Institution: University of South Wales

Unit of Assessment: C26

a. Overview

The Unit is located at the University of South Wales (USW) formed in April 2013 through a merger of the University of Glamorgan and the University of Wales Newport. Research is aligned to specialist themes. The Vascular Health Group (clinical theme) focuses on the pathophysiology of atherosclerosis and the vascular benefits gained through exercise and healthy eating across the human ageing continuum (led by **Bailey**). The Sports Performance Group (applied theme) takes a very practical approach to promoting physical activity amongst the adolescent performer through to improving performance of the elite athlete (led by **Mullen**).

b. Research strategy

i. Research strategy (2008-2014)

Strategic objectives: As planned in RAE 2008, strategies were put in place to build on distinctive strengths and address the weaknesses identified by Panel Feedback. A list of the Unit's primary objectives and corresponding outcomes is listed below:

Objective 1: Following SRIF-III infrastructure investment, develop additional vascular measurement capabilities to complement metabolic expertise in free radical metabolism.

***Bailey**, **Brugniaux, New & Fall** have implemented transcranial/Duplex ultrasonography/near infra-red spectroscopy/coagulometry providing new, exciting areas of high-quality research.*

Objective 2: Increase funding applications to research councils and other funding bodies.

*Members have increased their output of grant applications with successful bids secured by **Bailey**, **Mullen** and **Williams** including two prestigious research fellowships to **Bailey** (section d). There has been a marked increase in PI-led project grants to the Wellcome Trust, Alzheimer's Research UK, British Heart Foundation and Medical Research Council (cumulative bids >£3m by **Bailey**).*

Objective 3: Nurture an ambitious, collegial and vibrant research culture that enables all staff in particular ECRs to produce outputs and deliver projects at a level appropriate to their career stage.

*Four of the current members submitted are ECRs and have already developed an impressive research portfolio which stands testament to the intensive support/mentoring they have received. QR-funded attendance at meetings/research events to encourage dissemination and completion of outputs has been used strategically to support staff, from ECRs to senior researchers, in freeing time to undertake research, complete outputs, disseminate findings and develop grant applications. Personal development planning and mentoring within the established research themes (**Bailey** for Vascular/**Mullen** for Performance) support researchers' own ambitions.*

Objective 4: Develop postgraduate provision increasing the number of postgraduate students.

Doctoral completions have increased from 10 in 2008 (9.5 FTE) to 11 (7.0 FTE) equating to 1.6 completions/FTE vs. 1.1 completions/FTE in 2008, a relative increase of 50%.

Objective 5: Develop international collaborative networks to further enrich the research environment.

Members have collaborated with *internationally-renowned specialists to help develop individual research programs further enhanced through the strategic appointment of Visiting Professors.*

Objective 6: Continue to produce high-quality, peer-reviewed original research outputs.

*Unit members have published: **280 peer-reviewed articles** in the highest quality journals including Stroke, Circulation, Journal of the American College of Cardiology, Journal of Cerebral Blood Flow and Metabolism, Journal of Physiology, American Journal of Physiology, Journal of Applied Physiology, Chest, Free Radicals in Biology and Medicine and Diabetologia; **2 edited books**, **13 book chapters**, **2 invited editorials**, **275 national/international abstracts** and oral/poster presentations including **89 invited Keynote talks** at international research conferences.*

It is important to emphasise that these achievements have occurred in spite of the Unit losing several members (7.5/9.5 FTE) owing to re-appointment and/or retirement shortly following RAE 2008, stimulating additional growth within the speciality (see section **c**, part **i**).

ii. Research strategy (2014-2019)

