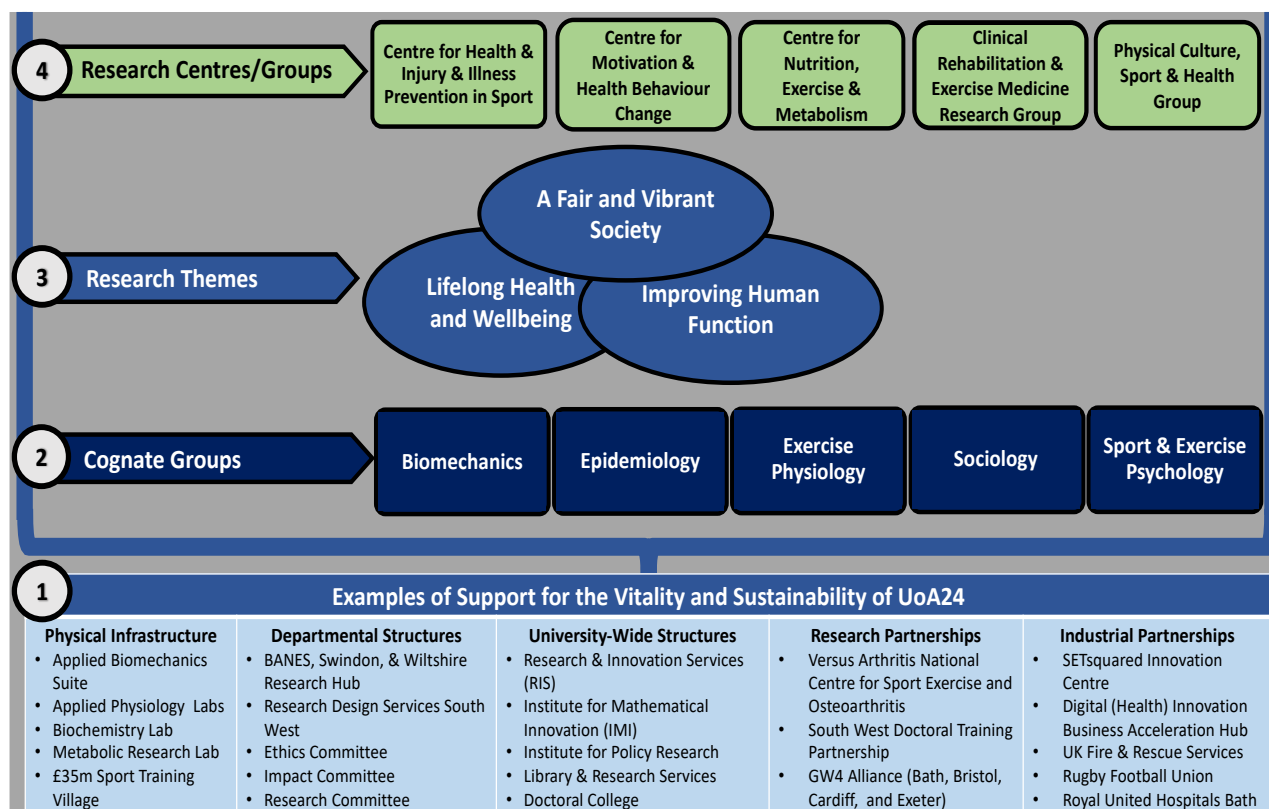


Institution: University of Bath
Unit of Assessment: C24 - Sport and Exercise Sciences, Leisure and Tourism
<p>1. Unit context and structure, research and impact strategy</p> <p>Unit Context</p> <p>The terms <i>sustained growth</i>, <i>maturity</i>, <i>expansion</i>, <i>vibrancy</i>, and <i>progression</i> are all synonymous with Sport, Health, and Exercise Science (SHES) at Bath. Following the inception of Sport and Exercise Science at Bath in 1999, considerable growth has occurred through each RAE/REF period. Such growth has been the result of the concerted, collaborative, and ambitious efforts of staff coupled with significant support, commitment, and investment from the University.</p> <p>UoA24 is based in the Department for Health, which is one of six Departments within the Faculty of Humanities and Social Sciences at the University of Bath. After operating for 15 months, the SHES unit comprised of only 5 Category A staff and was described by the RAE2001 panel as having “outstanding potential” within a “research intensive Faculty and University environment.” The unit was subsequently awarded Research Capability Funding from HEFCE to further develop SHES via investment in new staff, equipment, and laboratories. Based on the RAE2008 submission, Bath was considered to have progressed to “a research environment of international standing” and had more than doubled the number of staff returned (11 compared to 5 in 2001). In REF2014, the unit again doubled the total number of staff returned (n=22), grant income increased ten-fold to £4.26m, the total number of outputs more than quadrupled, and our impact was primarily judged as being world-leading (i.e., 73.3% assessed as 4*).</p> <p>During REF2021, the unit has continued to develop, mature, and diversify in strategically important areas. When compared with REF2014, our number of Category A staff has increased by 71% (22 to 37.7 FTE), our research income has grown by 76 % (£4.26m to £7.50m), the number of research doctoral degrees awarded has risen 160% (22 to 57), and research output has more than doubled (including 895 peer review papers, 19 books, and 109 book chapters). Throughout REF2021, our research objectives have been underpinned by a proactive approach to equality, diversity, and inclusivity.</p> <p>The efforts and ambition of the SHES unit have been matched by the University. During REF2021, the University has provided vast investment, including 18 new Category A staff appointments; more than £5.2m to extend, adapt, and improve the provision of our research space; and in excess of £1.3m for equipment, consumables, SHES-specific research support staff, and towards supporting research mobility.</p> <p>Reflecting our continued progress, Bath has been highly ranked in recent QS World Rankings for Sports-Related Subjects (e.g., 10th, 11th, and 7th in 2019, 2020, and 2021, respectively). Within this submission, the research structure, strategy, culture, infrastructure, achievements and contributions of our unit to the research base, economy, and society are outlined.</p> <p>Research Structure</p> <p>The organising structure for the delivery of our strategic priorities is depicted in Figure 1. In short, the Physical Infrastructure, Departmental and University-Wide Structures, and Research and Industrial Partnerships that provide the generative basis for our research activities are outlined in Point 1. Our research centres/groups that are interrelated units, yet with distinct aims and objectives, are described in Points 2 to 4.</p> <p>1. Support for Vitality and Sustainability: Our research activities are embedded within a thriving research environment comprising of outstanding facilities (e.g., purpose-built and well-equipped laboratories, £35m Sport Training Village), excellent administrative and specialist support structures (e.g., NHS Research Design Services South West; Research & Innovation Services), and established strategic research (e.g., GW4 Alliance of Universities comprising Bath, Bristol,</p>

Cardiff, and Exeter) and industrial partnerships (e.g., SETsquared - an enterprise collaboration between the universities of Bath, Bristol, Exeter, Southampton, and Surrey to support the growth of new businesses). This world-class set of facilities and infrastructure serve to nurture and support our thriving network of scientific cognate groups, thematic groups, and research centres/groups. The examples of supports identified in Figure 1 permeate through our different research groupings to cultivate an environment rich in vitality and sustainability, enabling all members of the unit to engage, thrive, and develop.

Figure 1 Schematic of the Structure and Supports for the Unit's Research and Impact Activities



2. Scientific Cognate Groupings: Research excellence within the traditional cognate areas of sport, exercise, and health sciences remain of vital importance to our research strategy. We have five cognate groupings. As evidenced by our output profile, each group continues to make world-class scientific contributions to their respective core disciplines. Across these groups, we have assumed notable leadership roles to support the sustained development and vitality of the core cognates including the hosting of national/international conferences, assuming leadership roles on learned societies, delivery of keynotes, and through housing discipline-specific internationally leading peer-review journals (e.g., *Journal of Sport & Exercise Psychology*; *International Journal of Sport Nutrition and Exercise Metabolism*). Excellence in our scientific discipline groupings also provides the required basis for our multi- and inter-disciplinary research activities to flourish.

