

**Environment template (REF5)**

<b>Institution:</b> Bangor University and Cardiff Metropolitan University
<b>Unit of Assessment:</b> 26 – Sport and Exercise Sciences, Leisure and Tourism
<b>a. Overview</b>

This submission is from the Institute for Research Excellence in Sport and Exercise (IRESE). Following 20 years of research cooperation between the School of Sport, Health and Exercise Sciences at Bangor University and the Cardiff School of Sport at Cardiff Metropolitan University, it marks a new phase of formal collaboration. It is also a strategic alliance intended to meet HEFCW’s collaborative research imperative.

<b>b. Research Strategy</b>
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Bangor’s objectives from 2008 were to: maintain its strong collaboration with the Ministry of Defence (MoD) and with national governing bodies of sport; and facilitate and lead multidisciplinary clinical and translational research links with the National Health Service. Cardiff Met’s main objectives were to: increase collaborative research activities with major groups in other Higher Education Institutions; and increase research income, postgraduate research student numbers, and contract research partnerships with the public, private and not-for-profit sectors.

At Bangor University, following RAE 2008, the research groups were reconfigured into three groups – each led by a Professor. The *Institute for the Psychology of Elite Performance* (led by **Woodman**) integrates research and professional practice across business, sport and the military and has significantly increased its research grant capture since 2008 (£832k over the period) including fulfilling its aim of extending its collaborative research links with the Ministry of Defence (e.g., the Army Staff Leadership School) and national sport organisations (e.g., England and Wales Cricket Board, UK Sport). The *Extremes Research Group* (led by **Walsh**) places emphasis on multi-disciplinary understanding of human performance and health in extreme environments. This group has achieved considerable grant capture since its formation in 2009, mainly from the MoD (£1.4 million) but also from other external agencies (£593k), and has recently led the British Association of Sport and Exercise Sciences position statement on exercise immunology. The *Health and Rehabilitation Group* (led by **Lemmey**) is concerned with the influence of exercise and nutrition on life-long wellbeing and health particularly linked to ageing, disease and recovery from illness. It is leading the drive for the establishment of a formal collaboration with the NHS in the form of a Rehabilitation Centre, which flows from its international renown in exercise prescription for chronic disease. With strong research collaborations with other schools (e.g., Psychology) and Higher Education Institutions (e.g., King’s College Hospital, Swansea University), this group has helped to capture in excess of £8.6 million during the REF period.

At Cardiff Met there are five established research groups. The *Sports Biomechanics* group (led by **Irwin**) combines computer simulation modelling, performance biomechanics and advanced measurement techniques, and secured the University’s largest single collaborative Research Council grant funding for the Sensing for Sport and Managed Exercise (SESAME) project (£3.7 million), which concluded in 2010. The *Physiology and Health* group (led by **Shave**), which researches human performance and the management and treatment of disease, has an international reputation for cardiac imaging. The *Sociology and Philosophy of Sport* group (led by **Jones C**) addresses the under-researched interface between sociology and applied ethics – its members hold key roles in the International Association for the Philosophy of Sport. The *Sport Psychology* group (led by **Evans**) is the most established at Cardiff Met and focuses primarily on stress and emotion, mental toughness and sports injury – its members make an outstanding contribution to the discipline through many prestigious editorial board commitments. The *Welsh Centre for Tourism Research* (led by **Pritchard**) embraces sustainable destination development

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and marketing, social inclusion and poverty alleviation, and was a co-host of the Critical Tourism Studies Series of biennial conferences which began in 2005 in conjunction with the Socio-Spatial Analysis Group at Wageningen University, the Netherlands and the Institute for Tourism, Zagreb.

