



BUILT ENVIRONMENT
RESEARCH INSTITUTE
ANNUAL REPORT
1 AUGUST 2012 - 31 JULY 2013

**BUILT ENVIRONMENT
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ANNUAL REPORT

1 August 2012 – 31 July 2013

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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 2012-2013. Once again this has been a year of considerable achievement including the further development of our research infrastructure base, major success in research grant funding, publication of papers by members in leading journals in the discipline area and research student success. Significant external research funding was achieved through the Seventh Framework Programme (FP7), the Engineering and Physical Sciences Research Council (EPSRC), government departments/agencies and the private sector.

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 research grants.

Over the period of this annual report FireSERT staff continued to attract considerable project funding (about £1.5 million) from the UK research councils, government, the European Union, KTP, INI innovation vouchers and industry including consulting projects. Current externally funded projects include fire safety related to advanced computer modelling (EPSRC), the performance of structures (cellular beams) (EPSRC, FP7), elliptic cross section columns in fire situations (EPSRC) and merging flows during evacuation for high rise buildings. New Computational Fluid Dynamics models were developed for the prediction of soot and radiation in fires including the Lattice Boltzmann method. Other projects include: Flashover and façade fires in collaboration with the SKFSL (State Key Fire Safety Laboratory, China) and Tokyo University of Science (TUS), the assessment and evaluation of fire safe nanoparticle materials including the potential for nano-engineered materials (FP7), the replacement of brominated fire retardants (FRs) with environmentally compatible FRs (FP7) and fire safety of aircraft composite materials (FP7).



University Council members visiting the facilities at FireSERT

Professor Ali Nadjai chaired and organized an international workshop in November 2012 regarding Innovative Construction Design for Fire Safety Engineering: New European Fire Design Guidance. The extended design guidance concerning the whole floor structure has been published by the EU and is available at <http://bookshop.europa.eu>. The international standing by FireSERT was reflected in an invitation to attend and have a display booth at the EXPO for international fire research and testing laboratories in Cologne, Germany in May 2013.



FireSERT stand at EXPO, Cologne, May 2013

FireSERT technologies, led by Professor Faris Ali won in the Hi-Tech category of the Northern Ireland Science Park 25K Award for a Fire-Blast Protection system, at a VIP gala ceremony in the iconic Titanic Belfast building, in September 2012. The Fire-Blast Protection system aims to provide superior safety, protection and security for people and assets, by offering an innovative Fire-Blast Protection system that is uniquely designed to provide dual protection against blasts and fires at a tenth of the cost of conventional, competing systems.



Professor Faris Ali (right) receiving the 25K Award for the Hi-Tech Category, September 2012.

Over the year 2012-2013, HySAFER (Hydrogen Safety Engineering and Research centre) successfully completed the projects TrainHy-Prof (<http://www.hysafe.org/TrainHyProf>) and HyFacts (www.hyfacts.eu) on development of research-led education/training of young professionals and regulators respectively. Several high

profile research grants were secured by HySAFER with external funding from prestigious sources including Fuel Cell and Hydrogen Joint Undertaking projects (HyResponse and SUSANA) and EPSRC for a project on Integrated safety strategies for onboard hydrogen storage systems. HySAFER leads networking activities within the FP7 grant Integrating European Infrastructure to support science and development of Hydrogen and Fuel Cell Technologies towards European Strategy for Sustainable, Competitive and Secure Energy (www.h2fc.eu).

Research undertaken during 2012-2013 includes releases and dispersion of hydrogen in enclosures with one vent; indoor jet fires, simulation for the first time self-extinction phenomena using CFD models; vent sizing of enclosures; behaviour of plane jets. Building on HySAFER's international recognition in CFD studies of hydrogen safety phenomena, a new strategic research direction concerns innovative solutions for fire resistance of onboard hydrogen storage supported by funding from both the UK (EPSRC) and Europe.

The Centre for Sustainable Technologies (CST) covers a wide range of research applicable to the sustainable built environment agenda including highways engineering, hydraulics, procurement and infrastructure enhancement but has its primary focus on energy. CST has enjoyed a highly successful research year over 2012-2013 including the start of a range of projects addressing industrial energy efficiency, building energy efficiency, advanced heat pump development and advanced glazing and solar innovations.

Solar energy now boasts a state-of-the-art solar simulator for the development and evaluation of solar energy technologies including the patented Solacatcher (a low cost solar water heater developed in conjunction with Invest Northern Ireland and with investment linked to the University spin-out company Solaform Ltd by E-Synergy). Advanced glazings in the form of novel solar energy systems are currently being developed under EPSRC funding and support from Invest Northern Ireland. Additional projects include Royal Society support for solar energy development in Tanzania and UKIERI support for solar energy driven anaerobic digestion in India.



Mr Dominic McLarnon and Dr Mervyn Smyth displaying their patented product, Solacatcher

The Centre for Research on Property and Planning, likewise has continued to attract significant research funding with the theme of urban security and emergency planning to the forefront in further FP7 research awards (HARMONISE and COBACORE). The Centre's long expertise in property market performance was marked by funding from the Northern Ireland Housing Executive for a project on House price, rents and affordability. In the commercial property market, the Centre working in conjunction with the Investment Property Databank (IPD) and sponsored by Belfast City Council, the Department for Social Development (DSD) and leading commercial real estate practices launched a new report (December 2012) on the Performance of the commercial property market.