3. Research Themes: During REF2021, we have extended our research themes to build the critical mass and interdisciplinary skills, knowledge, and methods required to coherently tackle societal challenges and complex research questions of national and global significance. These interdisciplinary themes provide a long-term strategy and map onto external priorities such as those identified by UKRI. The themes are: (1) Improving Human Function (i.e., with a focus on how to improve performance across a number of sporting, occupational, and clinical activities); (2) Lifelong Health and Wellbeing (i.e., focussing on developing health and wellbeing policies and programmes that target prevention and therapeutic treatments); and (3) A Fair and Vibrant Society (i.e., focussing on how to contribute to the development of vibrant, democratic societies that enable everyone to lead healthy and meaningful lives). It is important to note that these themes are fluid and dynamic, permitting us to collaboratively optimise our strengths to respond and shape

internationally-leading research agendas as well as to react to emerging priorities. All staff contribute to research in one or more of these themes. Each theme has a coordinator who reports to the Department Research Committee. Their role is to be alert to new interdisciplinary funding opportunities, organise unit-wide research meetings (i.e., our 'Research Rounds'), organise our Research Seminar programme, and oversee research activities designed to encourage interdisciplinary working (e.g., sandpit events). This is the forum within which all staff come together.

Since REF2014, we have also reconfigured our research theme approach to fully embed and make best use of the expertise, increased capacity, and diverse range of skills offered by the 'Physical Culture, Sport and Health' (PCSH) group. The merger between SHES and PCSH (previously based in the Department of Education) occurred early in 2014. A full integration of this group within a refined coordinated structure has been achieved during REF2021.

Embodying our research within these three broad research themes also provides the unit with a connected and integrated structure for the delivery of internationally-leading research, high quality outputs, interdisciplinary engagement, and impact focussed activities. This thematic approach provides a number of benefits including:

- Identifying and progressing interdisciplinary research synergies.
- Facilitating better engagement with external funders.
- Creating a structure around our strengths whilst emphasising the common ground between the diverse academics that comprise the SHES unit.
- Using language that makes sense to non-specialists as well as stakeholders and partners to help us better exploit current and emerging priorities and opportunities.
- Helping to rationalise the increased breadth within SHES in relation to public health and behavioural medicine.
- Focusing discussion on major problems of significance and to help staff to understand how they can use their skills to work collaboratively (rather than in isolation).
- Helping to share good practice. This is especially important for our large number of early career researchers (ECRs) who are looking for their first major grant.

4. Research Centres/Groups: Mapping directly onto our Research Themes are areas of strategic research activity that have developed, achieved sustained growth, been well-funded, and demonstrated excellence over several years. During REF2021, our areas of international excellence have been consolidated into three Research Centre's and two formal Research Groups. Similar to our research themes, these groups pull together a critical mass of disciplinary and interdisciplinary knowledge and skills, yet they provide a greater level of focus and coherence to our major programmes of research. These centres/groups operate on a more day-to-day basis. Each group has senior colleagues nominated to serve as directors and co-directors who report to the Department Research Committee.

Over 98% of the research submitted to REF2021 has been produced from the research centres/groups. For simplicity, we use the 'Centre/Group' level to present developments in research areas. Here, it is important to note that many researchers belong and contribute to more than one centre/group. Each staff member's primary affiliation is shown in bold; * denotes the centre/group lead(s) and co-lead(s); and ECRs are underlined.

Centre for Health and Injury and Illness Prevention in Sport (CHI²PS) (Stokes*, Bekker, Cazzola*, Cumming, Colyer, McGuigan, McKay*, Moore, Preatoni, Seminati, Williams, Wilson)

Research in CHI²PS draws from epidemiology, biomechanics, physiology, and psychology in order to study sports injuries to both understand the risk of getting injured in sport and to develop ways to reduce this risk. All with a view to ensuring that people can apply injury reduction approaches in the real world. Key workstreams relate to: (i) sport injury surveillance to identify the risk and patterns of injury and risk factors for injury; (ii) development and evaluation of the efficacy of injury prevention strategies; and (iii) investigating implementation of injury prevention in the real world. A key aim of CHI²PS is to create real-world impact through the co-production of knowledge with key partners. Support for research in CHI²PS during REF2021 includes grants from the Rugby Football Union (RFU), English Institute of Sport (EiS), International Rugby Board, and Premiership Rugby. Five strategic appointments were made during REF2021 to support this centre (Bekker, Cazzola, McKay, Preatoni, Williams).

Centre for Motivation and Health Behaviour Change (Standage*, Arnold, Cumming, Gillison*, Griffin, Lambert, McEwan, McKay, Moore, Rouse, Solomon-Moore, Townsend, Western)

This centre was established to consolidate our internationally-leading strengths in the areas of motivation and behaviour change. We have extended our work to also entail a broader interdisciplinary perspective on physical activity, sedentary behaviours, and objective health outcomes (including, integrating motivational perspectives within models that specify multiple levels of influence and across 24-hour periods). Work in the centre aims to: (i) better understand the motivation-related determinants of wellness, performance, and health; and (ii) to use these data to guide the development, refinement, and testing of novel behaviour-change interventions aimed at supporting and sustaining wellness, health, and functioning. During REF2021, external monies to support the centre's work has come from funders such as the MRC, the ESRC, the NIHR, and Versus Arthritis. The centre has hosted internationally-leading scholars, currently houses a leading international peer-review journal (*Journal of Sport & Exercise Psychology*) and organised the 2020 UK Society for Behavioural Medicine Conference. Research priorities align with UKRI agendas, and our work is co-produced with charities, public authorities, and sporting agencies to facilitate engagement and impact. Support from the University during REF2021 has come in the form of eight new appointments (Curran, Griffin, Lambert, McEwan, Rouse, Solomon-Moore, Townsend, Western).

Centre for Nutrition, Exercise and Metabolism (CNEM) (Thompson*, Betts*, Bilzon, Gonzalez, Griffin, Koumanov, Peacock, Turner, Walhin)

CNEM was established to further enhance our international reputation for research focussed on understanding the impact of nutrition and exercise on human physiology and metabolism. The ultimate application of this research ranges from prevention of chronic diseases such as type 2 diabetes through to the enhancement of training and performance for athletes. Recent research has been supported by the BBSRC, the MRC, the British Heart Foundation, and Lucozade Ribena Suntory. The Centre houses the international peer-review journal, *International Journal of Sport Nutrition and Exercise Metabolism*. During REF2021, the University has supported this centre via four key appointments (i.e., Gonzalez, Koumanov, Peacock, Walhin) to extend expertise and capacity into existing, emerging, and new opportunities including the key MRC and BBSRC priorities (e.g., mechanistic nutrition) and cross-council funding (e.g., ageing).

Clinical Rehabilitation and Exercise Medicine Research Group (CREM) (Bilzon*, Arnold, Campbell*, Cazzola, Colyer, McGuigan*, McKay, Peacock, Seminati, Stokes, Thompson, Turner)

Research within CREM systematically explores the biological, psychological, and mechanical basis of exercise for: (i) the prevention and management of chronic disabling conditions and diseases; (ii) the rehabilitation and recovery from injury, illness or surgery; and (iii) the long-term health and

wellbeing of people who have suffered life-changing injuries or illnesses. Members of CREM work with a range of specialist clinical partners and patient communities to address real-world challenges. They also collaborate with mechanical engineers, computer scientists, product developers and others to design and evaluate innovative assistive healthcare technologies across these themes. CREM has been central to the research activities and delivery of work related to: (i) the multi-institutional 'Centre for Sport, Exercise and Osteoarthritis (Versus Arthritis); (ii) the cross-faculty EPSRC-funded CAMERA Centre; (iii) the European Structural Investment Fund; and (iv) European Development funds. During REF2021, the University has supported CREM via three strategic appointments (Campbell, Colyer, Seminati).