Despite Bangor and Cardiff Met's separate RAE 2008 submissions, the origins of a more cohesive and collaborative IRESE were already well established with 58 international peer reviewed journal articles or other research outputs that had already been co-authored between the two institutions by **Callow, Evans, Fleming, Hanton, Hardy L, Kingston, Mitchell, Roberts, Thomas, Woodman** and previously Jones G and Mullen. Furthermore, Bangor and Cardiff Met are the only Institutions in Wales to receive quality-related research funding for sport and exercise sciences, leisure, and tourism. The combined strength of IRESE is such that if a joint Bangor-Cardiff Met submission had been made for RAE 2008, the overall IRESE yield of 3\* and 4\* outputs would have been the third largest in Unit of Assessment 46, Sports-Related Studies. With this collaborative backdrop of research excellence and after an extended period of discussion, it was decided in December 2011 to formalise the research links via a Memorandum of Understanding that was signed by the respective Vice-Chancellors in October 2012.

The main strategic priorities for IRESE are now to: (i) consolidate and extend the well-established research links between the two universities; (ii) establish a structure that assures recognition for high-quality research in sport and exercise sciences, leisure and tourism; (iii) develop robust and sustainable mechanisms to encourage and support this research; (iv) increase grant capture for research initiatives that produce high-quality research outputs; and (v) continue to exploit the impact of IRESE research beyond academia.

The first priority for IRESE is to build on the current research strengths of: mental resilience; human performance and health in extreme environments; exercise and cardiovascular health; ethics, equity and identity; psychology of injury; sustainable destination development, social inclusion, and poverty alleviation in leisure and tourism. It is also intended to further develop our research on the development of sports coaches. This will be achieved by enhancing the strong, well-established links with the MoD, National Institute for Social Care and Health Research, UK Sport, Sport Wales, the English Institute of Sport, the England and Wales Cricket Board, and the NHS.

The second priority for IRESE is to consolidate and grow the collaborative inter- and multi-disciplinary research that already exists within and across the two institutions (e.g., **Beattie, Callow, Evans, Hanton, Hardy L, Kubis, Lemmey, Macdonald, Neil, Oliver, Thom, Woodman**). This includes developing further collaborative links (e.g., in psychophysiology and cognitive neuroscience) within and across institutions. The recent appointments of **Cook** and **Cooke** (see section c. I. below) have been made with the explicit objective of enhancing our collaborative multi- and inter-disciplinary research. Three collaborative Bangor-Cardiff Met IRESE research away days have already taken place to target each of the aforementioned strategic objectives and these will continue into the next REF period.

The third priority for IRESE over the next REF cycle is to further consolidate its research links with the NHS via the local health boards. Negotiations are advanced with the aim of facilitating multidisciplinary clinical and translational research, and establishing a Clinical Exercise Rehabilitation Centre that will focus on out-patient related research with a specific focus on IRESE strengths (e.g., exercise prescription for chronic disease). With this objective in mind, a Memorandum of Understanding was signed between Bangor University and Betsi Cadwaladr University Health Board, and a joint working group was established in 2011. A service level agreement also exists between Cardiff Met and Velindre Health Board to provide specialist imaging services, as well as a Partnership Board with the Cardiff and Vale NHS.

**c. People, including:**
**I. Staffing strategy and staff development**

The shared commitment of the constituent Schools to supporting research excellence through appropriate high-quality staffing is evidenced through: (i) a recruitment strategy that has emphasised well-established, internationally recognised scholars with a record of grant capture and impact (**Cook, Shave**); (ii) planned investment in early career and other researchers who show the potential for work of 3\* and 4\* quality (**Arthur, Barlow, Bezodis, Cooke, Fortes, Gottwald, O'Brien, Rees, Stöhr**) as well as research staff funded internally (**Drane, Williams**) and externally (**Charalambous, Edmunds, Exell, Kuntze, Struzenger**); (iii) internal promotion to Senior Lecturer and Reader for deserving applicants (**Brown, Callow, Cooper, Hardy J, Haven-Tang, Kubis, Macdonald, Ritchie, Thom**); (iv) internal promotion to Professor for senior researchers who have developed their research leadership (**Irwin, Lemmey, Walsh, Woodman**); (v) appointment of eminent researchers to senior roles as Emeritus Professors (**Botterill, Hardy L, Kerwin, Maddison**), Visiting Professors (**Cockcroft**) and Visiting Readers (**Yousef**); and clear strategic drivers (see b) for replacing senior staff that have left (**Bell, Gilbourne, Khan, Marcora, Morgan N**).