Minister Nelson McCausland, Department for Social Development, with Professor Jim Berry, Professor Alastair Adair, Dr Martin Haran and Professor Stanley McGreal at the launch of the commercial property market report, December 2012.

The policy relevance of research within the Centre is highlighted by projects undertaken for the National Asset Management Agency concerning land holdings and housing in Northern Ireland and research funded by the Royal Institution of Chartered Surveyors into public private partnership and infrastructure funding. The latter project attracted invitations from RICS Americas to chair a roundtable workshop in Miami and take part in a high level discussion forum in New York. Colleagues in the Centre have worked in close collaboration with Belfast City Council in the development of a 3-d model to stimulate the city and allow projections concerning the impact of new development.

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.

Handwritten signature of Stanley McGreal.

Professor Stanley McGreal
Director Built Environment Research Institute

2. RESEARCH INSTITUTE: ACADEMIC STAFF MEMBERS STATUS AT 31 JULY 2013

| 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 |
| Brennan | Sile | Dr | Lecturer | Core |
| Choi | Seng-Kwan | Dr | Lecturer | Core |
| Dahoe | Arief | Dr | Lecturer | Associate |
| Davis | Peadar | 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 | Lecturer | Core |
| Huang | Ye | Dr | Lecturer | Core |
| Hyde | Trevor | Dr | Reader | Core |
| Joseph | Paul | Dr | Senior Lecturer | Core |
| Kashyap | Anil | Dr | Lecturer | Associate |
| Keenan | Michaela | Dr | Lecturer | Associate |
| Levendis | Yiannis | Prof | Professor of 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 |
| Makarov | Dmitriy | Dr | Reader | Core |
| Martinez-Perez | Alona | Mrs | Lecturer | Associate |
| 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 |
|------------------------|-----------------|--------------|---|-------------------------|
| 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 |
| McPhillips | Karen | Dr | 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 |
| Novozhilov | Vasily | Prof | Professor in Fire Dynamics | Core |
| Odeyinka | Henry | Dr | Lecturer | Core |
| Peel | Deborah | Prof | Professor of Planning Research and Scholarship | 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 |
| Van der Krabben | Erwin | Prof | Professor of Real Estate | Core |
| Woodward | David | Dr | Reader | Associate |
| Yohanis | Yigsaw | Prof | Professor of Building Services Engineering | Core |
| Zhang | Jianping | Dr | Lecturer | Core |

3. RESEARCH INSTITUTE: RESEARCH STAFF MEMBERS STATUS AT 31 JULY 2013

| Surname | Forename | Title | Position | Research Centre |
|----------------------------|-----------------|--------------|------------------------|------------------------|
| Chernyavskiy | Boris | Dr | Research Associate | HySAFER |
| Colclough | Shane | Dr | Research Fellow | CST |
| Dave | Ashok | Mr | Research Associate | CST |
| Devlin | Steven | Mr | Research Associate | CST |
| Fang | Yueping | Dr | Research Fellow | CST |
| 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 |
| 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 |
| Novaes | Marcio | Mr | Research Associate | CST |
| O'Brien | Vincent | Mr | Research Associate | CST |
| Ramani | Alwar | Dr | Research Assistant | FireSERT |
| Ramirez | Miguel | Mr | Research Associate | CST |
| Redpath | David | Dr | Research Associate | CST |
| Rolfe | Angela | Miss | Research Associate | CST |
| Tretsiakova-McNally | Svetlana | Dr | Research Associate | HySAFER |
| Zacharopoulos | Aggelos | Dr | Research Fellow | CST |

4. RESEARCH STUDENTS

The following research students were registered on research degree programmes during 2012-2013.

| Student Name | Thesis Title |
|---------------------------------|---|
| Adi Maimun, Nural Hana | The economic values 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 |
| Ali, Sadiq | Thermal / mechanical / electrical storage systems suitable for deployment in the Built Environment |
| Anderson, Mark T | Biomass pelletisation, fuel variability and pelletisation for co-gassification process |
| 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 |
| Bradley, Philip | A carbon valuation model for commercial buildings in a market downturn |
| Byrne, Conor | Dynamical system (Lattice Boltzmann) modelling of compartment fires |
| Byrne, Orla M | Investigation into the potential practical application of “smart growth” within an Irish case study |
| Caldwell, Stephen | A study into sustainable bitumen use |
| 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 |
| Eni, Sabariah | Value capture model as a financial tool for urban regeneration |
| 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 |
| Golden, Saul | Urban design decision support systems - assessment tools for successful urban civic space |
| Gunasekera, Sanwara | Modelling the relationship between organisational and supply chain performance in the construction industry |
| Hardie, Brian | The behaviour of compartment masonry walls in fires |
| Harpur, Amy | Development and analysis of a database on dwelling fire deaths in Northern Ireland |
| Harrison, Justin | Sustainable communities - mapping and measuring the balance of trade-offs |
| Henry, Keith | Planning and public spaces: a property rights perspective |
| Kang, Sungwook | Fundamental technologies for development of nanoclay dispersed intumescent polymer composition in applications for built environments and automobiles |
| Kashyap, Poonam | Innovative storage systems suitable for deployment in the Built Environment |