The Physical Culture, Sport and Health Group (PCSH) (Rich*, Bowles, Bush, Clift, Francombe-Webb, Manley, Morgan, McGee, Merchant*, Millington)

The PCSH group contribute critical and innovative insights across a range of contemporary issues and challenges in health, sport and physical cultural contexts. Research during REF2021 has focused on a number of grand challenges across four interrelated research areas (i) Wellbeing Across the Lifecourse: Promoting Healthy Ageing Across the Lifespan; (ii) Digital Cultures; (iii) Sustainable Cities and Communities; and (iv) Education and Development. Funding to support this agenda during REF2021 includes monies from the AHRC, the ESRC, The Wellcome Trust, The British Academy, EU Horizon 2020, AGE UK, and Cancer Research UK. During REF2021, the group have hosted two international conferences, developed a large network with internationally-leading scholars, and led on establishing a University-wide Qualitative Research Centre. Eight appointments were made during REF2021 to support and extend the research of the PCSH group (Bowles, Clift, Fullagar, Francombe-Webb, Manley, Morgan, McGee, Merchant).

Research Strategy

Although extremely proud of our progress on regional, national, and international fronts, we are very receptive to constructive feedback. In REF2014, the 'Environment' component of our submission was scored as 62.5% meeting the standard for 4* and 37.5% for meeting the standard for 3*. Specific feedback from the 'Sport UoA26 sub-panel' was that the "underpinning strategy of the unit was not as strong as other aspects of the Environment template." Reflecting on this advice, we invested concerted effort during the REF2021 period to develop a Research Strategy that is vibrant, lived, owned, and actualised on a daily basis.

The four specific core underpinning principles are:

1. To conduct internationally-leading research in the traditional cognate areas as well as to address complex societal issues via multi- and inter-disciplinary approaches.
2. To seek to optimise the intellectual, scientific, economic, social and cultural impact of our research locally, nationally, and internationally.
3. To serve as a centre of excellence for the development of postgraduate, postdoctoral, and ECRs within the areas of sport, exercise, and health sciences.
4. To promote external engagement, enterprise and innovation, stimulating the exchange of ideas and knowledge through partnership.

To best support the delivery of our research strategy, we developed several underpinning objectives. These are to:

- Strategically attract, develop, and retain excellent research-active staff in key areas that develop and/or extend research capacity and capability.

- Continue to conduct research of global significance including the development of multidisciplinary, high-profile, internationally recognised research centres/groups.
- Nurture a vibrant, collaborative, shared, and supportive research culture built on diversity and inclusivity.
- Foster day-to-day research discourse among academic staff, students, policymakers, and practitioners on key sport, exercise, and health topics/themes.
- Attract, develop, and support excellent doctoral research students via a stimulating research environment.
- Support grant capture – ranging from smaller awards and new investigator schemes (e.g., ECRs) through to large collaborative grant awards.
- Increase our visibility through producing world-class research outputs.
- Create real-world impact through the co-production of knowledge and cocreation of interventions/solutions with key partners, users, and stakeholders.
- Develop our infrastructure and research capability via strategic awards and investment.
- Maintain the highest standards of rigour and integrity in all aspects of research and to adhere to our policies, systems and procedures that ensure compliance with the Concordat to Support Research Integrity.

Approach to Open Access, Open Data, and Research Integrity

Within the context of the institution's open access strategy, we have progressed towards an open research environment via:

Open Access: All members of the unit work closely with the University's 'Open Access Team' and adhere to the University's Open Access Publications Deposit Mandate, published in 2011 and updated in 2017. Staff within the unit are fully supported to ensure that their research output is made available via open access, from training, to grant applications, and through to actual publishing. In 2019, Leiden Ranking introduced new indicators on open access and gender. When applied to the relevant parameters for SHES (biomedical and health sciences), the open access indicator shows Bath to rank 12th in the world for the proportion of papers that are open access.

Open Data: In regard to open data, the unit's processes and practices are guided by the Concordat on Open Research Data and the FAIR (Findable, Accessible, Interoperable, and Reusable) principles that are set out in our internationally recognised Research Data Policy. Bath was one of the first UK academic libraries to establish a permanent data management service. UoA24 engages and benefits from this mature service, which supports our planning, curation, preservation, and publication of research data and software. Collaboration with our highly experienced team of data librarians has led to a cultural change wherein good management of data is now considered a core tenet of our research and one that is also embedded in the unit's doctoral training. We also benefit from Bath being the first institution internationally to provide guidance and examples of data access statements, linking published articles to underpinning data to aid reproducibility of findings.

Research Integrity: We are fully committed to maintaining the highest standards of research excellence and integrity, consistent with the Concordat to Support Research Integrity. Clear systems and practices exist to embed these principles into all of our research. Examples at the unit-level include:

- The Research Ethics Approval Committee for Health (REACH) and Departmental Research Committee monitor our compliance with the Concordat.
- Ethical review is conducted via REACH prior to any research activity being undertaken.
- Our Research Manager ensures that research at the funding application stage is considered in terms of ethical, legal, and governance frameworks (e.g., the Human Tissue Act; Research Governance Framework for Health and Social Care, NHS Ethics).
- We have transparent and fair mechanisms in place to deal with allegations of research misconduct should they arise, including signing up to the Public Interest Disclosure (Whistleblowing) Procedure.
- We encourage post-publication data sharing to help minimise the likelihood of researcher misconduct and to maintain high levels of transparency.

Supporting Interdisciplinary Work

We work toward solving complex real-world problems of global importance. Thus, our engagement with, and support for, interdisciplinary work is paramount. To facilitate interdisciplinary discourse, we have structured our research themes and centres/groups such that we bring academic talents from across a range of disciplines together for discussions around key research challenges (e.g., healthy ageing, childhood obesity). Our Research Rounds provide an excellent forum for interdisciplinary academic discourse, including engagement with visiting speakers, research partners, and regional and national stakeholders. The University's Institute for Mathematical Innovation (IMI) and the Institute for Policy Research (IPR) provide outstanding support for our interdisciplinary work. Our collaboration with the IMI has allowed us to employ statistics as a powerful tool, providing insight and solutions to complex real-world challenges, whereas our engagement with the IPR has enabled us to further the public good through research into issues of significant relevance to policy debate and decision-making. To date, several members of the group have undertaken IMI or IPR secondments and/or engaged in joint research (e.g., **Betts, Bilzon, Cumming, Gillison, McKay, Preatoni, Standage, Stokes**).

Addressing a gap in structured provision and one that is key for many interdisciplinary projects, the unit led in creating the University-wide 'Centre for Qualitative Research' (**Clift, Bekker**). Established in 2019, this centre provides a scholarly and supportive platform for fostering research, training and education, and industry collaboration and consulting in qualitative research.

