more proficient life cycle maintenance served to showcase how 'modern' P3's have attracted increased levels of institutional investment into US infrastructure. The World Bank sponsored roundtable brought together policy makers and practitioners from across the Americas which showcased disparities in PPP application.

Also on an international front the RICS in partnership with the University of Ulster and the Indian Institute of Technology hosted COBRA 2013 in New Delhi, in September 2013.



Staff from RPP were amongst prize winning papers at the Conference of the American Real Estate Society, San Diego, April 2014

I would encourage you to read through this Annual Report and follow up any queries with either myself or colleagues. Further details of research expertise at the Built Environment Research Institute can be found at www.beri.ulster.ac.uk or by contacting Mrs S Magee (Admin Support) at (028) 90368638.



Professor Stanley McGreal
Director: Built Environment Research Institute

2. RESEARCH INSTITUTE: ACADEMIC STAFF MEMBERS STATUS AT 31 JULY 2014

Surname	Forename	Title	Position	Institute Status
Adair	Alastair	Prof	PVC (Development) & Provost (Jordanstown & Belfast)	Core
Ali	Faris	Prof	Professor of Structural Engineering	Core
Anderson	Mark	Mr	Lecturer	Associate
Berry	James	Prof	Professor in Urban Planning & Property Development	Core
Blair	Neale	Dr	Senior Lecturer	Associate
Boyce	Karen	Dr	Senior Lecturer	Core
Brandoni	Caterina	Dr	Lecturer	Associate
Brennan	Sile	Dr	Lecturer	Core
Choi	Seng-Kwan	Dr	Lecturer	Core
Dahoe	Arief	Dr	Lecturer	Associate
Davis	Peadar	Dr	Lecturer	Core
Davison	Karen	Dr	Lecturer	Associate
Davison	Lisa	Dr	Lecturer	Core
Delichatsios	Michael	Prof	Professor of Fire Dynamics and Flammability/Director of FireSERT	Core
Eadie	Robert	Dr	Lecturer	Associate
Gray	Paddy	Prof	Professor of Housing	Associate
Griffiths	Philip	Dr	Associate Head of School	Core
Haran	Imelda	Dr	Lecturer	Associate
Heaney	George	Prof	Professor of Construction	Core
Hemphill	Lesley	Dr	Lecturer	Associate
Hewitt	Neil	Prof	Professor of Energy/Director of CST	Core
Hine	Julian	Prof	Professor of Transport	Core
Huang	Ming Jun	Dr	Reader	Core
Huang	Ye	Dr	Reader	Core
Hyde	Trevor	Dr	Reader	Core
Joseph	Paul	Dr	Senior Lecturer	Core
Keenan	Michaela	Dr	Lecturer	Associate
Levendis	Yiannis	Prof	Professor for Fire Safety Science	Core
Lim	Lay-Cheng	Dr	Senior Lecturer	Core
Lloyd	Greg	Prof	Professor of Urban Planning/ Head of School of the Built Environment	Core
Lyness	John	Dr	Reader	Associate
MacIntyre	Sean	Mr	Senior Lecturer	Associate
Magee	Bryan	Dr	Lecturer	Associate
Makarov	Dmitriy	Dr	Reader	Core
McAnulty	Ursula	Ms	Lecturer	Associate
McCluskey	William	Dr	Reader	Core
McConnell	Nigel	Dr	Lecturer	Associate
McCord	Michael	Dr	Lecturer	Core

Surname	Forename	Title	Position	Institute Status
McDermott	Rodney	Mr	Lecturer	Associate
McGreal	Stanley	Prof	Professor of Property Research/ Director of BERI and RPP	Core
McIlveen-Wright	David	Dr	Lecturer	Core
McKeown	Clare	Ms	Lecturer	Associate
McLernon	Tim	Dr	Senior Lecturer	Associate
Millar	Phillip	Dr	Lecturer	Associate
Molkov	Vladimir	Prof	Professor of Fire Safety Science/ Director of HySAFER	Core
Mondol	Jayanta	Dr	Lecturer	Core
Murphy	Martina	Dr	Lecturer	Associate
Nadjai	Ali	Prof	Professor of Fire Structural Engineering	Core
Odeyinka	Henry	Dr	Lecturer	Core
Pimenidou	Panagiota	Dr	Lecturer	Associate
Rafferty	Gavan	Mr	Lecturer	Associate
Ritchie	Heather	Dr	Lecturer	Associate
Ryan	Donal	Dr	Lecturer	Associate
Smyth	Mervyn	Dr	Reader	Core
Strong	Alan	Mr	Senior Lecturer	Associate
Tretsiakova-McNally	Svetlana	Dr	Lecturer	Associate
van der Krabben	Erwin	Prof	Professor of Real Estate	Core
Woodward	David	Dr	Reader	Associate
Yohanis	Yigsaw	Prof	Professor of Building Services Engineering	Core
Zacharopoulos	Aggelos	Dr	Lecturer	Core
Zhang	Jianping	Dr	Lecturer	Core