| Student Name | Thesis Title |
|------------------------------------|--|
| Keig, Peter Richard | An investigation into establishing a hierarchy of sequential retrofit solutions |
| Kelly, Rachel Mary | NAMA: asset management on non performing real estate in a depressed economy |
| 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 |
| McClelland, Andrew G | The anatomy of architectural heritage destruction in Northern Ireland from the 1960s to the 21st Century |
| 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 |
| McKeown, Clare | To develop an economic operator prequalification model to assist in the award of public contracts |
| McKeown, Paul J | Legislative and operational issues for sustainable urban drainage systems |
| 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 |
| Millar, Phillip | A spatial rationale for engineering performance of highway surface materials based on digital photogrammetry |
| 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 |
| Moorehead, Donagh | Tradable heat - using Northern Ireland as a demonstrator for resource mapping, demand mapping and transport concepts |
| Moss, John | Sustainable rural communities – A carbon model |
| Murray, Aaron | A study in traffic planning |
| Novaes, Marcio F | Oilseed rape as a potential feedstock for domestic boilers |
| O'Brien, Vincent | Development and performance evaluation of nano-encapsulated solar concentrating panels and their potential for modular construction techniques |
| Petrou, Klelia | Fire compartments having long span cellular steel beams |
| Quigley, Denise | Achieving an optimum balance across capital, life-cycle and environmental costs |
| Quinn, Michael | Behaviour of glazing panel systems in tall buildings |
| 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 |
| 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 |

| Student Name | Thesis Title |
|-------------------------------|--|
| Samsudin, Salfarina | Exploring the role of land administration in supporting sustainable land use management |
| Shafie, Shahril | Synchronization of house price and buyer affordability: residential property in Malaysia |
| Shah, Nikhil K | Vapour compression heat pumps driven by advanced engine concepts and incorporating heat recovery |
| Shentsov, Volodymyr | Indoor use of fuel cell and hydrogen systems |
| Stevenson, David M | Coastal environmental determinism. Parameters for land use planning |
| Tierney, Christopher A | Dynamic road / tyre interaction |
| Williamson, Oscar | Assessing driver behaviour due to in-car distractions |
| Yates, David | Innovation solutions to reduce separation distance for hydrogen and fuel cell systems |
| Yi, Sung-Hee | Research on characteristics of fire behaviour and heat release rate of Korean high-rise buildings with state-of-the-art interior materials |

Graduated December 2012

| Student Name | Thesis Title |
|-------------------------|--|
| Akram, Waseem | Car culture and city design |
| Naili, El-Hadi A | Behaviour of composite floor structures in fire |
| Keatley, Patrick | Cyclic operation of baseload thermal plant in the Irish power system in high wind energy penetration scenarios |
| Mahmoud, Moataz | Design, access and security in public transport infrastructure (an integrated assessment tool for sustainable public transportation) |

Graduated July 2013

| Student Name | Thesis Title |
|---------------------------|---|
| Akbar, Muhammad R | Sustainable technologies, environmental subsidies, end user needs and business opportunities in the delivery of zero carbon homes |
| Friel, Shaun | Early life skid resistance |
| Keenan, James J | Modelling and LES of vented hydrogen-air deflagrations |
| McClements, Sharon | Selection of consultants based on trust |
| Quinn, Matthew V | Heat pumps digital compressor |
| Scullion, Thomas | Performance of axially restrained steel columns subjected to severe fire |

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

Ahern, C, Griffiths, P and O'Flaherty, M (2013) State of the Irish housing stock—Modelling the heat losses of Ireland's existing detached rural housing stock & estimating the benefit of thermal retrofit measures on this stock. *Energy Policy*, 55. pp. 139-151.

Amirabedin, E and McIlveen-Wright, D (2013) A feasibility study of co-firing biomass in the thermal power plant at Soma in order to reduce emissions: an exergy approach. *International Journal of Environmental Research*, 7 (1). pp. 139-154.

Arteconi, A, Hewitt, NJ and Polonara, F (2013) Domestic demand-side management (DSM): Role of heat pumps and thermal energy storage (TES) systems. *Applied Thermal Engineering*, 51. pp. 155-165.

Arteconi, A, Hewitt, NJ and Polonara, F (2012) State of the art of thermal storage for demand-side management. *Applied Energy*, 93. pp. 371-389.

Beekmans, J, van der Krabben, E and Martens, K (2012) An indicator for decline of industrial estates. *Journal of European Real Estate Research*, 5 (3). pp. 229-249.

Beji, T, Ukleja, S, Zhang, J and Delichatsios, M (2012) Fire behaviour and external flames in corridor and tunnel-like enclosures. *Fire and Materials*, 36 (8). pp. 636-647.

Blair, N, Hine, J and Bukhari, S (2013) Analysing the impact of network change on transport disadvantage: a GIS-based case study of Belfast. *Journal of Transport Geography*, 31. pp. 192-200.

Boyce, K, Purser, D A. and Shields, TJ (2012) Experimental studies to investigate merging behaviour in a staircase. *Fire and Materials*, 36 (5-6). pp. 383-398.

