

Institution: York St John University
Unit of Assessment: Sport and Exercise Sciences, Leisure and Tourism (UoA 24)
<p>1. Unit context and structure, research and impact strategy</p> <p>Context and structure.</p> <p>Sport and Exercise is an area of research at York St John University (YSJU) that has been recognised as producing world-leading and internationally excellent research. We have subsequently built on this success to establish a vibrant and inclusive research environment that seeks to support all staff in achieving their research aspirations. As a result, over the last seven years we have been able to attract, train, and reward high-quality research staff and significantly increase the quality and impact of our research.</p> <p>Sport and Exercise is one of four subject areas in the School of Science, Technology and Health (SSTH) at YSJU. The other subject areas are Computer and Data Science, Biomedical Science and Allied Health. Sport and Exercise is the largest subject area within the school and employs 18 academic staff (17.2 FTE), three graduate teaching assistants (1.5 FTE), two technical staff (2.0 FTE) and two administrative staff (1.65 FTE). The subject area is located on a new sport and recreation campus that houses a range of specialist facilities, including human performance laboratories, specialist teaching space and dedicated research space. The subject area is managed and strategically led by a School Academic Leadership Team (SALT) which is constituted of a head of school, associate heads of subject areas, a learning and teaching lead and a research lead.</p> <p>Sport and Exercise has two formalised research groups: (1) Motivation, Performance and Wellbeing (MPAW) and (2) Physical Activity and Cardiovascular Health (PATCH). MPAW (4.0 FTE) was established shortly after REF2014 and includes sport and exercise psychologists from within the SSTH and the School of Education, Language and Psychology (SELP). PATCH (3.0 FTE) is a newer research group that was established in 2018 and includes sport and exercise physiologists from within SSTH. MPAW was established to capitalise on the research productivity and reputation of academic staff for producing world-leading and internationally excellent research examining perfectionism in sport, exercise, and dance. PATCH was established to enhance our research capabilities and meet the needs of new research partners, primarily York District Hospital and Foss Park Mental Health Hospital. Outside of these two groups, we also have academic staff who conduct research in two emerging areas of research: clinical/sport biomechanics (2.0 FTE) and sociology of sport and leisure (4.0 FTE).</p> <p>Our REF2014 submission included seven members of staff (7.0 FTE), 22 research outputs, and two impact case studies. Fifty percent of the research outputs we submitted were considered world-leading (9% = 4* rating) and internationally excellent (41% = 3* rating). Our impact case studies were considered to evidence a mix of considerable and modest impact (40% = 2* rating and 60% = 1* rating). Our environment statement was considered to evidence an environment that was conducive to producing research that was internationally recognised (100% = 2* rating). Our REF2021 submission includes 13 members of staff (13.0 FTE), 33 research outputs, and two impact case studies. We believe that the quality of our new submission evidences improvement in all three areas of assessment.</p> <p>Over the last seven years we have significantly enhanced our research environment and capacity to conduct world-leading and internationally excellent research in three ways; (1) by targeted recruitment of excellent early career research (ECR) staff into areas of existing strength (MPAW) and new areas of strategic importance (PATCH), (2) by significant financial investment in new buildings and facilities (total £9.2m), and (3) by establishing new key partnerships around which to build sustainable, high-quality, impactful research.</p>

Research and impact strategy

The strategic **AIMS** in REF2014 stated:

- (1) Promote research as a key form of learning.
- (2) Ensure that research and scholarly activity contribute to exceptional learning and teaching.
- (3) Create a critical mass of sustainable research and increase the percentage of staff with doctorates.
- (4) Achieve research degree awarding powers (RDAP) with increasing numbers of students and high completion rates.
- (5) Engage with and influence users of research locally, nationally and internationally.

Most notably, research degree awarding powers (RDAP) were awarded to YJSU in 2014 (**AIM 4**). This was a significant milestone and has been a catalyst for change throughout the university, and within Sport and Exercise, by providing impetus and resource to improve our research infrastructure.