Impact Strategy

The nature of our research necessitates close working relationships with external stakeholders and partners and is a very natural part of our work (cf. Case Studies 1-4). Many of our research questions are systematically co-developed with external partners and interventions are co-produced with users and stakeholders. As per our Impact Strategy, much of our research has a clear user-group or pre-defined beneficiary. Our strategy is to deliver meaningful impact through: (i) Developing the skills and understanding of our staff of what non-academic impact is; (ii) Supporting staff to incorporate impact early into their research plans and allocating sufficient time and resource for them to do it well; and (iii) Developing pathways and partnerships for the translation of research into policy and/or practice. Overseen by our Director of Impact (**Gonzalez**), these group-level processes are supplemented by University training sessions on key issues such as impact, knowledge exchange, media communication, and public engagement. As with our REF2014 impact case studies, these processes were integral to the four submitted REF2021 case studies, providing the basis for enabling each line of research to achieve significant and wide-reaching impact in a timely manner.

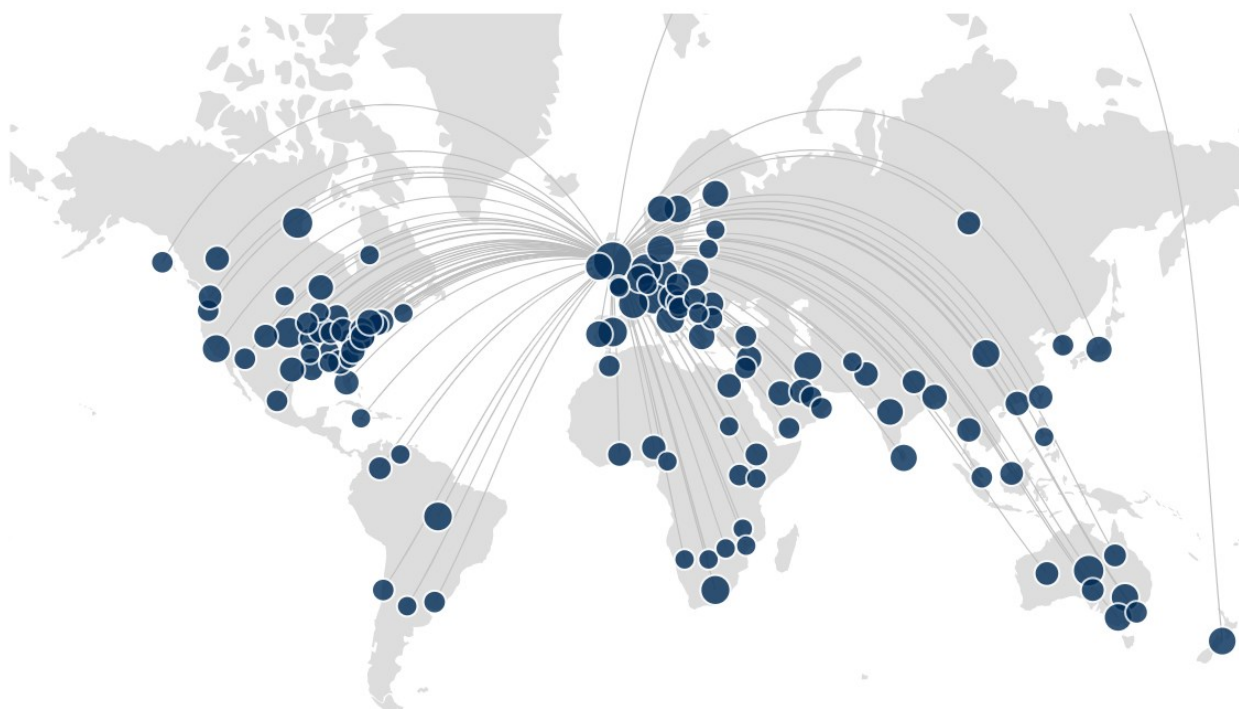
Evidence of Achievement of Strategic Aims Since REF2014

A key part of our strategy outlined in REF2014 was to “sustain the current rate of progress” in terms of growth and development. We have achieved and surpassed the objectives that we outlined. During REF2021, we have:

- Strategically enhanced research capacity and capability via a 71% increase in Category A staff.
- Maintained, improved, and refined our thematic approach to improve the coherence and daily delivery of our Research Strategy.
- Continued to develop and deliver a balanced portfolio of research spanning fundamental mechanistic research through to highly applied translational research that offers direct benefits to key users and/or stakeholders within international, national and local agencies, companies, and organisations (cf. Impact Case Studies 1-4).
- Increased external research funding by over 76%, a portfolio spanning most of research councils, several research charities, industry, and various international agencies/organisations.
- In collaboration with the Department of Computer Sciences, we have secured a £1.5 million European Structural Investment Fund grant to build and equip the largest motion capture studio in Europe.
- The University has invested over £5.2m on physical facilities and over £1.3m on equipment, consumables, SHES-specific research support staff, and toward supporting research mobility.
- Increased the number of externally funded postdoctoral researchers from funders such as the EPSRC, the MRC, the RFU, Age UK, the ARUK, the BBSRC, and the NIHR (n=27).
- Increasingly exploited the opportunities associated with the £35m Sports Training Village based on campus (i.e., essentially a “living lab” for our sport-related work).
- Helped to shape the international research agenda via editorial roles for international journals, membership of scientific boards for learned societies, and advisory roles to organisations.
- Continued to house the MRes in Health and Wellbeing in conjunction with the Universities of Bristol, Exeter, Plymouth, and UWE (accredited by the ESRC as part of the South West Doctoral Training Partnership; SWDTP).
- Delivered on the vision of the MSci in Sport and Exercise Science to improve preparation and training for a career in research.
- Developed and delivered a BSc (Hons) in Health and Exercise Science, leading to more investment and resource related to our teaching and research activities in areas such as health promotion, rehabilitation, and public health.
- Encouraged staff to make data and other materials available for effective and ‘open’ sharing.
- Received the Bronze Athena Swan award in 2016.

- Developed active and demonstrable research collaborations and research output with academics from more than 85 countries and over 250 universities (see Figure 2).

Figure 2 Location of Co-Authors on Research Outputs (2015-2020)



Future Strategy

Over the next five years, the unit will:

- Consolidate and strategically bolster our areas of world-class strength following several years of ambitious and rapid growth.
- Nurture the world-class academic talent of our excellent ECRs via senior mentors, our new 'Early Career Network', development programmes, and formal and informal training opportunities.
- Grow our cognate-specific portfolios to improve our internationally-leading output and world-class impact activities in these core areas of our discipline as well as the quality of work that feeds into our multi- and inter-disciplinary work.
- Support our coherent research-intensive groups, collaborations, and research centres so that we have the critical mass as well as the needed interdisciplinary skills, knowledge, and methods to tackle complex questions that are of local, national, and global significance.
- Continue to deliver a balanced portfolio of research funding, spanning fundamental mechanistic research through to highly-applied translational research with external partners that offers direct benefit to key users and/or stakeholders.
- Achieve the Silver Athena SWAN Award and build on our robust approach to wider equity so that all academic staff to contribute to a thriving shared research culture built on diversity and inclusivity.

2. People

Staffing Strategy and Staff Development

Recruiting and Rewarding Excellence in Research

Naturally, the quality and performance indicators of the SHES unit are dependent upon the performance of our staff. Thus, the staffing strategy is focussed on recruiting excellent researchers from a global pool, retaining them, and nurturing their talent and abilities via numerous leadership and training opportunities. Indeed, and within a research-intensive institution, we are entirely committed to fostering a world class research environment to allow our staff to grow, develop, and flourish in terms of their research activities. Our success in this regard is evidenced by 6 internal promotions to Professor during the REF2021 census period (**Betts, Bilzon, Rich, Standage, Stokes, Thompson**). Similarly, we have also retained high-performing PhD students and/or post-docs (**Cazzola, Colyer, Koumanov, Peacock, Preatoni, Rouse, Seminati, Wahlin, Western**).