Senior researchers (e.g., **Hanton, Hardy L, Pritchard**) have provided mentorship and guidance to colleagues to develop their academic careers and to ensure effective succession planning. As a result, some of these staff have taken on major academic leadership roles (e.g., **Callow** is Dean of the College of Health and Behavioural Sciences at Bangor, **Fleming** is the University Director of Research and Graduate Studies).

Formal interactions are fostered by specialised seminar series (within each group and across all groups) with external and internal speakers (including Research Assistants and PhD students), *ad hoc* journal clubs, and monthly research group meetings dedicated to discussion of research proposals, grant activity, and impact. All staff participate in a mentoring system that provides individualised, on-going support and guidance for research development by another senior colleague. All staff are individually reviewed annually with research-related targets aligned to strategic goals that are agreed and later evaluated. We actively protect the research time of our academic staff by seeking, wherever possible, to release them from duties that could instead be conducted by other staff, and by supporting research leave to further develop their research programmes – 18 periods of six-month research study leave awarded in the REF period. New and early career academic staff are provided with start-up laboratory funding (a total of £162k since 2008), organisational support, and priority for School-funded PhD students (25 awarded in REF period). Other research funding opportunities are also made available, for example, through a Seed Fund and an Impact Exploitation Fund. Finally, all staff and research students are funded to attend and present their work at international conferences.

IRESSE Schools engage in annual internal mock REF assessments. Incentive schemes are also in place to encourage the submission of grant proposals, and over the REF period approximately £120k has been allocated in this way. Central services at each university provide support in the form of training and assistance in writing grant bids and information regarding funding opportunities. Visits from research councils and other funding agencies are arranged to explain and explore funding possibilities. For grant proposals to external funding agencies, an internal peer review process is in operation. Further support in the form of continuing professional development is also provided to research staff through in-house programmes of activities (e.g., biannual research away days; advances in research methods, research ethics and Human Tissue Act compliance).

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Each institution is committed to all aspects of equity, diversity and social inclusion that are embedded in the mission statements of both universities. There is also a strong commitment to pursuing Athena SWAN charter principles: Bangor gained the Bronze award in November 2011 and will be submitting for the Silver Award in November 2014. Cardiff Met is preparing an application for the same award, and both **Fleming** and **Woodman** are on University steering groups to pursue this initiative.

IRESE benefits from the Concordat and Researcher Development Group at Bangor University that oversees and ensures effective researcher development as well as a significant endorsement of research culture and governance through the European Commission's Human Resources Excellence in Research award. In 2013 Bangor University held the Careers in Research On-line Survey and the Principal Investigators and Research Leaders Survey to ensure that provision meets the needs of research staff and addresses the University's research strategy objectives.

<b>c. II. Research students</b>
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There is a strategy in place to maintain the numbers of PhD students by school-funding at least four PhD studentships per year in addition to match-funding externally funded students and attracting external funding for PhD students. Formal interactions between PhD students and established researchers are fostered by the activities outlined in the staff section above (e.g., seminar series within and across research groups, monthly research group meetings dedicated to discussion of research proposals, grant activity, impact, etc.). Researchers who embark on research degree supervision for the first time complete an induction programme before being eligible to join supervision teams. In close alignment with established good practice across the sector, and compliant with the QAA Code of Practice, they join supervisory teams with at least one other experienced supervisor to maximise mentorship opportunities. The recruitment of postgraduate research students to IRESE has been supported by a portfolio of funding arrangements across both universities – for example, 13 PhD students from the '125 Scholarship' competitive scheme (marking the 125<sup>th</sup> anniversary of the founding of Bangor University), and the Vice Chancellor's Doctoral Awards and Research Innovation Awards at Cardiff Met. A recent initiative to introduce an internal bidding round for two sets of part-time fee bursaries per year, each for a maximum of five years, has also been successful. At present, 52 members of IRESE are engaged in PhD supervision.