Bragin, MV, Makarov, DV and Molokov, VV (2013) Pressure limit of hydrogen spontaneous ignition in a T-shaped channel. *International Journal of Hydrogen Energy*, 38 (19). pp. 8039-8052.

Brennan, S and Molokov, V (2013) Safety assessment of unignited hydrogen discharge from onboard storage in garages with low levels of natural ventilation. *International Journal of Hydrogen Energy*, 38. pp. 8159-8166.

Breslin, G, Liston, K, Prentice, G and McConnell, NC (2013) Making the successful transition to university: psychological predictors of first year sports students' academic performance expectations. *Perspectives on Pedagogy and Practice*, 4. pp. 43-56.

Brown, L, McGreal, S and Adair, A (2013) The role of bidding in determining sales price for residential property. *Journal of Housing Research*, 22 (1). pp. 39-57.

Choi, JY and Choi, SK (2013) Temperature on structural steelworks insulated by inorganic intumescent coating. *Steel and Composite Structures*, 15 (1). pp. 1-14.

Dai, J, Delichatsios, M and Yang, L (2013) Piloted ignition of solid fuels at low ambient pressure and varying igniter location. *Proceedings of Combustion Institute*, 34. pp. 2497-2503.

Dai, J, Delichatsios, M, Yang, L and Zhang, J (2013) Piloted ignition and extinction for solid fuels. *Proceedings of Combustion Institute*, 34 (2). pp. 2487-2495.

Dave, A, Huang, Y, Rezvani, S, McIlveen-Wright, D, Novaes, M and Hewitt, N (2013) Techno-economic assessment of biofuel development by anaerobic digestion of European marine cold-water seaweeds. *Bioresource Technology*, 135. pp. 120-127.

Davison, L and Ryley, T (2013) The relationship between air travel behaviour and the key life stages of having children and entering retirement. *Journal of Transport Geography*, 26. pp. 78-86.

Eadie, R, McKeown, C and Anderson, K (2013) The impact of recession on construction procurement routes. *International Journal of Procurement Management*, 6 (1). pp. 24-38.

- Eadie, R, Millar, P and Grant, R (2013) PFI/ PPP, private sector perspectives of UK Transport & Healthcare. Built Environment Project and Asset Management, 3 (1). pp. 89-104.
- Eadie, R, Millar, P and Harte, N (2013) A comparison between CESMM3 and MCHW as methods of measurement for civil engineering work. International Journal of Procurement Management , 6 (5). pp. 523-543.
- Eadie, R, Millar, P and Toner, L (2013) Public private partnerships, reevaluating value for money. International Journal of Procurement Management , 6 (2). pp. 152-169.
- Gu, H, Zhang, K, Wang, Y, Huang, Y, Hewitt, N and Roskilly, AP (2013) Waste biomass from production process co-firing with coal in a steam boiler to reduce fossil fuel consumption: A case study. Journal of Energy Chemistry, Vol. 22 (3). pp. 413-419.
- Halleux, JM, Marcinczak, S and van der Krabben, E (2012) The adaptive efficiency of land use planning measured by the control of urban sprawl. The cases of the Netherlands, Belgium and Poland. Land Use Policy, 29 (4). pp. 887-898.
- Haran, M, Davis, P, McCord, M, Grissom, T and Newell, G (2013) Equities or Real Estate? An International Evaluation of Listed Property Markets. Journal of European Real Estate Research, 6 (2). pp. 139-162.
- Haran, M, McCord, M, Hutchison, N, McGreal, S, Adair, A, Berry, J and Kashyap, A (2013) Financial structure of PPPs deals post-GFC: an international perspective. Journal of Financial Management of Property and Construction, 18 (2). pp. 184-203.
- Harpur, AP, Boyce, KE and McConnell, NC (2013) An investigation into the circumstances surrounding fatal dwelling fires involving very young children. Fire Safety Journal, 61. pp. 72-82.
- Haurin, D, McGreal, S, Adair, A, Brown, L and Webb, JR (2013) List price and sales prices of residential properties during booms and busts. Journal of Housing Economics, 22. pp. 1-10.
- Hess, S, Ryley, T, Davison, L and Adler, T (2013) Improving the quality of demand forecasts through cross nested logit: a stated choice case study of airport, airline and access mode choice. Transportmetrica A: Transport Science, 9 (4). pp. 358-384.
- Hu, L, Delichatsios, M, Li, J, Zhang, X, Wang, S and Huo, R (2012) Experimental study on diffusive solid combustion behavior during transition from normal- to reduced-gravity. International Journal of Heat and Mass Transfer, 55 (7-8). pp. 2035-2043.
- Hu, L, Lu, K, Delichatsios, M, He, L and Tang, F (2012) An experimental investigation and statistical characterization of intermittent flame ejecting behavior of enclosure fires with an opening. Combustion and Flame, 159 (3). pp. 1178-1184.
- Hu, L, Wang, Q, Delichatsios, M, Tang, F, Zhang, X and Lu, S (2013) Flame height and lift-off of turbulent buoyant jet diffusion flames in a reduced pressure atmosphere. Fuel, 109. pp. 234-240.
- Huang, MJ and Hewitt, NJ (2013) The experimental analysis of the effect of ambient factors on the defrosting of economised vapour injection compressor air source heat pump in marine climates. International Journal of Refrigeration, 36 (3). pp. 820-827.
- Huang, Y, McIlveen-Wright, D, Rezvani, S, Huang, MJ, Wang, YD, Roskilly, AP and Hewitt, N (2013) Comparative techno-economic analysis of biomass fuelled combined heat and power for commercial buildings. Applied Energy, 112. pp. 518-525.
- Huang, Y, Wang, MH, Stephenson, P, Rezvani, S, McIlveen-Wright, D, Minchener, AJ, Hewitt, N, Dave, A and Fleche, A (2012) Hybrid coal-fired power plants with CO₂ capture: A technical and economic evaluation based on computational simulations. Fuel, 101. pp. 244-253.
- Huang, Y, Wang, Y, Rezvani, S, McIlveen-Wright, D, Anderson, M, Mondol, JD, Zacharopoulos, A and Hewitt, N (2012) A techno-economic assessment of biomass fuelled trigeneration system integrated with organic Rankine cycle. Applied Thermal Engineering, 53(2). pp. 325-331.
- Hutchison, N, Fraser, P, Adair, AS and Rahul, S (2012) Regime shifts in ex post UK commercial property risk premiums. Journal of Property Research, 29 (3). pp. 247-269.
- Jay, S, Klenke, T, Ahlhorn, F and Ritchie, H (2012) Early European Experience in Marine Spatial Planning: Planning the German Exclusive Economic Zone. European Planning Studies , 20 (12). pp. 2013-2031.
- Johnston, HT, Hamill, GA, Wilson, PR and Ryan, D (2013) Influence of a boundary on the development of a propeller wash. Ocean Engineering, 61. pp. 50-55.