Strategic objectives: Looking forward to the period 2014-2019, the Unit is committed to further developing strengths within established and emerging research themes with the overarching objective of becoming an internationally renowned research force, recognised for its world-class vascular and sports medicine work with translational impact that ultimately benefits society across

the spectrum of health and disease. The Unit will target the following objectives that relate to the primary "drivers" underpinning future research success with a concerted focus on the primary "upstream driver", increasing external research income.
Objective 1: Increase external research income
The multidisciplinary nature of our research integrating clinical with applied interests will present new and exciting grant funding opportunities (see developing initiatives and priority areas).
Objective 2: Expand on current infrastructure through the recruitment of research staff and development of novel analytical expertise.
Through increased external research income combined with strategic support under the aegis of the Research Institute of Science and Health, the Unit will appoint Research Assistants supported by postdoctoral students to increase experimental "throughput" and "analytical expertise".
Objective 3: Continue to develop postgraduate provision and increase support for ECRs including continuing professional development of existing research staff.
*Through increased research income combined with a comprehensive support infrastructure provided by the Research Institute of Science and Health informed by The Concordat (see **ci**).*
Objective 4: Continue to produce high-quality, peer-reviewed original research outputs.
Given our contemporary research themes, members at all stages of their careers will be actively encouraged/mentored/trained to publish in the highest quality journals.
Objective 5: Build additional capacity for delivering translational impact
Research conducted will be aligned with the Unit's impact agenda a priori. Members will be actively encouraged to engage with stakeholders and foster an outward-facing approach emphasising the wider significance and value of their research underpinned by the appropriate support.

Activities: The Unit will continue with its dynamic approach to carrying out research maintaining its collaborative spirit. With four ECRs (**Evans, Fall, Nelson, New**), a major focus will be on mentoring and staff development led by Thematic Group Leads (**Bailey** and **Mullen**), supported through the Research Institute of Science and Health (below). The majority of **Bailey** and **Mullen**'s time will be strategically allocated to writing funding bids in an attempt to secure income into the Unit and provide a sustainable platform to allow its membership to flourish.

Target setting-monitoring attainment: The research environment is genuinely collaborative and will maintain the weekly meetings and (almost) daily interaction observed between its members and Thematic Group Leads (**Bailey** and **Mullen**) to assist with strategic target setting and regular performance assessments/adjustments. In his capacity as Director of the Research Institute of Science and Health, **Bailey** conducts formal appraisals with Institute members (including those returned in the current submission) to further formalise targets and monitor performance. To enhance external research income (Objective 1), the Research Institute of Science and Health has allocated part of its central QR funding to "incentivise" the grant application process: from rewarding submission to rewarding success that will provide an even finer focus on target setting/performance monitoring.

Developing initiatives of strategic importance: A list of new and exciting topics that the Unit is keen to encourage given their strategic capacity for translational impact and future fundability with established collaborators include:
*Obesity/diabetes (**Bailey, Brugniaux, New, Ainslie, Richardson**):* Understanding why obesity/diabetes are risk factors for cognitive decline; cardiovascular/cerebrovascular benefits of programmed weight loss collaborating with Wales' only NHS weight management clinic.
*Neurodegenerative (**Bailey, Brugniaux, Ainslie**):* Physical activity/nutritional interventions as treatments for clinical depression and Alzheimer's Disease; mental stress and vascular dysfunction; biomarkers of sports concussion and link to cognitive decline/dementia.
*Surgical (**Bailey, Brugniaux, New, Fall**):* Physical activity/nutritional interventions (novel targeted antioxidant therapy) in an attempt to slow the rate of stenotic plaque development and aneurysmal dilatation delaying the need for surgical intervention in patients with established atherosclerotic disease; remote ischaemic preconditioning as a means of improving surgical outcome.
*Sports Medicine (**Mullen, Bailey, Brugniaux, New, Williams, Nelson**):* Promotion of health and wellbeing (including motor performance) through sports participation; biomarkers of sports injury; optimising return-to-play strategies.