Enrolment of PhD candidates within IRESE during the current REF cycle is shown below (as FTEs):

Year	2008/09	2009/10	2010/11	2011/12	2012/13	2103/14
PhDs	60.5	52.5	61.5	63.0	56.5	61.5

Bangor University is the only HE institution in Wales with research degree provision in sport and exercise to be a constituent member of an ESRC-accredited Doctoral Training Centre. Seven PhD students have been funded by the European Union through Knowledge Economy Skills Scholarships. Other external funding for PhD students has been secured from AXA Insurance, Commonwealth Universities Scholarships, the Egyptian Education and Cultural Bureau, England and Wales Cricket Board, England Netball, the Libyan Embassy, the UK's Ministry of Defence, the national governments of Kuwait, Portugal, Saudi Arabia and United Arab Emirates, Sport Wales, Welsh Athletics, Coleg Cymraeg Cenedlaethol, and the Welsh (Assembly) Government. Self-funded postgraduate research students have also been recruited internationally from China, Iran, Iraq, Israel, Kuwait, Saudi Arabia, Singapore, and Switzerland. All IRESE PhD students are encouraged and funded to present their research at international conferences and many of them

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have won prestigious awards: **Diment** (1<sup>st</sup> prize, PhD award, Rank Prize Funds 2012), **Law** (“Jewels of the Crown” Young Investigator Award, British Society of Rheumatology 2011; best postgraduate oral presentation, British Association of Sport and Exercise Sciences 2009), **Lawley** (2<sup>nd</sup> prize, best oral presentation, Hypoxia conference 2012), **Mitchell** and **Lane** (British Psychological Society’s Division of Sport and Exercise Psychology Award for Outstanding PhD Thesis 2010, and Doctoral Thesis of the Year 2013, respectively), **Poynor** (1<sup>st</sup> prize, Draper’s Medal for outstanding research 2012), and **Wadey** (Association for Applied Sport Psychology Doctoral Dissertation of the Year Award 2011).

### d. Income, infrastructure and facilities

Since 2008, the research infrastructure has been strategically enhanced. Also, joint provision of research facilities has been enabled with other parts of Bangor University’s College of Health and Behavioural Sciences and the Cardiff School of Health Sciences (e.g., a functional magnetic resonance imaging unit, a motion analysis laboratory, and -80° freezers for the storage of human tissue).

The combined research activities of IRESE are supported by major capital investment by both universities. Since 2008, in excess of £1.4 million has been committed to maintain and enhance the infrastructure, facilities and research-related equipment. These new facilities include a cardiovascular research laboratory (~£250k), Vicon F40 12 camera system and Optotrak Certus System S-type (£186k), two neuromuscular strength and conditioning testing laboratories (£45k plus investment from England Rugby), the upgrading of an existing Environmental Chamber (£65k), a new Altitude Chamber (£80k), Vivid E9 Ultrasound system (£75k), and two CODA Sport CXS Sensor Units and System (£40k). Since 2010 the Welsh Centre for Tourism Research has been housed in a £20 million multi-purpose facility at the Llandaff Campus in Cardiff. All of this adds to the existing high quality facilities and equipment already in place for the delivery of research from RAE 2008. Finally, as part of the Estates strategies across campuses in Bangor and Cardiff, a total in excess of £13 million has been committed to strategic development and enhancement in support of the main research missions of the Universities over the next REF period.

Together, the facilities to support research include: nine exercise physiology laboratories; two environmental chambers; a dual energy X-ray absorptiometry laboratory; an underwater weighing laboratory for body composition assessments; a cell biology laboratory; a biochemistry laboratory; a 12-camera motion analysis laboratory; three motor control and learning laboratories; nine performance analysis and psychology laboratories; a psychophysiology and electrocardiography suite; and a social psychology/live-in laboratory. Furthermore, there are two biomechanics laboratories as well as the National Indoor Athletics Centre in Cardiff, which was purpose-built to accommodate biomechanics research.