3. RESEARCH INSTITUTE: RESEARCH STAFF MEMBERS STATUS AT 31 JULY 2014

Surname	Forename	Title	Position	Research Centre
Arya	Farid	Mr	Research Associate	CST
Chernyavskiy	Boris	Dr	Research Associate	HySAFER
Colclough	Shane	Dr	Research Fellow	CST
Devlin	Steven	Mr	Research Associate	CST
Fang	Yueping	Dr	Research Fellow	CST
Fateh	Talal	Dr	Research Associate	FireSERT
Han	Sanghoon	Dr	Research Associate	FireSERT
Haran	Martin	Dr	Senior Research Fellow	RPP
Keatley	Patrick	Dr	Research Associate	CST
Keenan	James	Dr	Research Associate	HySAFER
Kim	Yangkyun	Dr	Research Associate	HySAFER
Li	Zhiyong	Dr	Research Associate	HySAFER
Lytvyn	Inna	Dr	Research Associate	CST
Lytvyn	Iurii	Mr	Research Associate	CST
Manktelow	Matthew	Dr	Research Associate	FireSERT
McCord	John	Dr	Research Associate	RPP
McIlhatton	David	Dr	Research Fellow	RPP
McLarnon	Dominic	Mr	Research Fellow	CST
Palomares Carrascosa	Ivan	Dr	Research Associate	RPP
Ramirez	Miguel	Mr	Research Associate	CST
Redpath	David	Dr	Research Associate	CST
Rolfe	Angela	Miss	Research Associate	CST

4. RESEARCH STUDENTS

The following research students were registered on research degree programmes in the Institute during 2013-2014.

Student Name	Thesis Title
Adi Maimun, Nural Hana	The economic value of green residential buildings
Alexander, Gareth O	Novel floor constructions to improve the performance and energy efficiency of ground source heat pump (GSHP) powered underfloor heating
Allen, David	Innovative approaches to understanding business location factors
Arya, Farid	Producing cheap vacuum glazing sheets which can be cut in different sizes
Atefi Aghayan, Hooman	Developing a numerical method for simulating intumescent materials in fire
Banerjee, Urbi	Effect of urban form on dynamic nature of travel behaviour
Bogle, Gary	A cost versus benefit analysis of delay and disruption techniques in the risk management of construction projects
Bradley, Philip	A carbon valuation model for commercial buildings in a market downturn
Byrne, Orla M	Investigation into the potential practical application of “smart growth” within an Irish case study
Byrne, Raymond	Evaluation of energy storage with wind auto-production at an industrial site connected to the distribution grid
Chotzoglou, Konstantinos	External flames on façade fires
Clarke, Mervyn C	Strategic property performance management
Cotter, Donal F	The role of building simulation as an assessment methodology for new and existing dwellings
Dave, Ashok	Techno – Economic assessment of novel IGCC systems with CO ₂ capture
Dixon, Andrew JP	Experimental studies to investigate merging behaviour in a staircase
Doyle, Conor	Investigation of household energy use and its effective reduction
Eghbalighazijahani, Amir	Governance and planning policies to increase the resilience of urban areas to climate change
Elder, Kyle Mark	Business location factors: investigating regional development policy in the new economy
Fadeyi, Olawumi	Convergence / divergence of capital and real estate markets in global financial cities
Farnan, Emma MA	Evaluating community planning: towards better outcomes?
Firth, Simona	Vacuum window performance evaluation and characterisation
Gamu, Faoziah	Analysing real estate values in emerging economies. A case study of Nigeria
Ghayur, Muhammad A	Techno-economic modelling of bio-refinery concepts
Hardie, Brian	The behaviour of compartment masonry walls in fires
Henry, Keith	Planning and public spaces: a property rights perspective
Kahanji, Charles	Flexural and shear capacity of ultra high strength reinforced concrete beams under fire
Kang, Sungwook	Fundamental technologies for development of nanoclay dispersed intumescent polymer composition in applications for built environments and automobiles

Student Name	Thesis Title
Kashkarov, Sergii	Fire resistance of on-board high pressure storage tanks for hydrogen-powered vehicles
Keig, Peter Richard	An investigation into establishing a hierarchy of sequential retrofit solutions
Larkin, Keren	Modelling risk impacts on variability between contract sum and final account in contractor design and build projects
Lewis, John	Innovation in construction procurement – case based reasoning and artificial intelligence techniques
Lytvyn, Iurii V	Novel evacuated glazing system
Mahone, Nedra	Economic base and the impact on real estate returns
McDermott, Eva	Articulating heritage values
McDermott, Rodney PJ	Water conservation impact on solid transfer in sewers
McDonald, Kiera E	The linkages between mobility and lifestyle: an analysis of older people's travel behaviour in Northern Ireland
McElduff, Linda	Regenerating coastal communities on the Island of Ireland
McKane, Mark	The contributions of Building Information Modelling (BIM) to improved Construction Industry performance in Northern Ireland
McKeown, Clare	To develop an economic operator prequalification model to assist in the award of public contracts
McNally, Yvonne	Energy saving via retrofit compared to replacement housing
McQuaid, Grainne	Potholes in asphalt surfacing materials
Mellor, Kate	Slippery surfaces: photography, architecture and the cityscape of seduction
Meyer, Jean C	Optimisation of on-board hydrogen storage fire resistance
Minic, Ivica	An experimental study of air-source heat pump defrosting using solar collector as heating source
Mitchell, Ruth	Durability of warm asphalts for road surfaces
Nolan, William K	Modelling different ways of financing social housing in Ireland using private sector finance
O'Brien, Vincent	Development and performance evaluation of nano-encapsulated solar concentrating panels and their potential for modular construction techniques
O'Hare, Rachel Mary	NAMA: asset management on nonperforming real estate in a depressed economy
O'Neill, Jennifer T	'Emotional Mapping': exploring how participatory GIS can add value to knowledge on spatial identity, decision making and spatial planning
Pugsley, Adrian N	Development of hybrid photovoltaic/thermal (HyPV/T) facade solar collectors
Quigley, Denise	Achieving an optimum balance across capital, life-cycle and environmental costs
Redpath, Gwyneth M	Risk mapping of minor ('B' class) roads in rural Northern Ireland, reasons for the high proportion of collisions resulting in death or serious injuries, especially to young drivers
Rogers, Jane B	Productivity benefits of green building occupancy
Rolfe, Angela	Integrated wind-compressed air energy storage system with combined heating and cooling
Salehi Kouhestani, Mohammad	Investigation on advanced heat pumps in domestic appliances
Shafie, Shahril	Synchronization of house price and buyer affordability: residential property in Malaysia