Priority development areas: The Vascular Health Group will intensify its more recent focus on the ageing brain to explore why physical activity improves cerebrovascular function (see **Bailey** Impact Case Study 1 with collaborative input from **Ainslie** and **Richardson**) and the corresponding link to improved cognitive function, a priority area with excellent funding potential given its societal impact on health and welfare. This theme will continue to explore the pathophysiology and treatment of obesity and diabetes mellitus given emerging links with cognitive decline and suitability as clinical models of "accelerated vascular ageing". These projects, initially targeting the healthy elderly population, will provide a mechanistic basis justifying (the first) exercise RCT in follow-up studies with dementia patients taking a multi-disciplinary approach requiring close collaboration between physiologists, biochemists, neuroimaging methodologists, cognitive psychologists, exercise scientists and clinicians. The Group will continue to develop novel measurement capabilities with the potential to serve as vascular ageing "biomarkers" (eg **Bailey**: development of novel spin traps for targeted free radical detection in biological tissues, and **Fall**: novel haemostasis biomarkers to explore the functional link between free radicals and activated coagulation). Members are already working with dementia clinicians to generate preliminary data (eg **Bailey** with Dr Robin Corkill, Consultant Neurologist, University Hospital of Wales) to optimise funding bids to Horizon 2020, the Research Councils (Biotechnology and Biological Sciences Research Council, Engineering and Physical Sciences Research Council) in addition to charitable foundations (Wellcome Trust, British Heart Foundation, Stroke Association, Diabetes UK, Alzheimer's Research UK) and Government bodies (National Institute for Social Care and Health Research). The Unit will also explore other sources of funding, including industry (eg pharmaceutical companies such as Pfizer Ltd to examine the neuroprotective antioxidant bases of acetazolamide and sildenafil based on **Bailey's** recent works). The Sports Performance Group intend to add a more clinical dimension to their mostly applied research portfolio through the rapidly emerging Sports Medicine theme supported by extensive collaborations with elite teams, coaches and sports medicine specialists. Priority areas will involve a continuing focus on the mechanisms underpinning anxiety effects on motor performance (**Mullen**), novel training methods including intermittent hypoxia training as a legal means of improving sports performance (see **Brugniaux** Impact Case Study 2) and early (subclinical) prediction and prevention of injury through novel biomarker development (**Nelson**).

c. People

i. Staffing strategy and staff development

Staffing policy: The Unit has experienced considerable growth in the number of research active staff through the appointment of, 2009: **Brugniaux** (permanent SL)**,** exercise physiologist with expertise in intermittent hypoxia training; **New** (permanent SL and ECR), former PhD student of **Bailey**'s with expertise in nitric oxide metabolism and vascular function; 2010: **Mullen** (permanent Professor of Elite Performance & Coaching), sport psychologist with expertise in stress and performance; **Nelson** (permanent L and ECR), Biologist with expertise in regenerative medicine interested in the potential for cartilage repair in osteoarthritic knees and 2013: **Evans** (fixed appointment as SL and ECR), former PhD student of **Bailey**'s with expertise in nitric oxide metabolism and vascular function & **Fall** (fixed appointment as SL and ECR), former PhD student of **Bailey**'s with expertise in free radicals and haemostasis. Two additional fixed-term appointments have been made in 2013 to two overseas Professors in recognition of past (published), present and planned collaborative work conducted with **Bailey**. These include **Richardson**, University of Utah, exercise physiologist with expertise in skeletal muscle function and **Ainslie**, University of British Columbia, exercise physiologist with an interest in cerebrovascular function. These strategic appointments have resulted in the replacement of non-research active staff by established or promising researchers who complement and expand on the two established research themes (Vascular Health and Sports Performance) and develop new ones (eg Sports Medicine). This continues to build on the staffing strategy outlined in the 2008 RAE submission and aligns with the University's priority areas of supporting applied research. Newly appointed researchers are assigned an experienced mentor and undergo regular reviews with the Thematic Group Leads (as previously outlined). The University provides internal development opportunities for researchers by continually training staff on good practice in research supervision (**Bailey, Mullen**), for example, and by working closely with a network of other HEIs to provide researchers with access to further opportunities to develop their skills. The Effective Researcher, Grad Schools, Welsh Crucible (to which **Brugniaux** applied this year), Leadership In Action and Welsh Academic Leaders via the

Leadership Foundation for Higher Education (attended by **Bailey** this year) are good examples of collaborative provision utilised by staff. It is anticipated that within the next 5 years the appointments made during the current assessment period will have successfully supervised at least 5 PhD students, with **Brugniaux**'s appointment to Reader further demonstrating the continual career development of researchers and additional leadership capacity.