Research income has been secured from different sources. The EPSRC-funded SESAME project, which began in 2006, was completed successfully in 2010 by **Irwin** and **Kerwin**. In total worth £3.7 million over five years, it yielded £461k to IRESE during the present REF cycle. More recently, **Walsh** and **Hardy L**’s teams have collectively secured over £1.7 million from the Ministry of Defence since 2010 to investigate: the influence of trainers’ coaching and leadership skills on recruit retention and performance (£45k, 2008; £95k, 2010); the effects of a fourth meal on immunity and physical performance in soldiers (£86k, 2010); the effects of Vitamin D status on health and performance in military personnel (£1.35 million, 2013); and the cognitive neuroscience of mental resilience (£168k, 2013). **Walsh** and **Oliver**’s work on saliva diagnostics for hydration detection was funded by HydraDX Ltd (£210k, 2010/11). Since 2008, **Beattie**, **Hardy L**, and **Hardy J** have built up a very strong relationship with the England and Wales Cricket Board (£166k), which

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has funded a succession of three PhD students who have conducted high-quality research on mental toughness, talent selection, and group dynamics. Recent collaborations with the School of Psychology, the Institute of Medical and Social Care Research, King's College Hospital London, Queen Margaret University – Edinburgh, and Swansea University, have also recently secured £8.62 million for projects on exercise rehabilitation for arthritis, dementia, and kidney disease (**Backx, Lemmey, Macdonald, Shave, Thom**).

Other projects on cold protection clothing by **Oliver** and **Walsh** have been funded by Blizzard Protection Ltd (£130k, 2009-2011). In 2013, **Hayes** (with Tipper at the University of York) was awarded an ESRC grant (£348k) to continue IRESE's long-standing expertise on emotions, and an AHRC project was funded in collaboration with the Royal College of Music (£31k, 2013, **Wasley** – grant number AH/K002287/1). In 2011, IRESE also secured an AXA Insurance funded PhD studentship (€120k, **Nio**), which continues IRESE's work in cardiac physiology and health. In 2013, an international collaborative research project was funded by the Norwegian Research Council for a three-year multi-partner study led by the Arctic University of Norway at Tromsø about winter tourism and events worth a total of £1.7 million – the largest single award by that Research Council for a study on tourism (**Pritchard** – contract number 220925). Also in 2013, the publication of the report entitled "A comparison of the biographies of GB serial medal and non-medalling Olympic athletes" (**Barlow, Evans, Hardy L, Woodman**) marked the completion of the first major externally-funded IRESE project. The project was a collaborative research project funded by UK Sport (in excess of £600k), led by **Hardy L**, which involved 14 researchers from 6 universities worldwide.

The sports biomechanics research group (**Bezodis, Gittoes, Irwin** and **Kerwin**) has continued to generate external funding for its work. In addition to the SESAME project, another significant on-going series of projects is linked to research on playing surfaces for certain team sports. Originating from a multi-agency collaborative project with Liverpool John Moores University, the University of Cologne and the University of Valencia, which was completed in 2010 (£250k), the initial study was about fatigue testing. This was followed by the International Rugby Board-funded 'One Turf Concept' investigation (£120k) and most recently by a Charnwood Dynamics-funded 'One Turf' project (£30k) both jointly led by **Irwin** and **Mitchell**. Other external funding for research has been secured by **Irwin** and **Bezodis** from the Sports Council for Wales/Sport Wales on biomechanical analysis of elite sprinting, spinal loading and physical preparation, together yielding £104k.

IRESE researchers also have the opportunity to bid internally for funding to support staffing, major capital investment, equipment, and consumables twice a year. Supported by the different arrangements of each university, the combined effect of this has been the recruitment of two full-time Research Assistants (RAs), and two part-time RAs, and £57k of additional equipment and consumables including preliminary/preparatory work to enhance grant capture and research projects.

<b>e. Collaboration and contribution to the discipline or research base</b>
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Collectively, members of IRESE make a major contribution to the discipline. The extent of this contribution and the associated collaborations is a particular strength of this submission and adds value to the shared research culture of IRESE.