Research performance represents a central component of annual performance reviews and the majority of staff have received performance-related financial awards since 2014, based in part, on their success in research. All Category A staff are on permanent contracts. New appointments are made in strategically important areas of research that enable the strengthening and/or diversification of our research portfolio. To this end, new appointments to the SHES unit during the REF2021 period were: **Bekker, Bowles, Campbell, Cazzola, Colyer, Cliff, Curran, Gonzalez, Griffin, Koumanov, Lambert, McKay, McEwan, McGee, Merchant, Moore, Peacock, Rouse, Seminati, Solomon-Moore, Walhin, Western, Williams, Wiltshire** (all Lecturers); **Townsend** (Senior Lecturer); **Phoenix** (Reader), and **Fullager** (Professor). The number of Category A staff for REF2021 is 37.7 FTE comprised of 40 members of staff. The breakdown is 19 Lecturers, 13 Senior Lecturers, 2 Readers, and 6 Professors (26 male; 14 female). During REF2021, our UK staff have been joined by colleagues from Australia, Belgium, Canada, Greece, Italy, the Netherlands, and the United States (n=12).

Supporting, developing, and training the next generation of UoA24 researchers is reflected in our recruitment strategy of targeting ECRs with the highest potential to achieve research excellence (42% of our staff at ECR level). Here, we align our unit-level practices with the Concordat to Support Career Development of Research Staff. Our strategy of investing in people also provides an approach to succession planning whereby we identify, develop, and transition colleagues with high potential into key leadership roles. For example, the current Head of Department (**Gillison**) as well as her predecessors commenced their employment at Bath as ECRs (**Bilzon, Stokes**).

In addition to more traditional academic appointments, the unit was awarded three University Prize Fellows (**Bekker, Campbell, Rouse**). All three prize fellow awardees have now successfully transferred to permanent academic lecturing posts at the University.

Over 20 *honorary* and *visiting appointments* have contributed to our research culture during REF2021. Scholars include Professor's David Andrews (University of Maryland), Richard Ryan (Australian Catholic University), and Cara Aitchison (Cardiff Metropolitan University).

Providing Protected Time to Develop and Undertake Research

As a research-intensive University, teaching contact time for academic staff in the unit is low-to-moderate. Within a workload model, 500 hours are provided to support research activities (unfunded work, own research time, scholarship, etc.). Our probational staff receive an additional allocation of 400, 300, and 200 for Years 1, 2, and 3 of their appointment, respectively. Early career and probationary staff are also given lower teaching and administrative loads (~ 60 hours of contact time per year) and minimal administrative duties. Mentoring of ECRs is an important element of research support during the three years after appointment. All ECRs are provided with a mentor within the first month of appointment.

Innovative teaching technologies (e.g., virtual learning environments) also minimise the teaching-related administrative load. All academic staff have access to a range of support staff, including undergraduate and postgraduate administrative teams, technical staff, dedicated IT staff and website developers, and public and media relations support. New ECRs are included in a university-wide probationary system that provides mentoring and guidance from senior academics in external departments. Early career and probationary staff are automatically enrolled onto the Bath Course in Enhancing Academic practice delivered by Academic Staff Development; and research-related staff development workshops and training are available to all staff (e.g., supervision of research students).

Providing Resources to Enable Staff at All Levels to Develop their Research

Generous resource is made available to all staff and post-docs to allow them to attend conferences, laboratory and exchange visits, and to foster research collaborations. A significant budget is also provided by the faculty to support research equipment purchases. The unit capitalises on this expenditure each year, enabling colleagues in UoA24 to further enhance the quality of their research activities.

The Research and Innovation Service (RIS) at Bath provides training opportunities for research staff and doctoral students in the unit and works closely with the Careers Advisory Service (which provides a dedicated Careers Advisor for researchers). The University established a Research Staff Working Group in order to implement the Concordat to Support the Career Development of Researchers. This Working Group reports directly to the University Research Committee and, in recognition of achievements in this area, the University was awarded HR excellence in research award from the European Commission (one of 15 Universities to have gained this award).

The University has a funded sabbatical scheme which provides relief from all teaching and administrative duties for 6-12 months plus funding to cover replacement teaching costs. The scheme is available to all academic staff 3 years after probation. Three Professors, one Reader, and two Senior Lecturers in the unit were awarded sabbaticals during REF2021:

- **Bilzon** (12-months): University of Miami (US) and locally (2018-2019).
- **Fullager** (6-months): Griffith University and the University of Sao Paulo (2017-2018).
- **Standage** (6-months): Development of the Centre for Motivation and Health Behaviour Change (2015-2016).
- **Stathi** (6-months) Split between Stanford University and the University of Maryland (2015-2016).
- **Gillison** (6-months) Split between Cornell University and the University of Maastricht (2014-2015).
- **Trewartha** (6-months) Griffith University (2013-2014).

Stimulating and Facilitating Exchanges between Academia and Business, Industry or Public or Third Sector Bodies

Integral to the unit's staffing strategy and world-class impact are our close connections with differing external agencies/organizations/bodies/companies. During REF2021, **Stokes** has been seconded to the RFU as Medical Research Lead (0.4 FTE). Within this role, he is responsible for the co-ordination and management of all research relating to player welfare for players at all levels of the game (schools to international). Similarly, **Gonzalez** has been seconded to Ineos Grenadiers cycling team as the Head of Nutrition and Human Sciences (0.5 FTE). Here, he leads a team comprising of physiologists, performance nutritionists, and chefs to develop knowledge and delivery of nutrition, training, and environmental practices.

Research Students

As shown in Table 1, 57 Research Degrees have been awarded during REF2021. This represents a 160% increase on REF2014. These awards are distributed across three research themes with the majority of studentships being externally funded from agencies such as the ESRC, MRC, RFU, and the EIS. The University continues to be proactive in providing matched funding with key external partners, an approach that has yielded significant and wide-reaching impact.

Table 1 Doctoral Degree Data

Degree type	2013/4	2014/5	2015/6	2016/7	2017/8	2018/19	2019/0	Total
Ph.D.	2.00	8.65	5.25	9.00	6.25	7.90	10.05	49.10
Professional doctorate	0	3.40	0.40	2.40	0	1.00	1.00	8.20
Total	2.00	12.05	5.65	11.40	6.25	8.90	11.05	57.30

Research students within the unit are part of the ESRC SWDTP. This infrastructure provides the foundation for a vibrant research community in which our research students are provided with research training at masters and doctoral level. Workshops and academic courses provided by leading academics across the ESRC SWDTP form the basis for generic research skills training as well as specific training in a variety of methodology and analytical approaches. These sessions (i.e., over 100 offerings) are supplemented by annual research presentations as well as informal presentations to research centres/groups. Accumulatively, and since 2014, our research students have attended more than 750 training events with satisfaction ratings consistently above 90%.

All of our research students are provided with a high-quality physical working environment, including a PC with full access to the university network and library resources. The University provides exclusive space for research students to work and socialise and the English Language Centre offers free English language training to international students. The Postgraduate Association (part of the Student's Union) organises an annual conference as well as a range of social programmes and other opportunities for research students. Research student attendance at national and international academic conferences is supported via a Departmental fund.

In August 2017, the Doctoral College (DC) was created which is responsible for the recruitment and administrative support of all doctoral students across the University. The DC brings together institution-wide support, training, development and administration for our diverse doctoral population. Cross-disciplinary and cross-institutional collaboration is encouraged to further enrich the student experience. The DC oversees a comprehensive free skills development programme for doctoral students delivered by a range of both internal and external training providers, aligned with the Researcher Development Framework. Training for students within UoA24 include offerings from across the SWDTP and GW4 initiatives (e.g., MRC BioMed Doctoral Training Partnership) as well as national events such as training provided by the National Centre for Research Methods.