Research fellowships: **Bailey** is the recipient of a European Fellowship Award (visiting Research Professor) by the Laboratoire Chimie Provence (funded by Université de Provence, Université de la Méditerranée, Université Paul Cézanne and the Centre National de la Recherche Scientifique, France) to promote formal collaboration between Profs S Pietri and M Culcasi who are acknowledged world-leads in free radical metabolism (Institute of Radical Chemistry, Aix-Marseille Université, France). Application of novel spin traps has provided unique insight into the fundamental mechanisms associated with exercise-induced free radical formation (REF 2, **Bailey** and **Evans**). **Bailey** has also been awarded a William Evans Visiting Research Fellowship at the University of Otago in New Zealand (Dep^{t} of Medicine) to pursue collaborative research into the vascular benefits associated with remote ischaemic-preconditioning. Both fellowships continue to enrich the research environment providing access to additional equipment/expertise and helping communicate research activities to a global audience.

Equality of opportunity and career development: The egalitarian sense of collegial community remains a defining feature that has enabled the Unit to remain productive through considerable changes observed during the review period. The University has been awarded the ***HR Excellence in Research Award*** by the European Commission for its work to implement the Concordat to Support the Career Development of Researchers. Together with its membership of the Athena Swan Charter and Women in University Mentoring Scheme that support equality and diversity, this emphasises the University's ongoing commitment to meeting the needs of researchers and improving opportunities for future career development.

Research governance: The Faculty observes the University and Faculty Standard Operating Procedures and has produced a set of regularly updated information leaflets on all areas of research governance/good research practice that are made available to staff and published on the Faculty Intranet. The Faculty Ethics Champion holds regular Faculty Ethics meetings with Unit representation (**Brugniaux** and others) to consider ethics/governance issues including research projects. In recognition of the importance of high quality research funding applications and publications, the Faculty provides a peer review panel of experienced researchers to provide feedback and mentoring for those considering applying for funding or writing for publication.

ii. Research students

Studentships and funding: The Unit has successfully supervised ***11 PhD awards*** over the review period with an additional 16 students currently being supervised. A breakdown of those students registered and actively pursuing their research programme is outlined in the table below:

	2008-09	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-**
FTE	1.0	0	5.0	4.5	6.0	3.5

Several of our students led by **Bailey** are qualified doctors undergoing vascular surgical training. Funding has been obtained from internal competitive awards (eg University Research Investment Scheme) and industry (eg Huntleigh Healthcare). Two prestigious JPR Williams Fellowships were each awarded to **Bailey** and **Mullen** to investigate the detection and prevention of rugby union injuries providing an opportunity to develop new and exciting research directions including concussion, hamstring and cervical spine injuries, providing additional impetus to the (emerging) Sports Medicine research theme. Further involvement with elite sports teams and high-profile research expeditions has provided students with unique experiences that often involve interaction with broadcast media further developing their communication skills.

Research culture and support: The Faculty has a vibrant student community that encourages students from all disciplines to meet regularly, share ideas and present their research; its Research

Student Coordinator takes responsibility for the quality of the student experience and for upholding QAA guidelines. All doctoral research is closely aligned to existing programmes of research within the Unit, to further help develop research capacity and promote research excellence. Students typically undertake a low level of undergraduate teaching to develop further essential professional skills and are encouraged to attend and present at suitable conferences including the annual meeting of the Physiological Society funded by Travel Awards. Research student progress is formally monitored by the Research Committee which supports the research team, appoints examiners, and disseminates good practice in the delivery of research degrees to current and future supervisors. The Faculty offers a variety of research training and support programmes that are overseen by the Research Training Coordinator. This includes the recent development of a 60 credit M level Post Graduate Certificate in Research (PGCR), which provides PhD students with a sound framework for developing their research. The PGCR is delivered in two stages; a 40 credit research methods module and 20 credit research training programme aimed at promoting career development. A Research Student Voice Representative (including **Bailey**'s PhD student, D Hodson) is also based within the Faculty, who has input to strategic committees at faculty and university level. Furthermore, there have been further significant developments in relation to research training and support for research students to enhance employability, for example, regular research student forums, with student presentations and invited guest speakers, aimed at developing transferable employability skills (over and above research methods training). Sessions include applying for grant funding, conference presentation skills, dealing with the media and political awareness training which is especially relevant for our Unit. An annual public, recorded mock PhD viva is also organised by the Faculty allowing students to attend a staged defence to help demystify the doctoral viva process. Students are actively encouraged/supported (based on the underlying strategic benefits) to join local research interest groups/networks (*eg*. Older People and Aging Network, Stroke Research Network-OPAN, Wales Dementias and Neurodegenerative Diseases Research Network and Cardiovascular Research Group Cymru). Indeed, as a consequence of this "strategic" scholarly activity, one of **Bailey**'s PhD students (Mr CJ Marley) has been appointed as a P/T Stroke Association Research Coordinator to OPAN.