There is extensive involvement in Editorial Board activities across many of the sector-leading journals, 21 IRESE members have fulfilled key roles during the period and most continue to do so:

- i. **General / Managing Editors:** *International Journal of Performance Analysis of Sport* (**O'Donoghue**), *Leisure Studies* (**Fleming**) and *The Sport Psychologist* (**Hanton**).

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- ii. **Section/Associate Editors:** *Sports Biomechanics* (**Irwin**), *Journal of Applied Sport Psychology* (**Callow, Evans, Hardy J**), *Journal of Sport and Exercise Psychology* (**Hardy L**), *Journal of Sports Sciences* (**Walsh**), *European Journal of Sport Science* (**Hardy L, Thomas**), and *The Sport Psychologist* (**Woodman**).
- iii. **Editorial Boards / Editorial Advisory Board members:** *Annals of Tourism Research* (**Pritchard**), *British Medical Journal* (**Cooper**), *Frontiers in Cognition* (**Hayes**), *Journal of Sports Science and Medicine* (**Neil**), *Journal of Sports Sciences* (**Hanton, Irwin, Markland**), *Pamukkale Journal of Sport Sciences* (**Beattie**), *Psychology of Sport and Exercise* (**Woodman**), *Qualitative Research in Sport, Exercise and Health* (**Brown**), *Science et Motricité* (**Hardy L, Woodman**), *Sports Medicine: Science and Practice* (**Macdonald**), and *The Sport Psychologist* (**Evans, Roberts**). Though not dedicated to Sport and Exercise Sciences, Leisure and Tourism, *Gwerddon* (a multi-disciplinary Welsh-medium journal) has **Jones C** on its editorial board.

Two senior researchers hold two of the most prestigious peer review roles. **Hanton** is a member of the Economic and Social Research Council Peer Review College and **Hardy L** is a member of the REF Sub-panel 26. In addition to these, eleven other staff undertake peer and expert reviewing for funding agencies and Research Councils: Arts and Humanities Research Council (**Irwin**), AXA (**Shave**), Biotechnology and Biological Sciences Research Council (**Kubis, Walsh**), British Academy (**Callow, Hardy L**), British Council (**Hardy L**), British Society of Veterinary Cardiology (**Shave**), Czech Science Foundation (**Woodman**), Dunhill Medical Trust (**Shave**), Economic and Social Research Council (**Cooke, Fleming, Hardy L, Woodman**), Engineering and Physical Sciences Research Council (**Irwin**), European Commission Marie Curie Fellowships (**Cooke**), European Society of Hypertension (**Shave**), Health Technology Assessment Programme (**Lemmey, Thom**), Heart Research UK (**Shave**), Leverhulme Trust (**Evans, Hardy L**), Medical Research Council (**Kubis, Thom**), Arthritis Research UK (**Lemmey, Thom**), National Institute for Health Research (**Lemmey**), Social Sciences and Humanities Research Council of Canada (**Evans, Hardy L**), South African MRC (**Thom**), and Wellcome Trust (**Kubis**).

During the present REF cycle, members of IRESE have been recognised by the academic community through awards and other indicators of scholarly esteem: British Psychological Society's Distinguished Contribution to Sport and Exercise Psychology award (**Hardy L**, 2011), British Association of Sports and Exercise Sciences Emerging Research Medal – Sport and Performance Division (**Irwin**, 2009), European Athletics Innovation Award – Technology (**Bezodis**, 2010), British Association of Sport and Exercise Sciences best oral presentation (**Beattie**, 2008) and International Society of Biomechanics in Sports – Geoffrey Dyson Award (**Kerwin**, 2013).