Sport and Exercise used the impetus provided by RDAP to fulfil our stated aims. We have taken significant strides towards establishing critical mass of sustainable research (**AIM 3**) by recruiting, training, and retaining academic staff capable of producing high-quality research. The success of this approach is evident in terms of an increase in number of staff with doctorates (from 22% to 72%) and an increase in the number of Category A staff (from 30% to 86%) in the subject area. It is also evident in the increase in the total number of journal articles produced over the REF period by eligible staff in the UoA from 47 to 126 journal articles, the percentage of research outputs in the top 10% for citations in the field (6% in REF2014 to 14% in REF2021, Source: Web of Science/InCites), and in the increase in the number of competitive grant applications we have made over the REF period (11 in REF2014 versus 31 in REF2021).

Our longest standing research group, MPAW, have performed particularly well regarding productivity of high-quality research. MPAW have produced 83 peer reviewed journal articles examining perfectionism since 2014 (86% in Q1 journals [journals in the highest quartile based on citation data]) in leading sport and exercise psychology and mainstream psychology journals (e.g., *Psychological Bulletin*, impact factor [IF] = 21.0). Thirteen (16%) of these papers are in the highest 10% of cited work in the field (Source: Web of Science/InCites). Early indication is that PATCH has the potential for similar levels of productivity of high-quality research. This group have produced 21 journal articles since 2014 (76% in Q1 journals) in leading journals in physiology (e.g., *Journal of Physiology*, IF = 3.8). We consider these especially strong returns given the small size of the two groups (7.0 FTE combined).

To improve our research capability and sustainability, we have also made significant financial investment in our facilities. In total, YJSU have invested £9.2m in Sport and Exercise over the REF period. Notably, this includes developing our Sport and Recreation Campus and creating new human performance laboratories, dedicated research space and other specialist spaces (see Section 3).

With an increased focus on research and improved research capability, we have also been able to embed research in our curriculum, collaborate with our students, and recruit and support high-quality post-graduate research (PGR) students (**AIMS 1, 2 and 4**). These developments extend beyond the two research groups and encompass a wider contribution of all academic staff. Research is now the centre of our curriculum with research modules in every semester of every year of our undergraduate and postgraduate programmes and staff expertise underpinning the focus of individual modules.

We have also been able to provide the opportunity for PGR supervision to nearly all staff by offering PGR fee scholarships funded by the school or external partners. Over the REF period, 11 (of 13) staff have supervised (or are supervising) PhD students and six (of 13) staff have supervised (or are supervising) MSc by Research students. Arrangements are in place for the

other two staff to undertake PhD supervision during 2020-2021 (both clinical/sport biomechanics). Academic staff have also co-authored 22 journal articles with current and former PhD students since 2014 (an average of 3.14 journal articles per year).

We have taken significant steps towards increasing the accessibility and users of our research, as well as increasing sustainability by creating new strategic partnerships (**AIM 5**). By way of example, and as evidence of the progress we are making towards compliance with the Concordat on Open Research Data, the percentage of our research outputs that are open access has increased from 28% (REF2014) to 61% (REF2021) (Source: Web of Science/InCites), and our research outputs have been downloaded over 74k times since the launch of our institutional repository (RaY) in 2015 (substantially more than any other UoA at YSJU). All staff in the UoA are part of the Researcher and Contributor ID (ORCID) system and this is linked to their RaY profile.

Two of our major new partnerships are with York District Hospital and Foss Park Mental Health Hospital. The latter is located next to our Sport and Recreation Campus. We have memorandums of understandings with both hospitals that include a focus on research and sharing of expertise and resources. These two partnerships have, so far, led to the establishment of "Clinical Research Fellows" whereby hospital staff complete doctoral research supervised by our staff and senior clinicians. Projects in Sport and Exercise focus on the development of a novel physical activity-based intervention for hypercholesterolaemia (PATCH) and improving treatment of iliotibial band syndrome and Parkinson's disease using kinematic analysis (Jordan). Some of our other new strategic partnerships include national governing bodies (e.g., Goalball UK), professional and semi-professional sports clubs (e.g., York City Knights Rugby League Club), community groups (e.g., Coronary Support Group) and national charities (e.g., National Association for Able Children in Education [NACE]).