- Joseph, P and Tretsiakova-McNally, S (2012) Combustion behaviours of chemically modified polyacrylonitrile polymers containing phosphorylamino groups. *Polymer Degradation and Stability*, 97 (12). pp. 2531-2535.
- Joseph, P, Nichols, E and Novozhilov, V (2013) A comparative study of the effects of chemical additives on the suppression efficiency of water mist. *Fire Safety Journal*, 58. pp. 221-225.
- Kamruzzaman, M and Hine, J (2013) Self-proxy agreement and weekly school travel behaviour in a sectarian divided society. *Journal of Transport Geography*, 23. pp. 74-85.
- Keatley, P, Shibli, A and Hewitt, N (2013) Estimating power plant start costs in cyclic operation. *Applied Energy*, 111. pp. 550-557.
- Khamkanya, T, Heaney, G and McGreal, S (2012) Introduction of AHP satisfaction index for workplace environments. *Journal of Corporate Real Estate*, 14 (2). pp. 80-93.
- Kim, S, Kim, S, Ryu, D and Choi, SK (2013) Fire resistance of U-shape hybrid composite beam. *Journal of Korean Society of Steel Construction*, 25 (4). pp. 379-388.
- Kitagawa, K, Joseph, P, Novozhilov, V and Shimada, T (2012) Characteristics of chemically modified and nanocomposite polymers as novel fuels for hybrid rocket propulsion. *International Journal of Energetic Materials and Chemical Propulsion*, 11 (6). pp. 549-566.
- Kwaśniewski, L, Ali, F and Balcerzak, M (2013) Coupled structural-thermal calculations for restrained steel columns in fire. *Journal of Structural Fire Engineering*, 4 (1). pp. 59-70.
- Lee, YP, Delichatsios, M and Ohmiya, Y (2012) The physics of the outflow from the opening of an enclosure fire and re-examination of Yokoi's correlation. *Fire Safety Journal*, 49. pp. 82-88.
- Lim, LC, Berry, J and Sieraki, K (2013) Prime versus secondary real estate: When to buy and sell. *Journal of Property Investment & Finance*, 31 (3). pp. 254-266.
- Lloyd, MG and Murray, L (2013) Re-thinking scale in territorial development strategic interventions: towards an area-based focus. *Journal of Urban Regeneration and Renewal*, 6 (4). pp. 354-364.
- Lloyd, MG, Peel, D and Duck, RW (2013) Towards a social-ecological resilience framework for coastal planning. *Land Use Policy*, 30 (1). 925-933.
- Love, PED, Sing, CP, Wang, X, Edwards, DJ and Odeyinka, H (2013) Probability distribution fitting of schedule overruns in construction projects. *Journal of the Operational Research Society*, 64. pp. 1231-1247.
- Mahmoud, M and Hine, J (2012) Using AHP to measure the perception gap between current and potential users of bus services. *Transportation Planning and Technology*, 36 (1). pp. 4-23.
- Makarov, D and Molkov, V (2013) Plane hydrogen jets. *International Journal of Hydrogen Energy*, 38 (19). pp. 8068-8083.
- McCluskey, W, Davis, P, Haran, M, McCord, M and McIlhatton, D (2012) The potential of artificial neural networks in mass appraisal: The case revisited. *Journal of Financial Management of Property and Construction*, 17 (3). pp. 274-292.
- McCluskey, WJ and Trinh, HL (2013) Property tax reform in Vietnam: Options, direction and evaluation. *Land Use Policy*, 30 (1). pp. 276-285.
- McCord, J, McCord, M, McCluskey, WJ, Davis, PT, McIlhatton, D and Haran, M (2013) Belfast's iron(ic) curtain "Peace Walls" and their impact on house prices in the Belfast housing market. *Journal of European Real Estate Research*, 6 (3). pp. 333-358.
- McGreal, S and Taltavull de La Paz, P (2013) Implicit House Prices: Variation over time and space in Spain. *Urban Studies*, 50 (10). pp. 2024-2043.
- McIlveen-Wright, D, Huang, Y, Rezvani, S, Redpath, D, Anderson, M, Dave, A and Hewitt, N (2013) A technical and economic analysis of three large scale biomass combustion plants in the UK. *Applied Energy*, 112. pp. 396-404.
- Molkov, V and Saffers, JB (2013) Hydrogen jet flames. *International Journal of Hydrogen Energy*, 38 (19). pp. 8141-8158.
- Mondol, JD and Koumpetsos, N (2013) Overview of challenges, prospects, environmental impacts and policies for renewable energy and sustainable development in Greece. *Renewable and Sustainable Energy Reviews*, 23. pp. 431-442.
- Nase, I, Berry, J and Adair, A (2013) Hedonic modelling of high street retail properties: a quality design perspective. *Journal of Property Investment & Finance*, 31 (2). pp. 160-178.