d. Income, infrastructure and facilities

Research funding: Over the census period, £128k has been secured from competitive sources including UK-based charities (**Mullen**, Leverhulme Trust), government bodies (**Williams**, Cwm Taf Health Board) and the European Union (**Bailey**, Danish Cardiovascular Research Academy) representing ~30% increase over that secured during RAE 2008. Competition for funding within the discipline has become increasingly fierce; members are actively encouraged to apply for grants from a wide range of sources. Indeed, the last 12 months alone has seen **Bailey** submit >£3m to Wellcome Trust, Alzheimer's Research UK, British Heart Foundation and Medical Research Council as PI. Though the feedback was extremely encouraging (with bids reaching Panel consideration), they ultimately fell short of the funding threshold. Members have been awarded 16 Travel Awards from the Physiological Society and 2 prestigious JPR Williams Fellowships have each been awarded to **Bailey** and **Mullen**. It is noteworthy that much of the Unit's international research has been supported by grants secured by the "Home Institution", even though Unit members (notably **Bailey**) were key contributors during the grant application process.

Funding strategy: It has been the Unit's intention to encourage members to collaborate and publish with eminent specialists in their respective fields. With an impressive array of measurement capabilities, members are now in a realistic position to lead major grant applications to a variety of funding agencies including industrial sources as previously outlined. Looking forward, concerted efforts will be dedicated to writing funding bids led by Bailey and Mullen in an attempt to secure income into the Unit and further enhance its vitality and sustainability.

Infrastructure and facilities: Since RAE 2008, the Sport, Health and Exercise Sciences Research Unit has moved to a different campus and is now housed in the Alfred Russell Wallace Building (http://estates.glam.ac.uk/glyntaff-expansion/). This has vastly improved the research environment providing staff with access to specialist purpose-built exercise science laboratories and complementary analytical infrastructure offered by the allied sciences of chemistry, biology and forensic science including HPLC, GC-MS-MS and NMR. The University has also invested £3.7 million in specialist sports facilities and purpose-built laboratories that constitute the Glamorgan

Sport Park housing specialist hardware (CODA 3-D motion analysis system, ASL mobile-eye and force platforms) which the Sports Performance membership takes full advantage of (http://sport.glam.ac.uk/test/glamorgan-sport/). All staff and research students have high-quality accommodation with individual networked desktop PCs installed with standard and specialist software and receive full professional IT support.

e. Collaboration and contribution to the discipline or research base

i. Collaborations

A strategic development in the review period is the increase in collaborative research, both national and international. This is actively encouraged by the University who have generously provided members with leave to foster collaborative research projects. All collaborations listed below have without exception resulted in published outputs, grant applications, exchange visits and contributed extensively to analytical technique development within the (home) Unit.