Some IRESE staff have had a central influence on the strategic direction of subject associations / professional organisations: Association for Tourism in Higher Education (Executive Committee Member – **Pritchard**), International Association for the Philosophy of Sport (President – **Jones C**), International Society of Biomechanics in Sports (Vice-President – **Irwin**, Board Member – **Bezodis**), Leisure Studies Association (Chair – **Fleming**), and British Psychological Society Division of Sport and Exercise Psychology (Committee member – **Roberts**). **Cooper** is also an Elected Fellow of the Royal Statistical Society and a Fellow of the Institute of Mathematics and its Applications. **Walsh** (2012) gave a tutorial lecture with Lawrence Armstrong at the American College of Sports Medicine. Other IRESE members have also been centrally involved in the organisation of academic conferences: Annual London Marathon Science and Medicine Conference (**Shave**), Scientific Committee for the ICSEMIS 2012 Pre-Olympic Congress (**Jones R**), Scientific Committee for the World Congress of Performance Analysis of Sport (**O'Donoghue**).

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There continues to be a significant presence of IRESE researchers at many subject-focused research conferences.

Keynote and plenary lectures/presentations have been delivered at annual conferences of some of the learned societies already listed in this section (**Bezodis** – International Society of Biomechanics in Sports, 2012; **Fleming** – Leisure Studies Association, 2011; **Jones C** – International Association for the Philosophy of Sport, 2013). Other keynote contributions have been made to: Annual Conference of the German Sport Medicine Society (**Hardy L**, 2008); Annual Conference of the North American Society for Sport Psychology and Physical Activity (**Hardy L**, 2011), International Conference on Children's Spirituality (**Brown**, 2012), International Sport and Exercise Nutrition Conference (**Walsh**, 2012, 2013), CANTATA2 Tourism and Innovation Project Conference (**Haven-Tang**, 2011), European Congress of Sport Psychology (**Hanton**, 2011), International Conference on Destination Branding and Marketing (**Pritchard**, 2009), International Convention on Science, Education and Medicine in Sport (**Walsh**, 2012), and the Nordic Symposium of Tourism Research (**Pritchard**, 2010). All established IRESE researchers have also acted as external examiners for PhDs at many UK and international universities (e.g., Belgium, Canada, France, New Zealand, Norway, USA). IRESE researchers (e.g., **Fleming**, **Hanton**, **Hardy L**, **Jones R**, **Shave**) also serve as reviewers for the discipline's reader and professorial applications at universities in the UK (e.g., Birmingham, Edinburgh, Loughborough) and overseas (e.g., Copenhagen University, Seoul National University, University of British Columbia and Western Australia).

Formal external collaborations have been secured with other Universities in the UK and internationally. For instance, **Jones R**, **Pritchard**, **Shave** and **Woodman** were Visiting Professors at the Norwegian School of Sport Sciences, the University of Languages and Communication Milan, Cardiff Medical School, and University of Paris-Sud, respectively. **Fleming** and **Thom** are Honorary Research Fellows at Zhejiang University (China) and Newcastle University (Australia), respectively. **Jones E** also has formal links as a contributor to the emerging research cultures at Moi University, Kenya and the University of Klaipėda, Lithuania. In addition to the research collaborations identified in Section b and above, collaborations have been established and maintained with internationally excellent research groups such as: Birmingham; Cambridge; Exeter; Harvard; Hong Kong; Loughborough; Nice; University College London; Western Ontario, Windsor, and Alberta (Canada); Maastricht (Netherlands); University of Lisbon (Portugal); and Griffiths and Queensland (Australia).

In addition to the EPSRC funded SESAME and One Turf projects (see Section d), a major recent joint project between IRESE and SPIRE Hospital Cardiff has embraced the psychology of injury with clinical practice. Led by **Evans** (with **Hardy L** as Co-Investigator), the project was supported through the appointment of a full-time Research Assistant, and is concerned with the effect of psycho-social factors on patient recovery and functional outcome following surgery. The International Primate Heart Project, led by **Shave** and **Drane**, is another example of collaborative, cross-disciplinary and translational work. In collaboration with zoological collections and sanctuaries in Europe and sub-Saharan Africa, techniques from exercise physiology are being deployed to understand heart disease in great apes and to shed light on the evolution of the human heart.