Student Name	Thesis Title
Shah, Nikhil K	Vapour compression heat pumps driven by advanced engine concepts and incorporating heat recovery
Shanks, Peter	A review of the corporate governance arrangements of the housing association sector in Northern Ireland
Shentsov, Volodymyr	Indoor use of fuel cell and hydrogen systems
Stephenson, Jill	A study of the environmental implications and health impacts of floods in Northern Ireland
Stevenson, David M	Coastal environmental determinism. Parameters for land use planning
Tierney, Christopher A	Dynamic road/tyre interaction
Waddell, Campbell	Variation of race track grip
Wijayanto, Arief	Property tax as a local tax in Indonesia
Williamson, Oscar	Assessing driver behaviour due to in-car distractions
Wilson, Christopher	Development of advanced heat pump and thermal storage systems capable of cost effective demand side management
Yates, David	Innovation solutions to reduce separation distance for hydrogen and fuel cell systems

Graduated December 2013

Student Name	Thesis Title
Ali, Sadiq	Proposed design of a novel expander-turbine for use with compressed air energy storage for generating electricity
Gunasekera, Sanwara	The development of a framework for assessing the integration of construction supply chains
Kashyap, Poonam	Modelling least-cost technology and carbon emission scenarios for Northern Ireland electricity market
McKeown, Paul J	Water resilient communities (sustainable water evaluation process)
Millar, Phillip	Non-contact evaluation of the geometric properties of highway surfacing textures using close range photogrammetry

Graduated July 2014

Student Name	Thesis Title
Byrne, Conor	Application of the Lattice Boltzmann method to thermal explosion development
Eni, Sabariah	Urban regeneration financing and land value capture in Malaysia
Harpur, Amy	A detailed investigation into occupant behaviours and influencing factors surrounding fatal dwelling fire incidents in Northern Ireland
McClelland, Andrew G	Contesting destruction, construction heritage: the social construction of architectural heritage values in Belfast, circa 1960-1989
Petrou, Klelia	Experimental and finite element analysis of protected composite cellular beams of different span length
Quinn, Michael	Behaviour of glazing panel systems in tall buildings
Samsudin, Salfarina	Decentralisation and governance of land administration systems

5. PUBLICATIONS

Details of all publications by BERI staff are on the University of Ulster's Institutional Repository <http://eprints.ulster.ac.uk/>. This section reports those outputs published over the period of this report and classified as either journal articles, books/chapters in books, research reports and published conference papers.

5.1 Journal Articles

Arteconi, A, Brandoni, C, Rossi, G and Polonara, F (2013) Experimental evaluation and dynamic simulation of a ground coupled heat pump for a commercial building. *International Journal of Energy Research*, 37 (15). pp. 1971-1980.

Beetham, I, Enoch, M, Tuuli, M and Davison, L (2014) Stakeholder perspectives on the value of car parking. *Urban, Planning and Transport Research*, 2 (1). pp. 195-214.

Bikkarolla, SK, Yu, F, Zhou, W, Joseph, P, Cumpson, P and Papakonstantinou, P (2014) A three-dimensional Mn₃O₄ network supported on a nitrogenated graphene electrocatalyst for efficient oxygen reduction reaction in alkaline media. *Journal of Materials Chemistry A*, 2. pp. 14493-14501.

Can, C, Jin, W, Ding, H, Basheer, PAM and Magee, BJ (2014) Experimental research on concrete strength prediction by Limpet pull-off test in China. *International Journal of Structural Engineering*, 5 (1). pp. 1-12.

Clarke, J, Colclough, S, Griffiths, P and McLeskey, J (2014) A passive house with seasonal solar energy store: in situ data and numerical modelling. *International Journal of Ambient Energy*, 35 (1). pp. 37-50.

Curl, A and Davison, L (2014) Transport Geography: perspectives upon entering an accomplished research sub-discipline. *Journal of Transport Geography*, 38. pp. 100-105.

Davison, L, Enoch, M, Ryley, T, Quddus, M and Wang, C (2014) A survey of Demand Responsive Transport in Great Britain. *Transport Policy*, 31. pp. 47-54.

Davison, L, Littleford, C and Ryley, T (2014) Air travel attitudes and behaviours: The development of environment-based segments. *Journal of Air Transport Management*, 36. pp. 13-22.

Doheim, RM, Yohanis, Y, Nadjai, A and Elkadi, H (2014) The impact of atrium shape on natural smoke ventilation. *Fire Safety Journal*, 63. pp. 9-16.

Eadie, R and Rafferty, S (2014) Do corporate social responsibility clauses work? A contractor perspective. *International Journal of Procurement Management*, 7 (1). pp. 19-34.

Eadie, R, Browne, M, Odeyinka, H, McKeown, C and McNiff, S (2013) BIM implementation throughout the UK construction project lifecycle: An analysis. *Automation in Construction*, 36. pp. 145-151.

Eadie, R, Odeyinka, H, Browne, M, McKeown, C and Yohanis, M (2013) An analysis of the drivers for adopting building information modelling. *Journal of Information Technology in Construction*, 18. pp. 338-352.

Fang, Y, Hyde, T, Arya, F and Hewitt, N (2013) A novel building component hybrid vacuum glazing - a modelling and experimental validation. *ASHRAE Transactions*, 119. pp. 430-441.