In terms of monitoring and support, all doctoral supervisors are required to complete progress reports every six months. These reports also include contributions from the student and our Director of Studies for Post-Graduate Research (**Cazzola**). Based on the completed forms, it is determined whether further action is required or whether a report needs to be discussed at the next Faculty Doctoral Studies Committee (FDSC) or University Board of Studies (Doctoral). All students are supervised by at least two Bath-based members of academic staff.

The University has dedicated careers support for doctoral students. Example activities include extensive tailored web resources for researchers and regular blog articles tailored to the career development needs of doctoral students, regular emails on career opportunities inside and outside

of academia, running career panel events with doctoral alumni and sourcing alumni case studies, access to career management training sessions in online and in-person formats, and promoting and facilitating access to professional networks inside and outside of research.

Equality and Diversity

Our staffing strategy embraces diversity of all backgrounds as a valuable cornerstone of successful research. Indeed, it is vital to the success of our Research Strategy that we can attract researchers from a wide range of backgrounds and specialisms. The richness of knowledge, approach, and heritage that diverse researchers bring is absolutely fundamental to our unit. We are entirely committed to the Athena SWAN Charter and broader equity principles and are dedicated to gender equality, representation, progress, and an environment supportive of staff development and success for all. The Department earned the Bronze award (2016), and we are now actively working toward the Silver award.

We are equally committed to adhering with the University's policies and codes of practice on Childcare, Dignity and Respect, Flexible Working, Maternity and Paternity, Occupational Health, Recruitment and Selection, and Trans Equality, which are published and regularly reviewed. The University's Dignity and Respect policies apply to all staff including honorary staff, casual workers, visiting staff and students, and third parties (e.g., contractors, clients, customers). At the unit-level, we ensure that all staff engage in E&D training and promote equality through our structures and processes such that opportunities for support and progression (e.g., promotion and reward processes, recruitment for leadership roles, sabbatical leaves, submission of funding applications) and internal funding (e.g., conference funding, rolling research funds) are based on equality or merit rather than one's background, identity, beliefs, or individual characteristics or circumstances. Examples of these structures and processes include:

Equality and Diversity (E&D) Committee. Our E&D Committee operates in line with the Terms of Reference agreed by the Department Executive. The committee's membership (9f, 6m) is guided by analysis of staff trends and ensuring diverse representation including staff at differing career stages (e.g., student members through to Professors). It comprises Teaching and Research, Research-only, Teaching-only, Professional Service and Support staff, Technicians, and PGR and UG students. The role of the E&D Committee is to promote and reflect a supportive and egalitarian culture and philosophy at all levels and across all staff and student groupings.

Gender Equality. Gender equality during REF2021 has been supported in a number of ways, including:

Senior Roles: Senior positions are currently held by women, including the Head of Department (**Gillison**) and Deputy Head of Department (**McGuigan**). When submitting our Bronze Athena SWAN application, we had a clear gender gap. Through concerted actions in relation to both recruitment and by actively encouraging promotion applications via our transparent processes, we have seen a marked reduction in this gap. Most notably at Lecturer and Reader levels where we have achieved gender equity.

Senior Colleagues - Role Models, and Mentoring: Through the unit's research presentations, we have increased the visibility of female role models and invited speakers to share their career successes. Increases in promotion rates for females provides evidence for the positive impact of our more proactive approach (i.e., more females have applied and been awarded promotion during REF2021). Eligible staff are encouraged to apply for promotion with consideration given to any impact of maternity leave, career breaks and part-time working on outputs and/or research grant income. Practical support is given to highlight gaps in CVs and ways that these can be developed. A mentoring programme with senior women across the University also operates.

Leadership: Annually, the University funds 15 competitively allocated places on the Aurora Leadership Programme. SHES has had four female members complete this programme. Three

females have also completed the Academic Leaders Programme and two are currently enrolled on a Management and Leadership in Action programme.

Early Career Researchers (ECRs). Vital to supporting the growth and development of our ECRs is an inclusive and supportive environment that promotes collegiality and a commitment to mentoring. All new staff members have a formal probation period in which objectives are agreed and monitored by line managers and recorded by HR. The process for new Lecturing staff includes completion of the three-year Bath Course (approved by the HEA). Early Career Lecturers are given a reduced teaching load that enables them to develop their research. We also host an Early Career Academic Network, where ECRs meet over lunch on the last Wednesday of every month to support each other and discuss topics related to their current job roles and career development (e.g., improving teaching practice, applying for research grants, etc.).

Core Working Hours. Wherever possible all meetings and events take place between 10am-3pm to facilitate the involvement of those staff working flexi-hours. All research centres and groups have adopted this approach. Also, and with increasing commitments for academic staff at weekends (e.g., open days), we work to ensure that staff with caring responsibilities are able to contribute at alternative times.

Committee Membership. All committees operate in an inclusive way, seeking membership from staff at all career stages (including PGR if applicable), and from underrepresented groups. Committee roles are openly advertised (except where ex-officio) and include E&D as a standing item.

Promotional/Web Materials. All materials are reviewed to ensure that they reflect the diversity of our staff and students.

Transition Back into Work. We support requests from staff to adjust their working hours after a period of leave for caring or health reasons to ensure a smooth and gradual transition back to work. We also ensure that the duties of women taking maternity or adoption leave (or men taking paternity leave) are fully covered by temporary staff in their absence. The unit is family friendly and has been fully supportive of temporary and permanent flexible working requests. During leave staff can also use up to 10 paid "Keeping in Touch" days; this helps maintain links to their work, colleagues, and job-specific activities.

Research-Only Staff. The University has implemented the "Concordat to Support the Career Development of Researchers" and this, with the development opportunities and support offered by the Academic Staff Development Unit, enables staff in the unit to get the most out of their research careers via the organisation of workshops and events as well as a webpage with additional information and activities (including opportunities to teach if this is supportive of their career plans).

Physical Environment. We have created communal spaces to facilitate social opportunities from cake sales and presentations to support International Women's and Men's Day through to 'PhD - Staff' networking events.

Staff with Protected Characteristics. Across the unit, needs are diverse and are met on a case-by-case basis. Support includes workplace assessments, training for staff working with others who require more support (e.g., neuro-atypical staff and students), training for staff with a disability where indicated by an Access to Work assessment, Personal Emergency Evacuation Planning, and reasonable adjustments developed on the basis of Access to Work assessments and on a case-by-case basis through discussion.

Construction of the Unit's REF Submission. The procedures used in preparing this submission were consistent, transparent, accountable, and conducted in an inclusive manner and in accordance with our institutional values and existing policies (i.e., the University's 'REF 2021 Code of Practice' and 'Principles of Research Assessment and Management'). The UoA lead engaged in University courses pertaining to Diversity in the Workplace, Inclusion, and Unconscious Bias. A

core panel of eight males and eight females provided the internal scores to create our REF output profile submission.

3. Income infrastructure and facilities

Income

All research-active staff are expected to secure funding as required so as to facilitate world class research outputs and significant and wide-reaching impact. The unit's portfolio of funded research has grown from £4.26m in REF2014 to £7.50m during REF2021. We are particularly pleased with this 76% increase in view of 42% of our 37.7 FTE being ECR scholars. The majority of the external monies were secured via a competitive process involving external peer review.