Paired with the productivity of our research groups, these partnerships have been the basis on which we have been able to establish pathways to impact and direct routes to end users. The work has often been embedded locally and, over time, extended to national and international spheres. Our two impact case studies (ICS) offer excellent examples. Our first ICS focuses on how our research on perfectionism with local sports organisations and schools eventually resulted in (I) the addition of the topic to the curriculum of BTEC Sport and Exercise Science, the largest further education sports course in the UK, (II) the inclusion of perfectionism on multiple national and international mental health and wellbeing education programmes (e.g., Epigeum, NACE), and (III) culminated in its inclusion in a new Department for Education student mental health taskforce. Likewise, our second ICS focuses on how our research first changed local practice in the assessment of readiness to return to sport after injury and subsequently (I) was adopted by multiple UK professional bodies (e.g., Society for Sports Therapists, Women's Football Association) and subsequently implemented in (II) sports medicine clinics in the UK, Ireland, and Canada, and (3) by national and international sports teams (e.g., England Basketball, Egypt International Football Team).

Strategic AIMS for 2020–2026

Our new strategic aims for research and impact are informed by the YSJU 2026 strategy. YSJU has a strong sense of its civic responsibility and the transformative power of education and research. The university strategic priorities are: inspiring learning, impactful research and enabling our students to be clear about their careers. The university research strategy emphasises interdisciplinary working, demonstrating greater research excellence through external recognition, and wider dissemination of research as key goals. With this in mind, our focus over the next six years is to increase our capability for impactful research in Sport and Exercise. We intend to do this by building upon existing research, using our strengths to spawn new areas of research and, in turn, capability for interdisciplinary research, while also cultivating an environment that produces research which is recognised for its quality, rigour and integrity.

Our aims, then, for 2020–2026 are:

1. Increase our capacity for world-leading and internationally excellent research by reinforcing existing areas of strength through targeted recruitment and retention of high-quality staff, targeted deployment of financial resources and increased grant-funding applications.
2. Create new complementary areas of research strength by coalescing existing expertise across subject area, school and university, targeted deployment of financial resources and providing structured mentorship from senior research staff.
3. Increase interdisciplinary research within the subject area and across the subject areas within the school by prioritising interdisciplinary projects, collaborative grant applications and interdisciplinary PGR studentships.
4. Establish new and sustainable strategic partnerships to increase research collaboration, grant application successes and enhance the significance and reach of our impactful research by identifying and investing in key partners regionally, nationally, and internationally who share our values and mission.
5. Embed open science practices throughout the subject area by providing staff training and infrastructure and recognising and rewarding open science practices among staff and PGR students.

Each academic member of staff will be expected to make a meaningful contribution to these aims, adjusted based on research seniority. Contribution at individual level will be monitored through a biannual performance development review (PDR) chaired by the head of school or associate head of school, depending on the individual's seniority. Overall progress towards these aims will be monitored by the school research lead (SRL) and reported to SALT monthly. A research dashboard provides quarterly data (e.g., grant applications, progress towards annual target, currently 2% of school income) and annual data (e.g., journal article submissions and journal rankings) to support assessment of progress towards meeting these aims.

2. People

Staffing strategy

The UoA currently consists of 13 staff (13.0 FTE) of which one is a professor (1.0 FTE; AH), who is also the SRL, eight are senior lecturers (8.0 FTE; Carter, Jordan, Law, Liefeth, Madigan, Mallinson-Howard, Mierzwinski, Vaughan) and four are lecturers (4.0 FTE; Beaumont, Brislane, Swain, Cock). All staff are on permanent/open-ended contracts. Nine academic staff were recruited after REF2014, of which six of the staff were recruited with the aim of establishing additional credibility and capability in the two key areas where we believe we were producing world-leading research and internationally excellent research (MPAW) or had the potential to do so (PATCH). As a consequence of our more targeted approach to recruitment, we consider ourselves to have now laid the foundation in these two areas for further development, creation of critical mass and sustainable research activity.

The impetus for establishing MPAW was provided by feedback from REF2014 in which research examining perfectionism was identified as world-leading ("in psychology there was evidence of world-leading research" [only psychology research outputs focused on perfectionism were entered]). In response to the feedback, we recruited four new members of staff with expertise in this area (Hill from University of Leeds, 2014, Madigan from University of Kent, 2016, Mallinson-Howard from Nottingham Trent University, 2016, Smith from Dalhousie University, Canada, 2018). Hill is recognised as a leading researcher in the area of perfectionism in sport, exercise and dance, and the other three staff we consider to be exceptional ECRs. We have also subsequently begun to draw in expertise from other schools at YSJU with similar interests in personality, individual differences, and quantitative research methods (Vaughan from Newman University, 2014).