Fang, Y, Hyde, T, Arya, F, Hewitt, N, Eames, PC, Norton, B and Miller, S (2014) Indium alloy-sealed vacuum glazing development and context. *Renewable and Sustainable Energy Reviews*, 37. pp. 480-501.

Grissom,TV, McCord, M, Davis, P and McCord, J (2014) The use of strong and weak form sustainability to assist in rate development for the valuation of exhaustible resources (part II). *Property Management*, 32 (4). pp. 295-311.

Grissom,TV, McCord, M, McIlhatton, D and Haran, M (2014) The use of strong and weak form sustainability to assist in rate development for the valuation of exhaustible resources (part I). *Property Management*, 32 (3). pp. 256-277.

Hasan,A, McCormack, S, Huang, MJ and Norton, B (2014) Characterization of phase change materials for thermal control of photovoltaics using differential scanning calorimetry and temperature history method. *Energy Conversion and Management*, 81. pp. 322-329.

Hasan,A, McCormack, S, Huang, MJ and Norton, B (2014) Energy and Cost Saving of a Photovoltaic-Phase Change Materials (PV-PCM) System through Temperature Regulation and Performance Enhancement of Photovoltaics. *Energies*, 7 (3). pp. 1318-1331.

Kamruzzaman, Md, Wood, L, Hine, J, Currie, G, Giles-Corti, B and Turrell, G (2014) Patterns of social capital associated with transit oriented development. *Journal of Transport Geography*, 35. pp. 144-155.

Kelly, HF, Adair, A, McGreal, S and Roulac, SE (2013) Twenty-four Hour Cities and Commercial Office Building Performance. *Journal of Real Estate Portfolio Management*, 19 (2). pp. 103-120.

Magee, BJ, Basheer, PAM, Bai, Y, Long, AE, McCarter, WJ, Jin, WL and Zhao, YX (2013) UK-China Science Bridge – Sustainable solutions for the built environment. *Construction and Building Materials*, 47. pp. 20-28.

McCluskey, WJ, McCord, M, Davis, PT, Haran, M and McIlhatton, D (2013) Prediction accuracy in mass appraisal: a comparison of modern approaches. *Journal of Property Research*, 30 (4). pp. 239-265.

McCord, M, Davis, P, Haran, M, McIlhatton, D and McCord, J (2014) Understanding Rental Prices in the UK: A comparative application of spatial modelling approaches. *International Journal of Housing Markets and Analysis*, 7 (1). pp. 1-10.

McGreal, S and Kupke, V (2014) The Spatial Dynamic of Retail Planning and Retail Investment: Evidence from Australian Cities. *Urban Policy and Research*, 32 (3). pp. 253-269.

Molkov, V and Shentsov, V (2014) Numerical and Physical Requirements to Simulation of Gas Release and Dispersion in an Enclosure with One Vent. *International Journal of Hydrogen Energy*, 39. 13328-13345.

Molkov, V, Shentsov, V and Quintiere, J (2014) Passive ventilation of a sustained gaseous release in an enclosure with one vent. *International Journal of Hydrogen Energy*, 39 (15). pp. 8158-8168.

Molkov, V, Shentsov, V, Brennan, S and Makarov, D (2014) Hydrogen non-premixed combustion in enclosure with one vent and sustained release: Numerical experiments. *International Journal of Hydrogen Energy*, 39 (20). pp. 10788-10801.

Oyedele, JB, Adair, A and McGreal, S (2014) Performance of global listed infrastructure investment in a mixed asset portfolio. *Journal of Property Research*, 31 (1). pp. 1-25.

Ploegmakers, H, van der Krabben, E and Buitelaar, E (2013) Understanding industrial land supply: how Dutch municipalities make decisions about supplying serviced building land. *Journal of Property Research*, 30 (4). pp. 324-344.

Quinn, M, Nadjai, A and Ali, F (2013) Experimental and Numerical Investigation of Localised Fire on Glazing Facades Having different orientations. *Journal of structural Fire Engineering*, 4 (3). pp. 153-164.

- Rafi, MM and Nadjai, A (2014) Parametric finite element analysis of FRP reinforced concrete beams in fire and design guidelines. *Fire and Materials*, 38 (3). pp. 293-311.
- Redpath, DAG, Dalzell, P, Griffiths, P and Hewitt, N (2014) Investigation of concentrating and nonconcentrating evacuated tube solar water heaters using 2D particle imaging velocimetry. *International Journal of Low Carbon Technologies*. pp. 1-5.
- Renzi, M and Brandoni, C (2014) Study and application of a regenerative Stirling cogeneration device based on biomass combustion. *Applied Thermal Engineering*, 67 (1-2). pp. 341-351.
- Ritchie, H (2014) Understanding emerging discourses in Marine Spatial Planning. *Land Use Policy*, 38. pp. 666-675.
- Ritchie, H, Hardy, M, Lloyd, G and McGreal, S (2013) Big Pylons: Mixed signals for transmission. *Spatial planning for energy distribution*. *Energy Policy*, 63. pp. 311-320.
- Ryan, D and Hamill, G A (2013) Determining Propeller Erosion at the Stern of a Berthing Ship. *Journal of Waterway, Port, Coastal, and Ocean Engineering*, 139 (4). pp. 247-255.
- Saffers, JB and Molkov, V (2013) Towards hydrogen safety engineering for reacting and non-reacting hydrogen releases. *Journal of Loss Prevention in the Process Industries*, 26 (2). pp. 344-350.
- Saffers, JB and Molkov, V (2014) Hydrogen safety engineering framework and elementary design safety tools. *International Journal of Hydrogen Energy*, 39 (11). pp. 6268-6285.
- Said, R, Adair, A, McGreal, S and Majid, R (2014) Inter-relationship between the housing market and housing finance system: evidence from Malaysia. *International Journal of Strategic Property Management*, 18 (2). pp. 138-150.
- Stevenson, J, Vaganay, M, Cameron, R and Joseph, P (2014) The long-term health impacts of repeated flood events. *WIT Transactions on Ecology and the Environment*, 184. pp. 201-212.
- Suzanne, M, Delichatsios, M and Zhang, J (2014) Flame extinction properties of solids obtained from limiting oxygen index tests. *Combustion and Flame*, 161 (1). pp. 288-294.
- Ukleja, S, Delichatsios, MA, Delichatsios, MM and Zhang, J (2013) Smoke concentrations inside and outside of a corridor-like enclosure. *Fire Safety Journal*, 60. pp. 37-45.
- Wang, C, Quddus, M, Enoch, M, Ryley, T and Davison, L (2013) Multilevel modelling of Demand Responsive Transport (DRT) trips in Greater Manchester based on area-wide socio-economic data. *Transportation*, 41. pp. 589-610.
- Woestenburg, A, van der Krabben, E and Spit, T (2014) Institutions in rural land transactions: Evidence from the Netherlands. *Journal of European Real Estate Research*, 7 (2). pp. 216-238.
- Yang, K, Basheer, PAM, Bai, Y, Magee, B and Long, AE (2014) Development of a new in situ test method to measure the air permeability of high performance concretes. *NDT&E International*, 64. pp. 30-40.
- Yang, K, Basheer, PAM, Magee, B and Bai, Y (2013) Investigation of moisture condition and Autoclave sensitivity on air permeability measurements for both normal concrete and high performance concrete. *Construction and Building Materials*, 48. pp. 306-314.