Table 2 Research Income

2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	Total
637,712	642,249	1,077,717	1,125,242	1,220,206	1,452,746	1,347,242	£7,503,114

The unit has a good balance of research funding including monies from:

- Research Councils: AHRC, BBSRC, EPSRC, ESRC, MRC, The British Academy.
- The European Commission: Horizon 2020, European Regional Development Fund.
- UK-Based Charities: Age UK, The Wellcome Trust, Versus Arthritis, British Heart Foundation, Chief Fire Officer's Association, Diabetes UK, British Medical Association, Arts Council England, Cancer Research UK, Big Lottery Fund, Private Physiotherapy Educational Foundation.
- UK Central Government: NIHR, Innovate UK, Bath & NE Somerset Council, Ministry of Defence, Royal United Hospitals Bath, The British Council, UK Sport.
- UK Industry: Lucozade, Pro Bono Bio Entrepreneur Limited, Wessex Water, Boing Kids Ltd, RFU for Women, RFU, Open Bionics Ltd.
- Overseas Industry: ARLA Foods Ingredients, Kellogg's, Nestlé, The Coca-Cola Company

Examples of research awards made during REF2021 include:

- Centre for the Analysis of Motion, Entertainment and Research Applications (CAMERA; 2015-2021) – EPSRC-funded Research Centre with the Department of Computer Sciences (£3.9m). Funding for CAMERA was renewed by the EPSRC in March 2020 (2020-2025; £3.4m).
- The REACT Study – a £1.75m Bath-led NIHR grant aimed at increasing physical activity in older adults (with Birmingham, Exeter, Oxford, and UWE) (2015-2020).
- BBSRC (ESA) – We are part of an international project co-ordinated and led by the European Space Agency to examine and understand the changes induced by long-term bed rest (funded by BBSRC) (£500K).
- A £630k grant from the RFU to continue our high impact work on injury prevention.

- The Walk to Work study (led by Bristol) – we were part of a £1m NIHR grant with the Universities of Bristol and Swansea to conduct an RCT in workplaces to assess the effectiveness of a behavioural intervention in increasing walking during the commute.

Infrastructure

The University's Research & Innovation Services (RIS) allocates considerable support and resource to our UoA. Adopting a whole lifecycle approach to research, dedicated teams provide guidance and support on all aspects of research, from developing a funding idea and identifying appropriate funding opportunities, through bid development and submission, project management and financial oversight, research commercialisation support to impact evaluation and evidencing. RIS provide specific research development training, including workshops on funding proposals. Sources of research funding are highlighted regularly via 'Research Professional', the University's database for research funding opportunities, a resource which includes opportunities for part-time staff and staff returning after career breaks. We also work with RIS in regard to requests for financial support from the University which are considered at the time of making a grant application (e.g., allocation of a University PhD studentship and/or purchase of specialist equipment).

The UoA benefits markedly from the broader, thriving research-intensive institution, with a well-established research infrastructure. Library, computing, and online services provide comprehensive coverage of academic publications and electronic resources. The unit has an allocated SHES subject librarian. A repository for publications from academic staff in the UoA is maintained (via PURE), which also offers 'green' open access to ensure the widest possible audience. Bath University Computing Services offer support to academic staff and research students, including training in specific computing packages and software as well as providing a repository for archiving data. All research staff and research students are provided with their own personal office space, PC, specialist software, and equipment as required.

At the unit-level, we host the local office of NIHR Research Design Services which aids with the preparation of NIHR grant applications. We also host the BSW Research Hub (a partnership between local Universities, the Clinical Commissioning Group, charities, and community health and social care providers). A Research Manager oversees research within the unit. Three highly skilled technical staff are vital to the delivery and sustainability of our research activities through the maintenance of our equipment (including bespoke adaptations), software, and facilities.

Consistent with our proactive approach to equality, diversity, and inclusivity we provide additional support to staff with any special needs. We provide this provision in relation to acquiring research funding and/or with accessing scholarly or operational infrastructure to support their research and research productivity.

Facilities

During REF2021, the university invested over £5.2m to extend, adapt, and improve the provision of our research space. Notable expenditure includes, £4.9m for our new building (1West; Levels 3-5) and £233k which was spent to improve and our physiology laboratories (Building 6West).

The University provides various dedicated research laboratories:

- Applied Biomechanics Suite
This facility is equipped to study human motion and muscle dynamics. Equipment includes automatic motion capture systems (CODA and Qualisys), Kistler force plates, an isokinetic dynamometer, high speed video cameras, multiple digital video cameras, various gate-based timing systems, laser distance measurement device, Noraxon hardwired EMG and Delsys wireless EMG systems with added IMU technologies, Telemed ultrasound system, Xsens IMU motion tracking technology and a powerful standalone computer solely to do computational analysis. Much of this equipment is mobile and can be used for field-based

research. The facility also includes a video and data analysis room with two Vicon Motus motion analysis systems.

- Applied Physiology Laboratories

Three exercise physiology laboratories are dedicated to research. Equipment includes a variety of ergometers, treadmills and a range of related analytical equipment for monitoring physiological responses to submaximal exercise (including bespoke equipment for specific populations such as a wheelchair-ready treadmill). These laboratories also include testing equipment (e.g., Dual X-ray Absorptiometry [DXA] Scanner, Keiser, Instrumental Treadmill) and field-based equipment (e.g., Actiheart monitors, COSMED portable expired air analysis, continuous glucose monitors).

- Metabolic Research Rooms

Three rooms are equipped with hospital beds and associated equipment for the assessment of metabolism and blood flow under resting and postprandial conditions (including adipose and muscle sampling).

- Biochemistry Laboratory

This 'wet' laboratory is equipped for blood and tissue handling, biochemical analysis and cell culture. The techniques used in this laboratory utilise equipment such as automated spectrophotometers, a quantitative real-time RT-PCR machine for gene expression and genotyping, a clinical chemistry analyser, and a haematology analyser.

In addition to physical infrastructure (£>5.2m), the University has spent over £1.3m on equipment, consumables, and SHES-specific research staff during REF2021. Expenditure includes:

- Instrumented Treadmill (£179k).
- DXA Scanner (£92k).
- Qualisys System (£113K).
- Kistler Force Plates (£40K).
- 2 x Cosmed K5 (£60K).
- pQCT XCT 3000 (£63K).
- Metabolic Cart (£36K).
- YSI 2300 STAT Plus Glucose and Lactate Analyser (£11K).
- EEG System (£30K).
- Eye Tracking Glasses and Software (£38K).
- Full-Time Research Coordinator (12 months).
- 50% Research Officer position (12 months).

4. Collaboration and contribution to the research base, economy and society

Collaboration and Contribution to the Research Base

Our research activities are conceived, informed, and developed through collaborations, networks, and partnerships with business, third and public sector organisations/bodies/agencies, public and/or user-groups, and extensive roles and relationships with national and international academic communities. These diverse contributions vastly enrich our research environment and enhance our research activities spanning inputs, outputs, outcomes, and impacts. Indicators of wider influence, contributions to, and recognition by the research base related to the SHES group are readily evidenced and include:

Journal Editorship

During REF2021, unit staff have made significant contributions to leading national and international peer-review outlets through differing editorial roles/duties. These include:

- Editor-in-Chief: *International Journal of Sport Nutrition and Exercise Metabolism* (**Betts**); *Journal of Sport and Exercise Psychology* (**Standage**)
- Editor: *International Journal of Sports Medicine* (**Stokes**); *Frontiers in Sport and Active Living* (Speciality Chief Editor: **Rich**)
- Associate Editor: *BMC Musculoskeletal Disorders* (**McKay**); *Journal of Aging and Physical Activity* (**Stathi**); *Journal of Applied Sport Psychology* (**Cumming**); *BMC Sports Science, Medicine & Rehabilitation*; *Leisure Sciences* (**Francombe-Webb, Fullager, Millington**); *Psychology of Sport & Exercise* (**Gillison**); *Journal of Sport & Exercise Psychology* (**Curran**); *Journal of Sports Sciences* (**Thompson**); *Trials* (**Betts**); *Frontiers in Sports and Active Living* (**Fullagar**); *Motivation and Emotion* (**Standage**).
- Editorial Board Membership: More than 50 Editorial Board memberships including for: *The Journal of Physiology*; *Psychology of Sport & Exercise*; *Nutrition Research Reviews*; *International Journal of Sport Nutrition and Exercise Metabolism*; *Stress & Health*; *Sociology of Sport*; *Scandinavian Journal of Medicine and Science in Sports*; *Journal of Sports Sciences*; *The Journal of Nutrition*; *BMC Musculoskeletal Disorders*; *Journal of Sport & Exercise Psychology*; *Sports Biomechanics*; *Journal of Sports Sciences*; *Injury Epidemiology*; *Leisure Studies*; *Journal of Aging Studies*; *Qualitative Research in Sport Exercise & Health*; *Physiological Reports*; *BMJ Injury Prevention*; *The Sport Psychologist*; *Sociology of Sport Journal*.