- Nase, I, Berry, J and Adair, A (2013) Real estate value and quality in commercial office properties. *Journal of European Real Estate Research*, 6 (1). pp. 48-62.
- Newell, G, Adair, AS and Nguyen, TK (2013) The significance and performance of French REITs (SIIcs) in a mixed-asset portfolio. *Journal of Property Investment & Finance*, 31 (6). pp. 575-588.
- Newell, G, Kupke, V and McGreal, S (2013) The significance of capital flows into the Australian commercial property markets. *Pacific Rim Property Research Journal*, 19 (1). pp. 3-15.
- Nkwetta, DN, Smyth, M, Haghighat, F, Zacharopoulos, A and Hyde, T (2013) Experimental performance evaluation and comparative analyses of heat pipe and direct flow augmented solar collectors. *Applied Thermal Engineering*, 60 (1-2). pp. 225-233.
- Novozhilov, V and Byrne, C (2013) Lattice Boltzmann modeling of thermal explosion in natural convection conditions. *Numerical Heat Transfer, Part A: Applications*, 63 (11). pp. 824-839.
- Odeyinka, H, Lowe, J and Kaka, A (2012) Regression modelling of risk impacts on construction cost flow forecast. *Journal of Financial Management of Property and Construction*, 17 (3). pp. 203-221.
- Odeyinka, H, Lowe, J and Kaka, AP. (2013) Artificial neural network cost flow risk assessment model. *Construction Management and Economics*, 31 (5). pp. 423-439.
- Oyedele, JB, McGreal, S, Adair, A and Ogedengbe, P (2013) Performance and role of European listed infrastructure in a mixed-asset portfolio. *Journal of Financial Management of Property and Construction*, 18 (2). pp. 160-183.
- Paul, DI, Smyth, M, Zacharopoulos, A and Mondol, JD (2013) The design, fabrication and indoor experimental characterisation of an isolated cell photovoltaic module. *Solar Energy*, 88. pp. 1-12.
- Peel, D and Lloyd, MG (2012) The Edinburgh Concordat: Contractual, collaborative positive planning? *Public Performance & Management Review*, 36 (2). pp. 275-289.
- Rafferty, G (2012) Embracing the creation of shared space: Considering the potential intersection between community planning and peace-building. *Space and Polity*, 16 (2). pp. 197-213.
- Rafi, MM and Nadjai, A (2012) Numerical modelling of carbon fibre-reinforced polymer and hybrid reinforced concrete beams in fire. *Fire and Materials*, 37. pp. 374-390.
- Rezvani, S, McIlveen-Wright, D, Huang, Y, Dave, A, Mondol, JD and Hewitt, N (2012) Comparative analysis of energy storage options in connection with coal fired integrated gasification combined cycles for an optimised part load operation. *Fuel*, 101. pp. 154-160.
- Rossini, P, Kupke, V, Kershaw, P and McGreal, S (2012) Cross sectional analysis of time on market indicators for an Australian city. *Pacific Rim Property Research Journal*, 18 (4). pp. 407-425.
- Rush, D, MacIntyre, S and McKay, S (2012) Conundrums in conservation: Complexity in control. *Urban Studies Research*, 2012. pp. 1-14.
- Ryan, D, Hamill, GA and Johnston, HT (2013) Determining propeller induced erosion alongside quay walls in harbours using artificial neural networks. *Ocean Engineering*, 59. pp. 142-151.
- Ryley, T, Burchell, J and Davison, L (2013) Valuing air transportation and sustainability from a public perspective: Evidence from the United Kingdom and the United States. *Research in Transportation Business & Management*, 7. pp. 114-119.
- Samsura, AA and van der Krabben, E (2012) Negotiating land and property development: a game theoretical approach to value capturing. *Journal of European Real Estate Research*, 5 (1). pp. 48-65.
- Singhal, S, McGreal, S and Berry, J (2013) An evaluative model for city competitiveness: Application to UK cities. *Land Use Policy*, 30 (1). pp. 214-222.
- Singhal, S, McGreal, S and Berry, J (2013) Application of a hierarchical model for city competitiveness in cities of India. *Cities*, 31. pp. 114-122.
- Suzanne, M, Delichatsios, M and Zhang, J (2012) Prediction of the limiting oxygen index using simple flame extinction theory and material properties obtained from bench scale measurements. *Fire Safety Science*, 10. pp. 375-387.
- Tang, F, Hu, L, Delichatsios, M, Lu, K and Zhu, W (2012) Experimental study on flame height and temperature profile of buoyant window spill plume from an under-ventilated compartment fire. *International Journal of Heat and Mass Transfer*, 55 (1-3). pp. 93-101.