5.2 Books/Chapters in Books

- Eadie, R (2014) Government investment in PPP: Re-evaluating value for money. In: *Commonwealth Governance and Growth 2014*. (Eds: Robertson, Andrew), Commonwealth Office, United Kingdom, pp. 76-79.

Joseph, P and Tretsiakova-McNally, S (2013) Chemical modification of natural and synthetic textile fibres to improve flame retardancy. In: Handbook of fire resistant textiles. Woodhead Publishing, New Delhi, pp. 37-67.

Keatley, P (2014) Cost modelling of coal power plant start-up in cyclical operation. In: Coal power plant materials and life assessment. (Eds: Shibli, Ahmed), Woodhead, Cambridge, pp. 358-388.

Sotelo, R and McGreal, S eds. (2013) Real Estate Investment Trusts in Europe Evolution, Regulation, and Opportunities for Growth. Springer, Germany. 236 pp.

5.3 Research Reports

Adair, A, McGreal, S, McIlhatton, D and McCord, J (2013) Northern Ireland Quarterly House Price Index for Q2 2013 Report 115. Northern Ireland Housing Executive and Bank of Ireland. University of Ulster. 8 pp.

Adair, A, McGreal, S, McIlhatton, D and McCord, J (2013) Northern Ireland Quarterly House Price Index for Q3 2013 Report 116. Northern Ireland Housing Executive and Bank of Ireland. University of Ulster. 8 pp.

Adair, A, McGreal, S, McIlhatton, D and McCord, J (2014) Northern Ireland Quarterly House Price Index for Q4 2013 Report 117. Northern Ireland Housing Executive and Bank of Ireland. University of Ulster. 8 pp.

Adair, A, McGreal, S, McIlhatton, D and McCord, J (2014) Northern Ireland Quarterly House Price Index for Q1 2014 Report 118. Northern Ireland Housing Executive and Bank of Ireland. University of Ulster. 8 pp.

Campbell, H, McCord, J, Chapman, T and Wilson, D (2013) Developing a Whole System Approach to Embedding restorative practices in YouthReach Youth Work and Schools in County Donegal. County Donegal Vocational Education Committee. University of Ulster and Co. Donegal ETB Restorative Practices Project. 44 pp.

Clarke, A, Monk, S, Tang, C, Gray, P, Keenan, M and McAnulty, U (2013) Research to Inform a Fundamental review of Social Housing Allocations. Report 2: Best Practice Approaches to Accessing and Allocating Social Housing. Department of Social Development. 68 pp.

Gray, P, Keenan, M, McAnulty, U, Clarke, A, Monk, S and Tang, C (2013) Research to Inform a Fundamental review of Social Housing Allocations: report Number 1: Current Approaches to Accessing and Allocating Social Housing in Northern Ireland. Department of Social Development. 79 pp.

Gray, P, Keenan, M, McAnulty, U, Clarke, A, Monk, S and Tang, C (2013) Research to Inform a Fundamental review of Social Housing Allocations: Final Report Conclusions and Recommendations. Department of Social Development. 76 pp.

Gray, P, McAnulty, U and Shanks, P (2014) Living in the Private Rented Sector: The experiences of tenants. Northern Ireland Housing Executive. Northern Ireland Housing Executive. 54 pp.

Hansson, U, O'Connor, U and McCord, J (2013) Integrated Education: A Review of Policy and Research Evidence 1999-2012. Integrated Education Fund. 78 pp.

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Haran, M, McCord, M, Smyth, C, Adair, A, Berry, J, McGreal, S, Hutchison, N and Kashyap, A (2013) The Global Infrastructure Challenge: The Role of PPP in a New Financial and Economic Paradigm. Royal Institution of Chartered Surveyors (RICS). Royal Institution of Chartered Surveyors (RICS). 88 pp.

Hemphill, L, Lim, LC, Adair, A and McGreal, S (2014) The Role of International and Local Valuation Standards in Influencing Valuation Practice in Emerging and Established Markets. Royal Institution of Chartered Surveyors. 98 pp.