Vascular Health Group (Bailey, Evans, Fall , New, Richardson, Ainslie)

Free radical detection: Prof S Pietri & M Culcasi (University of Aix-Marseille, France), Prof J McCord (University of Colorado Denver, USA), Prof C Cooper (University of Essex, UK), Profs I Young & J McEneny (Queen's University Belfast, N. Ireland) & Prof G Davison (University of Ulster, N. Ireland). ***Vascular endothelial function:*** Profs R Richardson, A Donato & W Wray (University of Utah, USA), Prof P Wagner (University of California San Diego, USA) & Profs J Halcox/P James (Cardiff University), Profs U Wisløff/J Hoff (Norwegian University of Science and Technology, Norway) & Prof J Allen (Duke University, USA). ***Haemostasis:*** Prof PA Evans (Swansea University, UK). ***Neuroimaging:*** Profs R Wise & D Jones (Cardiff University Brain Research Imaging Centre, UK), Prof T Steiner (University of Heidelberg, Germany), Prof M Knauth (University of Göttingen, Germany) & Prof D Janigro (Cleveland Clinic Foundation, USA) & Prof R Edden (Johns Hopkins University, USA) ***Cognitive function:*** Prof J Hall, K Graham & A Lawrence (Cardiff University, UK). ***High-altitude:*** Prof P Bärtsch & H Mäirbaurl (University of Heidelberg, Germany), Prof U Scherrer (University Hospital Bern, Switzerland), Prof C Sartori (Botnar Centre for Clinical Research, Switzerland), Prof M Villena (Bolivian Institute of High Altitude Biology, Bolivia), Prof E Swenson (University of Washington, USA), Prof C Imray (University Hospitals Coventry and Warwickshire NHS Trust), (Honorary) Prof J Milledge (University College London, UK) & Prof C Lundby (University of Zurich, Switzerland). ***Cerebral haemodynamic function:*** Profs BK Pedersen, K Möller, B Saltin & N Secher (University of Copenhagen, Denmark), Prof S Ogoh (Toyo University, Japan), Prof R Panerai (University of Leicester, UK), Profs P Ainslie/A Sheel/N Eves (University of British Columbia, Canada), Dr W Colier (Radboud University, The Netherlands), Prof P Raven (University of North Texas Science Health Center, USA) & Profs Y Tzeng/J Cotter (University of Otago, New Zealand). ***Surgical research:*** Prof M Lewis & Mr M Rocker (Royal Glamorgan Hospital, UK) & Dr W Ford (Cardiff University, UK).

Sports Performance Group (Mullen, Brugniaux, Nelson, Williams)

Stress and performance: Prof L Hardy (Bangor University, UK) & Dr C Harwood (Loughborough University, UK). ***Hypoxia:*** Prof M Poulin (University of Calgary, Canada), Profs J Richalet/R Mounier (University of Paris, France), Prof V Pialoux (University of Lyon, France) & Dr G Foster (University of British Columbia, Canada). ***Cartilage repair:*** Prof C Archer (Swansea University). ***Respiratory training:*** Prof L Passfield (University of Kent) & Prof S Kotecha (Swansea University).

ii. Contributions to the discipline or research base

National/International leadership: **Bailey:** Stroke Steering Group Member to the Older People Aging Research Network (2012-), Cardiovascular Physiology Lead to the Cardiovascular Research Group Cymru (2010-), British representative to the European Hypoxia Society Steering Committee (2010-), University Representative to The Physiological Society (2009-), Lead of the Oxidative Stress Interest Group, American College of Sports Medicine (2008-), Research Leader to research expeditions (Mt Elbrus 2008 & Mt Sajama 2012); **Mullen:** Chair, British Psychological Society (Division of Sport and Exercise Psychology), Football Association Psychology Advisory Group Member; **New:** BASES HoD Representative; **Ainslie:** Committee Member to Canadian Institutes of Health Research Movement and Exercise (2012-) & British Columbia Network for Aging (2009); Research Leader to research expeditions (Mt Everest 2008 & 2012); **Richardson:** Advisory Board,

Dep[t] of Exercise, Sport, and Health Sciences, University of Milan, Italy, Geriatric Research, Education and Clinical Center National Associate Directors for Research Committee, USA.