van der Krabben, E and Jacobs, HM (2013) Public land development as a strategic tool for redevelopment: Reflections on the Dutch experience. *Land Use Policy*, 30 (1). pp. 774-783.

Vassart, O, Bailey, C, Hawes, M, Nadjai, A, Simms, I, Zhao, B, Gernay, T and Franssen, JN (2012) Large-scale fire test of unprotected cellular beams acting in membrane action. *Structures and Buildings*, 165 (7). pp. 327-334.

Yao, W, Zhang, J, Nadjai, A, Beji, T and Delichatsios, M (2012) Development and validation of a global soot model in turbulent jet flames. *Combustion Science and Technology*, 184 (5). pp. 717-733.

Zhang, J and Delichatsios, M (2012) TGA maximum heat release rate and mass loss rate and comparison with the cone calorimeter. *Fire Safety Science*, 10. pp. 1333-1346.

Zhang, J, Delichatsios, M, McKee, M and Ukleja, S (2012) Experimental and numerical study of burning behaviors of flaxboard with intumescent coating and nanoparticles in the cone calorimeter and single burning item tests. *Fire and Materials*, 36 (7). pp. 554-564.

5.2 Books/Chapters in Books

Eadie, R, Perera, S and Heaney, G (2012) Electronic procurement in the construction industry. In: *Public Sector Transformation Processes and Internet Public Procurement: Decision Support Systems*. (Eds: Pomazalová, Nataša), Hershey, PA: Information Science Publishing. pp. 335-385.

Joseph, P and Tretsiakova-McNally, S (2012) Mechanistic aspects of flame retardation by phosphorus-containing groups in some chain growth polymers. In: *Fire and Polymers VI: New Advances in Flame Retardant Chemistry and Science*. (Eds: Morgan, AB, Wilkie, CA and Nelson, GL), ACS Publications, pp. 37-50.

McCluskey, WJ and Franzsen, RCD (2013) Non-market value and hybrid approaches to property taxation. In: *A Primer on Property Tax: Administration and Policy*. (Eds: McCluskey, WJ, Cornia, GC and Walters, LC), Wiley-Blackwell, UK, pp. 287-305.

McCluskey, WJ and Franzsen, RCD (2013) Value based approaches to property taxation. In: *A primer on property tax: Administration and Policy*. (Eds: McCluskey, WJ, Cornia, GC and Walters, LC), Wiley-Blackwell, UK, pp. 41-68

McCluskey, WJ, Cornia, GC and Walters, LC, eds. (2013) *A Primer on Property Tax: Administration and Policy*. Wiley-Blackwell, UK. 364 pp.

McCluskey, WJ, Davis, P, McCord, M, McIlhatton, D and Haran, M (2013) Computer assisted mass appraisal and the property tax. In: *A Primer on Property Tax: Administration and Policy*. (Eds: McCluskey, WJ, Cornia, GC and Walters, LC), Wiley-Blackwell, UK, pp. 307-338.

McIlhatton, D, McCord, M, Haran, M and Davis, P (2013) Geographical Information Systems and the importance of location: Integrating property and place for better informed decision making. In: *A Primer on Property Tax: Administration and Policy*. (Eds: McCluskey, WJ, Cornia, GC and Walters, LC), Wiley-Blackwell, UK, pp. 339-357.

5.3 Research Reports

Adair, A, McGreal, S and McIlhatton, D (2012) Northern Ireland Quarterly House Price Index for Q3 2012 Report 112. Northern Ireland Housing Executive and Bank of Ireland. University of Ulster. 8 pp.

Adair, A, McGreal, S and McIlhatton, D (2012) Northern Ireland Quarterly House Price Index for Q2 2012 Report 111. 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 Q1 2013 Report 114. 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 Q4 2012 Report 113. Northern Ireland Housing Executive and Bank of Ireland. University of Ulster. 8 pp.

Haran, M, Davis, P, McCord, M, McGreal, S, Newell, G and Grissom, T (2012) Commercial real estate investment: Co-integration and portfolio optimisation. European Public Real Estate Association. European Public Real Estate Association. 36 pp.

Ritchie, H, Yates, K, Kidd, S and Magowan, L (2013) Irish Sea issues and opportunities. University of Ulster University of Ulster. 36 pp.

Young, G, O'Sullivan, T, Redmond, D, Blair, N, Cave, S and Gibb, K (2012) Crossing borders. BRIC Partnership: Rural Development Council (RDC); Northern Ireland Housing Executive (NIHE); TIDES Training. Northern Ireland Housing Executive. 126 pp.