Leighton, A, Keenan, M and McAnulty, U (2013) In all fairness...? Housing Policy and Welfare Reform. Ark Northern Ireland. 8 pp.

McGreal, S, McCord, J, McIlhatton, D, McAnulty, U and McCord, M (2013) Performance of the private rental market in Northern Ireland: Jan - Jun 2013. Northern Ireland Housing Executive. Property News and University of Ulster. 19 pp.

Venturei Network, PlayBoard NI and MacIntyre, S (2013) Carrickfergus Borough Council Play Strategy 2013-2016. Carrickfergus Borough Council. 54 pp.

5.4 Published Conference Papers

Arteconi, A, Brandoni, C and Polonara, F (2014) Demand side management of the built environment for sustainable energy. In: Energy Production and Management in the 21st Century, Ekaterinburg, Russia. WIT press. 12 pp.

Banerjee, U, Hine, J and Kashyap, A (2013) The Effect of Urban Form on Travel Behaviour – Initial findings from In-depth Interviews and Focus Groups. In: Irish Transport Research Network Annual Conference, Trinity College Dublin. Irish Transport Research Network. 12 pp.

Brandoni, C, Renzi, M, Caresana, F and Polonara, F (2013) Optimization of hybrid micro-CCHP systems in the day-ahead electricity market. In: The 3rd edition of the International Conference on Microgeneration and Related Technologies, Naples. Microgen III. 10 pp.

Brandoni, C, Arteconi, A, Ciriachi, G and Polonara, F (2014) Heat pumps and demand side management for renewable energy integration in sustainable communities. In: Green Energy for Sustainable Development (ICUE), 2014 International Conference and Utility Exhibition on Green Energy, Pattaya City, Thailand. IEEE. 7 pp.

Brandoni, C, Arteconi, A, Ciriachi, G and Polonara, F (2014) Optimal management of renewable and fossil fuel energy systems in a smart community. In: 2nd International Conference on Environmental and Economic Impact on Sustainable Development, Environmental Impact 2014, Ancona. WIT press. 12 pp.

Davison, L, Ahern, A and Hine, J (2013) The Travel and Transport Implications of University Choice: Case Studies in the UK and Ireland. In: Irish Transport Research Network, Trinity College Dublin. Irish Transport Research Network. 8 pp.

Eadie, R (2014) The impact of building information modelling (BIM) on public sector tender documents for civil engineering works. In: Education, Science and Innovations, European Polytechnical University, Pernik, Bulgaria. European Polytechnical University. Vol 1. 6 pp.

Eadie, R, Comiskey, D and McKane, M (2014) Teaching BIM in a multidisciplinary department. In: Education, Science and Innovations, European Polytechnical University, Pernik, Bulgaria. European Polytechnical University. Vol 1. 6 pp.

Eghbalighazijahani, A, Hine, J and Kashyap, A (2013) How to do a Better Q-Methodological Research: A Neural Network Method for more Targeted Decision Making about the Factors Influencing Q-Study. In: Irish Transport Research Network, Trinity College Dublin. Irish Transport Research Network. 11 pp.

Fang, Y, Hyde, T and Hewitt, N (2013) Improvements in triple vacuum glazing. In: Glass Performance Days (GPD) International Conference, 2013 Tampere Finland, Tampere Finland. Glass Performance Day conference. 4 pp.

Joseph, P, Bakirtzis, D and Richard, Q (2014) Preliminary studies on the efficiency of an environmentally-friendly fire-fighting agent based on starch. In: Suppression, Detection and Signaling Research and Applications Symposium (SUPDET 2014), University of Central Florida, Orlando, USA. National Fire Protection Association. 3 pp.

Joseph, P and Tretsiakova-McNally, S (2014) The influence of B-cyclodextrin on the thermal degradation and combustion behaviours of acrylonitrile-based polymers. In: 3rd International Symposium on Flame-Retardant Materials and Technologies, Hefei, China. Organizing Committee of ISFMRT2014. 2 pp.

Keenan, J, Makarov, D and Molkov, V (2013) Towards the Implementation of Rayleigh-Taylor Instability into the Multi-Phenomena Deflagration Model. In: Seventh International Seminar on Fire & Explosion Hazards (ISFEH7), Providence, RI, USA. Research Publishing. 10 pp.

Molkov, V, Shentsov, V, Brennan, S and Makarov, D (2013) Dynamics of Hydrogen Flame Self-Extinction in a Vented Enclosure. In: Seventh International Seminar on Fire & Explosion Hazards (ISFEH7), Providence, RI, USA. University of Maryland. Research Publishing. (110). 10 pp.

Molkov, V, Shentsov, V and Quintiere, J (2013) Sustained Hydrogen Leak Concentration in Enclosure with One Vent. In: Seventh International Seminar on Fire & Explosion Hazards (ISFEH7), Providence, RI, USA. University of Maryland. Research Publishing. (111). 8 pp.

Petrou, K, Nadjai, A, Ali, F and Han, S (2013) Experimental and Finite Element Modelling of Protected Cellular Beams in Fire Conditions. In: Interflam 2013, Royal Holloway College, University of London, UK. West Yard House Guilford Grove, Greenwich, London, UK. 12 pp.

Quinn, M, Nadjai, A, Ali, F and Bakirtzis, D (2013) Experimental Investigation of Flame impingement on Vertical and Inclined Glazing Facades. In: 1st International Conference for Fire Safety of Facades, Paris. MATEC Web Conference. 10 pp.