We recently repeated the process of building a research group for PATCH. Impetus to do so was provided by our desire to increase our overall research capability and the aim of strengthening our new partnerships with York District Hospital and Foss Park Mental Health Hospital, while also responding to national health and funding agendas (e.g., All Our Health: Personalised Care and Population Health 2015). Drawing on these factors, cardiovascular health and physical activity was identified as the new area in which we wanted to establish ourselves. Based on performance in UoA26 in REF2014, Liverpool John Moores University (LJMU) was identified as one of the main producers of high-quality research in this area and we subsequently identified and recruited a group director from LJMU (Carter, 2018), honed the focus of the group to cerebral blood flow, sedentary behaviour and exercise and then made two further appointments (Beaumont from University of the West of Scotland, 2018, and Brislane from LJMU, 2019). These academic staff are exceptional ECRs who have brought substantial technical and research expertise to the subject area, as well as networks to their previous universities and collaborators.

Since REF2014, there has been a greater acknowledgement of the need to better establish career pathways for researchers and to promote and reward academic staff at YSJU for their research. This has been evident in Sport and Exercise where one academic staff benefited from the introduction of associate professor role at YSJU and then later promotion to professor (Hill). In addition, three further academic staff have been promoted from lecturer to senior lecturer via a new accelerated route based, in part, on their research profiles (Madigan, Mallinson-Howard, Vaughan). This has helped secure academic talent within the subject area and, in these cases, firmly establish MPAW within the subject area. Based on their developing staff profiles, it is likely that other staff in the subject area will benefit from increased recognition of research via both these two routes before the next REF.

UoA24 sits within a broader context of support for equality and diversity at YSJU which has implemented several initiatives which ensure policies and practices relevant to researchers are inclusive, equitable and transparent. This is formalised in the YSJU Equality, Diversity and Human Rights Policy and the targets within the YSJU 2026 strategy (e.g., 10% BAME student and staff population; all staff are engaged in equality and diversity training and development appropriate to their role; median gender pay gap below 10%; 95% of staff think the university is a good place to work). Equality impact assessments are a routine part of annual monitoring and progress towards YSJU targets are reported to executive board and the governing body on a yearly basis. Of additional note, YSJU is a member of the Athena SWAN Charter (and is currently applying for a Bronze Award), a Stonewall Diversity Champion (ranked 49th place on the 2020 Top 100 Employers list) and Top 20 Trans employer, a Disability Confident employer, and a Mindful Employer. There are also several active staff networks available for staff to join that align with these awards and this agenda including the LGBT+, BAME and Disability staff networks.

This broader context is evident within the UoA in several ways. For example, unconscious bias training is mandatory for any member of staff involved in staff recruitment, including recruitment of graduate teaching assistants (GTAs). As such, all staff within Sport and Exercise have completed unconscious bias training. One staff member of the UoA is the university co-lead for the YJSU Athena SWAN application (Mallinson-Howard) and provides local input into equality and diversity issues. The same member of staff was supported in taking part in the Aurora Developing Women in HE Leadership programme and is now Associate Head of Sport and Exercise (Mallinson-Howard). It is also noteworthy that York St John University does not make use of teaching-only contracts - part of its fair and inclusive approach to research – as such all staff in Sport and Exercise have research, scholarship, and teaching contracts. In addition, all academics are encouraged to progress their research career; two staff entered in the UoA completed PhDs with the support of the school during the REF cycle and a further three are currently doing so. Academic leave, flexible working, remote working, special leave and career breaks are available to all staff (with a minimum of 0.2 FTE required and minimum term of service for some policies).