5.4 Published Conference Papers

Artamendi, I, Phillips, P, Allen, B and Woodward, D (2013) Development of UK proprietary asphalt surfacing skid resistance and texture. In: Airfield and Highway Pavement 2013, Los Angeles. American Society of Civil Engineers. 10 pp.

Eadie, R, McKeown, C, Millar, P, Odeyinka, H and McMorran, G (2012) Public and private sector views of electronic government tendering in light of the Glover report in Northern Ireland. In: 7th International Conference on Innovation in Architecture, Engineering and Construction (AEC), Sao Paulo, Brazil. Escola Politecnica, University of Sao Paulo Brazil. 12 pp.

Eadie, R, Millar, P and McMorran, G (2012) Public and private sector views of electronic government advertising in light of the Glover report in Northern Ireland. In: 7th International Conference on Innovation in Architecture, Engineering and Construction (AEC), Sao Paulo, Brazil. Escola Politecnica, University of Sao Paulo Brazil. 8 pp.

Eadie, R, Millar, P, McKeown, C and Courtney, K (2012) An analysis of public sector procurement in Ireland. In: International Conference on Civil Engineering Design and Construction (Science and Practice), Varna, Bulgaria. 6 pp.

Eadie, R, Millar, P, McKeown, C and Ferguson, M (2012) The feasibility and rationale for using early contractor involvement ECI in Northern Ireland. In: 7th International Conference on Innovation in Architecture, Engineering and Construction (AEC), Sao Paulo, Brazil. Escola Politecnica, University of Sao Paulo Brazil. 13 pp.

Friel, S and Woodward, D (2013) Predicting the development of asphalt surfacing properties in Ireland. In: Airfield and Highway Pavement 2013, Los Angeles. American Society of Civil Engineers. 12 pp.

Friel, S, Kane, M and Woodward, D (2013) Use of Wehner Schulze to predict skid resistance of Irish surfacing materials. In: Airfield and Highway Pavement Conference 2013, Los Angeles. American Society of Civil Engineers. 12 pp.

Joseph, P, Kitagawa, K, Novozhilov, V and Shimada, T (2012) Reactive and additive routes to novel polymer-based fuels for hybrid propulsion. In: 9th International Conference on Flow Dynamics, Sendai, Japan. Global COE Program, Tohoku University, Japan. 2 pp.

Joseph, P, Tretsiakova-McNally, S and Byrne, C (2013) Effects on the combustion behaviour of polyacrylonitrile (PAN) polymers modified with covalently-bound penta-valent phosphorus under different chemical environments. In: Fire and Materials 2013, San Francisco, USA. Interscience Communications, London, UK. 12 pp.

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.

Larkin, K, Odeyinka, H and Eadie, R (2012) An exploration of theoretical concepts and methods for assessing risk impacts on the variability between contract sum and final account in design and build projects. In: 28th Annual ARCOM Conference, Edinburgh, UK. ARCOM, Association of Researchers in Construction Management. Vol 1, 10 pp.

McClements, S, Odeyinka, H and Eadie, R (2012) Pre-selection of construction consultants based on attributes of trust. In: 28th Annual ARCOM Conference, Edinburgh, UK. ARCOM, Association of Researchers in Construction Management. Vol 1, 10 pp.

Mitchell, R, Woodward, D and Ryan, D (2013) Use of microwave conditioning to rapidly age asphalt mixes. In: Airfield and Highway Pavement 2013, Los Angeles. American Society of Civil Engineers. 8 pp.

Mondol, JD, Kishore, VVN, Smyth, M, Zacharopoulos, A, Kansal, A and Anderson, M (2013) Solar accelerator anaerobic digester design for small-scale bio-gas production. In: 21st European Biomass Conference and Exhibition, Copenhagen, Denmark. ETA-Florence Renewable Energies 5 pp.

Mondol, JD, Smyth, M, Zacharopoulos, A and Damasen, P (2012) Comparative performance analysis of solar heat exchangers for solar hot water systems. In: EuroSun 2012, Rijeka. Croatian Solar Energy Association Rijeka, Vukovarska 58, Croatia. 8 pp.

Woodward, D, Millar, P, Friel, S and Waddell, C (2013) Measuring grip and the contact patch. In: Airfield and Highway Pavement 2013, Los Angeles. American Society of Civil Engineers. 12 pp.

Zacharopoulos, A, Paul, DI, Mondol, JD and Smyth, M (2012) Optical characterisation of a PV concentrator under simulated and realistic solar conditions using an isolated cell PV module. In: EuroSun 2012, Rijeka. International Solar Energy Society. 8 pp.

6. RESEARCH FUNDING: NEW AWARDS NOTIFIED - 1 AUGUST 2012 - 31 JULY 2013

| Research Institute Member | Title of Award | Funding Body | Value |
|---|---|-------------------------------------|----------|
| Ali, Prof FA | The Smart Fire-blast Protection System | Invest NI – Proof of Concept | £105,455 |
| Blair, Dr N Lloyd, Prof MG | CROSPLAN 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 | CEC – Framework 7 - Security | £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 |

| Research Institute Member | Title of Award | Funding Body | Value |
|---|--|---|------------|
| 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 |
| 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 |