6. RESEARCH FUNDING: PORTFOLIO OF RESEARCH GRANTS ACTIVE DURING PERIOD - 1 AUGUST 2013 - 31 JULY 2014

Research Institute Member	Title of Award	Funding Body	Value
Adair, Prof AS Berry, Prof JN Davis, Dr PT Haran, Dr ME McCord, Dr M McGreal, Prof WS McIlhatton, Dr D	Spatial Analysis and Exploration of NAMA's Northern Ireland Residential Land Development Portfolio	National Asset Management Agency	£35,000
Blair, Dr N McIlhatton, Dr D	3D Model: Re-imaging the Greater Whitewell Community	Greater Whitewell Community Surgery	£4,500
Delichatsios, Prof M	High Performance Computing Support for UK consortium of Turbulent Reacting Flows (UKCTRF)	EPSRC	£27,851
Delichatsios, Prof M Zhang, Dr J	Experimental and Modelling Work on Large-Area Fires - Phase 2	Atomic Weapons Establishment	£131,080
Hewitt, Prof NJ Anderson, Mr M	KTP Programme between the University of Ulster and Delta Print and Packaging Ltd	TSB/INI and Delta Print & Packaging Ltd	£107,200
Huang, Dr Y McIlveen-Wright, Dr DR Hewitt, Prof NJ	SCARLET: Scale-up of Calcium Carbonate Looping Technological for Efficient CO ₂ Capture	CEC - Framework 7 - Energy	£188,096
Huang, Dr Y Hewitt, Prof NJ	TEMPO: Total Energy Management for Production Operations - Stage 2	Enterprise Ireland	£263,143
McCluskey, Dr WJ McIlhatton, Dr D McCord, Dr M Haran, Dr ME Davis, Dr PT Hewitt, Prof NJ McGreal, Prof WS Ryan, Dr D Haran, Dr I	INTACT	CEC - Framework 7 SEC-2013-1.6-3	£186,148
McGreal, Prof WS McIlhatton, Dr D McCord, Dr J McAnulty, Miss U	Adjustment Factors for the Valuation of NIHE Housing	NIHE	£24,750
Strong, Mr WA	DEL CAST AWARD - Integrated constructed wetlands: performance and analysis	WYG Engineering Ltd	£25,200

Research Institute Member	Title of Award	Funding Body	Value
Ali, Prof FA	The Smart Fire-blast Protection System Concept	Invest NI – Proof of	£105,455
Blair, Dr N Lloyd, Prof MG	CROSPAN 2	INTERREG IVA	£30,335
Davis, Dr PT Ali, Prof FA Boyce, Dr KE Haran, Dr I Haran, Dr M Hyde, Dr TJ Lyness, Dr JF McCluskey, Dr WJ McCord, Dr M McGreal, Prof WS McIlhatton, Dr D	HARMONISE: Holistic Approach to Resilience and Systematic Actions to make Large Scale Urban Built Infrastructure Secure	CEC – Framework 7 Security	£284,761
Delichatsios, Prof M	Experimental and modelling work on large-area fires	Atomic Weapons Establishment	£90,000
Delichatsios, Prof M	Flame behaviours from enclosure fires over facades in tall buildings	The Royal Society	£12,000
Delichatsios, Prof M Zhang, Dr J	ELISSA: Energy efficient lightweight-sustainable-safe-steel construction	CEC – Framework 7	£285,996
Delichatsios, Prof M Zhang, Dr J	Fire hazards of exterior wall assemblies	Fire Protection Research Foundation	£9,641
Griffiths, Dr PW Huang, Dr M Hewitt, Prof NJ	MERITS – More Effective use of Renewables Including Compact Seasonal Thermal Energy Storage	CEC – Framework 7	£233,296
Haran, Dr M McCluskey, Dr WJ Davis, Dr PT Ali, Prof FA Lloyd, Prof MG McGreal, Prof WS McIlhatton, Dr D McCord, Dr M	COBACORE – Community Based Comprehensive Recovery Security	CEC – Framework 7	£414,560
Hewitt, Prof NJ	Higher Education EU Support Fund - Theme Leader Energy (NICP)	DEL	£197,013
Hewitt, Prof NJ Huang, Dr M Huang, Dr Y	POREEN: Partnering Opportunities between Europe and China in Renewable Energies and Environmental Industries	CEC – Framework 7- Marie Curie RTN	£62,273
Hewitt, Prof NJ Griffiths, Dr PW Huang, Dr M Huang, Dr Y Keatley, Dr P	SPIRE – Storage Platform for the Integration of Renewable Energy	INTERREG IVA	£2,932,732

Research Institute Member	Title of Award	Funding Body	Value
Hewitt, Prof NJ Huang, Dr M	Interdisciplinary Centre for Storage, Transformation and Upgrading of Thermal	Energy (i-STUTE) EPSRC/ESRC	£831,903
Hyde, Dr TJ	High Performance Vacuum Flat Plate Solar Thermal Collectors for Hot Water and Process Heat	EPSRC	£270,608
Makarov, Dr DV Molkov, Prof V	SUSANA: Support to Safety Analysis of Hydrogen and Fuel Cell Technologies	CEC – Framework 7- Fuel Cell Hydrogen	£249,640
Makarov, Dr DV Joseph, Dr P Molkov, Prof V	Integrated safety strategies for on-board Hydrogen Storage Systems	EPSRC	£970,514
McAnulty, Miss U	Review of Housing Association Governance	Various Housing Associations	£17,789
McCord, Dr M Berry, Prof JN McGreal, Prof WS Haran, Dr M McIlhatton, Dr D	Unlocking Land	NIHE	£30,000
McGreal, Prof WS McCord, Dr M McAnulty, Miss U Adair, Prof AS McIlhatton, Dr D	House Prices, Rents & Affordability	NIHE	£295,000
McLernon, Dr CT	Congruent assessment and feedback that satisfies education and students in Higher Education	Higher Education Academy	£6,420
Molkov, Prof V	HyResponse	CEC – Framework 7 – Fuel Cell Hydrogen	£269,923
Mondol, Dr J	Development of Solar Concentrating Technologies for Rural Tanzanian Communities	The Royal Society – International Exchange Scheme	£5,950
Nadjai, Prof A	LOCAFI	CEC – Coal and Steel	£78,185
Smyth, Dr MA Mondol, Dr J Zacharopoulos, Dr A McLarnon, Mr D	Hybrid Photovoltaic/Solar Thermal (HyPV/T) Façade Module	Invest Northern Ireland – Proof of Concept	£105,792
Zacharopoulos, Dr A Mondol, Dr J Smyth, Dr MA Hyde, Dr TJ	Concentrating Photovoltaic Evacuated Glazing (CoPEG) multi-functional building façade element	Invest Northern Ireland - Proof of Concept	£105,382
Adair, Prof AS McGreal, Prof WS	Northern Ireland Quarterly House Price Index	Bank of Ireland	£30,000