Participation on Grant Committees/Panels

Examples include sitting on funding panels for UK Research Councils (BBSRC; EPSRC; MRC); The Academy of Finland; The Research Council of Norway; Diabetes UK; Versus Arthritis; The Netherlands Organization for Health; and The Diabetes Research & Wellness Foundation.

Fellowships

Staff have been made fellows of societies such as: Academy of Social Sciences (UK), ACSM, The Physiological Society, BASES, Royal Society of Medicine, International Society of Biomechanics in Sports, the Society of Sport and Exercise Medicine (Malaysia).

Prizes

More than 40 prizes including the Cuthbertson Medal (The Nutrition Society), the American Psychological Association Dissertation Award, The Susan Shaw and Roger Mannell Leisure Research Award, Julie Wallace Award (The Nutrition Society), BJSM PhD Editors' Pick Award, Sociology of Sport Journal ECR Award, and New Investigator Award (International Society of Biomechanics in Sports).

Membership of Research Council or Similar National and International Committees

Colleagues have joined the Board of Directors, Scientific Board/Committees for various associations, including the International Society of Biomechanics in Sport, European College of Sport Science, International Olympic Committee, Biomechanics Committee of the Society of Experimental Biology, Political Studies Association, UK Society of Behavioural Medicine, Division of Health Psychology of the British Psychological Society, and North American Society for the Sociology of Sport. Staff have also supported and engaged with colleagues around the world via more than 125 active memberships of numerous professional organisations/bodies.

Conference Organisation

The unit has hosted the following international conferences during REF2021:

- 2017: *British Association of Sport and Exercise Medicine* Annual Conference. Organising committee comprised of **Bilzon**, **McGuigan**, and **Thompson**.
- 2018: *Leisure Studies Association Annual Conference* co-chaired by **Fullagar**, **Rich**, and **Francome-Webb**. **Clift**, **McGee**, **Merchant**, and **Phoenix** were on the organising committee.
- 2015-2020: *Qualitative Research Symposium* led by **Bekker** and **Clift**.
- 2020: Annual *UK Society of Behavioural Medicine* conference. **Gillison** led on the organisation and delivery. **Griffin**, **Solmon-Moore**, **Standage**, and **Western** were members of the local organizing committee.

Invited Keynotes, Lectures and/or Performances, or Conference Chair Roles

Collectively, we have delivered over 175 invited talks and keynotes at conferences and universities around the world during REF2021; including at ACSM; BASES; BASEM; ISBNPA; World Leisure Congress, Arab Public Health Conference; Sport Performance Research Institute New Zealand; Association of Sports Kinetics Annual Conference; National Youth Sports Institute; 5th International Conference for Qualitative Research in Sport and Exercise; World Rugby Science Network; and World Congress on Sport and Exercise Medicine.

A presentation of note is **Curran's** 2018 TED Talk. Translated into 22 languages, this talk has been viewed over 3 million times.

Outputs: Contributions to the Research Literature

During REF2021, staff have produced 1557 outputs including 895 peer-reviewed journal papers, 19 books, and 109 book chapters. Notably, peer-reviewed output appears in prestigious journals such as: *The British Medical Journal*, *Lancet Global Health*, *Cell Metabolism*, *European Heart Journal*, *British Journal of Sports Medicine*, *Journal of Sport and Exercise Psychology*, *Sports Biomechanics*, *Medicine and Science in Sports and Exercise*, *Sociology of Sport Journal*, *International Journal of Obesity*, *Journal of Physiology*, *Health Psychology Review*, and *Statistical Methods in Medical Research*.

Refereeing Academic Publications or Research Proposals

We have served as peer-reviewers for over 200 different academic journals as well as the UK research councils (ARC, BBSRC, EPSRC, ESRC, MRC), NHS (across various NIHR Programmes), national research charities (e.g., Diabetes UK, The Leverhulme Trust), and international agencies (e.g., Academy of Finland; Australian Research Council; Social Sciences and Humanities Research Council of Canada; the Norwegian Research Council).

Public Engagement

We engage with communities and publics via the University's Public Engagement Unit (PEU), which supports a positive culture of public engagement with research. The PEU is a capacity- and capability-building unit which supports researchers to develop and advance their public engagement practice. Twelve members of SHES have engaged with the PEU during the census period. An example of PEU funding within the group was provided to **Stathi** who used this to form the Avon Network for Promoting Active Ageing, which includes charities and community groups, leisure providers, local councils, and public health teams. Collectively, they co-developed ideas for research topics, and co-produced a project called Active, Connected, and Engaged (ACE), which tested a peer volunteering model of supporting inactive older people to connect with their local communities. The collaborative nature of ACE meant that the work was directly relevant to charity

partners and was immediately adopted by two of them for further implementation with their service users.

Industry, Third Party, and Other User Involvement in Research

We have established collaborations with various industrial partners, the third sector, and other research users. In addition to formal secondments (**Gonzalez:** Ineos Grenadiers; **Stokes:** RFU), examples include **Gillison** who is a member of the Public Health England National Child Measurement Programme Board and **Bilzon** who is the Honorary Civilian Consultant Advisor in Sport & Exercise Science to the Ministry of Defence. SHES staff also contribute to the development of key national policies such as the Chief Medical Officers 2019 National Guidelines for Physical Activity (**Standage, Thompson**).

Examples of our external research partnerships include: the RFU, the EIS, The Royal Ballet, Royal United Hospital Bath, Defence Medical Rehabilitation Centre, Age UK, Manchester United, British Gymnastics, Help for Heroes, Cancer Research UK, Chief Fire Officer's Association, Diabetes UK, English Premier League, Southampton FC, European Space Agency, Bath Rugby, The Lawn Tennis Association, and British Skeleton.

Conference Attendance

Generous conference support is provided on an annual basis, helping staff to participate in more than 150 different national/international conferences. During the COVID pandemic, the move to online conferences/meetings has facilitated the attendance of staff, especially those with caring responsibilities.

Visiting Scholars

We have hosted more than 25 international scholars across the breadth of SHES research, from short visits to extended sabbaticals.

Networks

Leading roles in notable networks include the Active Healthy Kids Global Alliance (over 50 countries and over 140 universities/partner organisations) (**Standage**); World Rugby Science Network (**Stokes**), Versus Arthritis Centre for Sport, Exercise and Osteoarthritis Centre (with Oxford, Nottingham, Loughborough, Southampton, Leeds; **Bilzon** - Centre Director).

Co-Operation and Collaborative Arrangements for PGR Training

During REF2021, the unit continued to make significant contributions to the ESRC SWDTP (i.e., by leading the "Health & Wellbeing" pathway at Bath) and the MRC GW4 doctoral training programme. We have hosted more than 25 visiting PGR students. SHES staff served as External Examiners for more than 100 PGR student dissertations in the UK and internationally.