Editorial positions: **Bailey:** Editorial Board Member to International Journal of Vascular Medicine (2011) & Extreme Physiology and Medicine (2011); Editorial Adviser to Clinical Science (2008). **New:** New Trends in Sport Science. **Ainslie:** Associate Editor to Applied Physiology, Nutrition and Metabolism (2012). **Richardson:** Editorial Board Member to Journal of Applied Physiology (2009) & American Journal of Physiology-Heart and Circulatory Physiology/Regulatory, Integrative, and Comparative Physiology (2011).

Examination of Doctorates and HEI consultancies: During the review period, Unit members have externally examined ***34 PhD theses*** with **Bailey** serving as External Adviser for validation of the Mountain Medicine Course (University of Leicester, *c/o* Dr P Barry).

Invited keynotes: During this period, members have been invited to give ***68 invited keynotes*** at international meetings. Selected examples include, **Bailey:** International Conference on Environmental Ergonomics (2013 Queenstown, New Zealand), International Symposium on High-Altitude Tolerance (2013 Heidelberg, Germany), World Congress on High Altitude Medicine and Physiology (2012 Taipei, Taiwan & 2010 Arequipa, Peru), American College of Sports Medicine (2012 San Fransisco/2011 Denver & 2010 Baltimore, USA), International Symposium on Pulmonary Function in Health (2011 Giessen, Germany), Canadian Society for Exercise Physiology (2012 Regina, Canada), Oxygen 2011: HypoxiaNet (2011 Davos Switzerland) & Society for Free Radicals in Biology and Medicine (2009 Santiago, Chile); **Brugniaux:** 1st International Symposium of High-Altitude (2008 Granada, Spain); **Ainslie:** International Hypoxia Conference (2013 Alberta, Canada), CHEST (2011, Hawaii USA) & Physiological Society (2010 Durham, UK/2009 Manchester, UK); **Richardson:** American College of Sports Medicine (2013 Indianapolis/2011 Denver & 2008 Indianapolis, USA).

Peer review for research councils, journals and publishers: Members have reviewed ***grant applications*** for American Heart Association, Biotechnology and Biological Sciences Research Council, British Heart Foundation, UK Sport, British Council, Canadian Institutes of Health Research, National Institute of Health (USA) & Wellcome Trust. Members have reviewed ***journal articles*** for American Journal of Physiology, American Journal of Respiration and Critical Care Medicine, Brain, Brain Research, Circulation, Circulation Research, Experimental Physiology, Hypertension, International Journal of Sport and Exercise Psychology, Journal of Applied Physiology, Journal of Cerebral Blood Flow & Metabolism, Journal of Clinical Investigation, Journal of Physiology, Journal of Sports Sciences, Lancet, Stroke and Physiological Reviews.

Conference organisation: Unit members have served as Panel Chairs/Organising Committee Members at several international meetings. Notable examples include, **Bailey:** International Conference on Environmental Ergonomics (2013 Queenstown, New Zealand), American College of Sports Medicine (2012 San Fransisco/2011 Denver & 2010 Baltimore, USA); **Mullen:** Chair of scientific committee for British Psychological Society (Division of Sport and Exercise Psychology) Annual Conference (2013); **Ainslie:** Ultrasound summer school (2010 Liverpool John Moores University, UK, Canadian Society for Exercise Physiology (2012 Regina, Canada) & New Zealand Physiological Society Meeting (2008).

Scholarly awards, prizes and fellowships: **Bailey:** Winner of the Cwm Taff Health Board Annual Research & Development Conference (Nov 2012), Young Investigator Award: (Hypoxia: Monte Verità, Ascona, Switzerland), Fellow of the American College of Sports Medicine (2011-)/Pulmonary Vascular Research Institute (2010-)/Royal Society of Chemistry (2008-), European Fellowship Award (2009-) & William Evans Visiting Research Fellowship (2013-); **New:** Young Investigator Awards (Sports Medicine Welsh Institute of Health & Exercise Science & Birmingham Medical Research Expeditionary Society**,** 2009); **Brugniaux:** Fellow of the Higher Education Academy (2013); **Ainslie:** Canada Research Chair CIHR (2011), Young Investigator Awards (Canadian Society for Exercise Physiology 2010 & Physiological Society 2008).