Research Institute Member	Title of Award	Funding Body	Value
Adair, Prof AS Berry, Prof JN Haran, Dr M McCluskey, Dr WJ McGreal, Prof WS	Northern Ireland Commercial Property Index	Dept of Social Development, Belfast City Council, and Estate Agency Practices	£40,800
Adair, Prof A Berry, Prof J Haran, Dr M Kashyap, Dr A McCord, Dr M McGreal, Prof S Smyth, Mr C	Value for Money Framework for PPP/PFI	Royal Institution of Chartered Surveyors	£27,500
Choi, Dr SK Zhang, Dr J	Fundamental Technologies for Development of Nanoclay Dispersed in tumescent polymer composition in Applications for Built Environments and Automobiles	Korea Evaluation Institute of Industrial Technology	£174,000
Haran, Dr M Adair, Prof AS Berry, Prof JN McGreal, Prof WS McIlhatton, Dr D	Development Land in Northern Ireland	National Asset Management Agency	£20,000
Hewitt, Prof NJ Griffiths, Dr PW Huang, Dr M Yohanis, Prof YG	EINSTEIN: Effective Integration of Seasonal Thermal Energy Storage Systems in Existing Buildings	CEC - Framework 7	£429,415
Hewitt, Prof NJ Huang, Dr Y	TEMPO: Total Energy Management for Production Operations	Enterprise Ireland	£196,722
Hewitt, Prof NJ Griffiths, Dr PW Anderson Mr M	CESAR: Cost Effective Solar Air Conditioning	CEC - Framework 7	£119,787
Hewitt, Prof NJ Huang, Dr MJ Anderson Mr	SuLA: Sustainable Living Assistant	NPP – Interreg EU	£109,816
Joseph, Dr P Byrne, Dr J McBride, Dr N	KTP Programme between the University of Ulster and Precision Processing Services Ltd, Northern Ireland	The Technology Strategy Board and Precision Processing Services Ltd, NI	£107,200

Research Institute Member	Title of Award	Funding Body	Value
McIlhatton, Dr D Berry, Prof JN Davis, Dr PT Haran, Dr M Kashyap, Dr A Lim, Dr LC McCluskey, Dr WJ McCord, Dr M McGreal, Prof WS	BESECURE	CEC - Framework 7	£450,000
Molkov, Prof V Brennan, Dr SL Makarov, Dr DV	Integrating European Infrastructure to support science and development of Hydrogen and Fuel Cell Technologies	CEC - Framework 7	£460,899
Molkov, Prof V Makarov, Dr DV	Hydrogen and Fuel Cell Supergen hub	EPSRC	£182,231
Molkov, Prof V Brennan, Dr SL Makarov, Dr DV	HYINDOOR 2010: Pre-normative research on Safe Indoor Use of Fuel Cells and Hydrogen Systems	CEC - Framework 7	£276,924
Molkov, Prof V	HyCube	European Institute of Innovation and Technology	£30,176
Mondol, Dr JD Smyth, Dr M Zacharopoulos, Dr A Anderson, Mr M Huang, Dr M Hewitt, Prof N	UKIERI Thematic Partnership (UK India Education and Research Initiative). Solar accelerator design for small scale bio-gas production	British Council	£39,901
Smyth, Dr MA Anderson, Mr M	KTP Programme between the University of Ulster and Copper Industries (Ireland) Ltd Industries (Ireland) Ltd	Momenta & Copper	£107,200
Delichatsios, Prof M Zhang, Dr J	AIRCRAFTFIRE: Fire Risks Assessment and Increase of Passenger Survivability	CEC - Framework 7	£288,302
Hine, Prof JP	Rees Jeffreys Road Fund Part Funded Lecturer	Rees Jeffreys Road Fund	£66,107
Lim, Dr LC Hemphill, Dr L	The Role of the RICS and Global Valuation Standards in Influencing Practice within BRIC/MENA Countries	RICS	£25,000
Molkov, Prof V Brennan, Dr SL Makarov, Dr DV	HyFacts: Identification, Preparation and Dissemination Officials of Hydrogen Safety Facts to Regulators and Public Safety	CEC - Framework 7	£160,573

Research Institute Member	Title of Award	Funding Body	Value
Woodward, Dr WDH	Assessment of warm mix asphalt for road surfaces	NDP - National Roads Authority	£127,992
Choi, Dr SK Nadjai, Prof A	Development of Advanced PBD method for structural fire protection using innovative insulation material	Korean Ministry of Knowledge Economy	£139,606
Hewitt, Prof NJ Griffiths, Dr P Hyde, Dr T McIlveen-Wright, Dr DR Smyth, Dr M	Charles Parsons Energy Research Awards	Science Foundation Ireland	£2,895,714