Sport and Exercise complied fully with the YSJU institutional code of practice in selecting research outputs. The UoA lead also undertook Advance HE training on equality and mitigating bias as part of the role. Due to the small size of our submission, it is not possible to report a profile at UoA level here while also complying with HESA guidelines on anonymous reporting when presenting Equality and Diversity data (e.g., all our percentages would be based on less than 22.5 FTE). However, equality and diversity data for the UoA was reviewed internally following the completion of output selections and reported to both the SALT and Athena SWAN development groups as part of promoting greater diversity and inclusion at UoA, school, and institutional levels. Our data was also included as part of an equality and diversity impact assessment at institutional level.

We recognise that working towards greater inclusivity, equality and diversity in practice and research is an area that requires ongoing work and improvement in Sport and Exercise Science, generally. It is a subject area where others have raised concerns regarding the lack of female participants, for example (Costello, Bieuzen, & Bleakley, 2014). In keeping with the ethos of YSJU, we have begun to address this issue via involvement with the Institute for Social Justice (ISJ). One of the UoA staff (Brislane) is a member of the steering group of the ISJ and has subsequently been supported in establishing a new line of research examining menopause and physical activity. This works sits alongside our research with marginalised groups (British Somalis; Swain), disabled athletes (Swain, Madigan) and women in hyper-masculine sport (e.g., mixed martial arts; Mierzwinski). In this way, the type of research being produced by staff in the UoA is itself a key way in which equality and diversity is promoted in sport and exercise science.

Staff development

Staff have an annual personal development review (PDR), with research as an integral part. Topics discussed include reviewing progress, setting objectives for published outputs, research engagement (grant applications, PGR supervision, scholarship, knowledge exchange) and research development (external visibility, conference attendance, networking). YSJU is a signatory on the Vitae Concordat to Support the Career Development of Researchers, which directly informs our staff development approach. Our centralised research CPD programme (over 40 sessions) is aligned to the four core Vitae competencies and recognises staff individual development needs while also acknowledging that a common set of requisite personal and professional skills are needed for success. CPD delivery is mainly delivered by our professoriate and by external speakers (e.g., Professor Mark Reed delivered our impact workshop). Our new open data repository service (RaYDaR) and research repository (RaY) will further increase the impact and transparency of research at YSJU and support researcher development.

Within Sport and Exercise, staff development is discussed as part of annual performance reviews with the head of school and associate heads of subject area and is tailored to career and research aspirations. Over the REF period, we have significantly enhanced the support available to staff for research. These include access to (1) MSc by Research fee scholarships (nine awarded in total), (2) PhD fee scholarships (two awarded in total), (3) GTAs ([PhD fees and maintenance] four awarded in total), (4) an annual budget to fully fund national and international conference attendance (33 conferences supported), (5) funding for international and national laboratory visits (five awarded in total), (6) funding to host visiting international scholars (four awarded in total) and (7) training for research-grant writing, research impact and media engagement delivered within Sport and Exercise to all staff by external providers. These initiatives are awarded based on a mix of strategic allocation and a competitive basis. They are funded by direct access to QR monies from REF2014 and school-level budgets allocated to staff development and central budgets that support research projects.

These initiatives have provided a large amount of support when considered in context of the size of the UoA (13.0 FTE). MPAW has benefited in several ways, primarily by being supported in establishing PGR students within the group and providing opportunities for PGR supervision. With this aim in mind, MPAW have been awarded four GTAs, a PhD fee scholarship, and five MSc by Research fee scholarships over the REF period. MPAW has also been supported in

establishing a reputation nationally and internationally. MPAW has hosted two leading academics in the area of perfectionism (J. Dunn and M. Lizmore, University of Alberta, Canada) undertook one external laboratory visit (Madigan, University of British Columbia, Canada), and received funding to support attendance of 20 national and international conferences (e.g., European Congress of Sport and Exercise Psychology and World Congress of Sport Psychology).

Although only established in 2018, PATCH has also benefited from the award of two PhD fee scholarships (part-time) and two external laboratory visits (Beaumont to University of Texas, US; Brislane to University of Colorado, US). Sport and Exercise has also made a large financial investment in specialist equipment needed to ensure the group are able to continue their research (e.g., transcranial Doppler ultrasound, vascular ultrasound and cardiac ultrasound; £72k to date). We have recently committed to investing further in the group (PowerLab and LabChart Pro Software, £8.6k) and continue to do so to serve our broader strategic aims of establishing and reinforcing areas of research strength.

The other six staff in the UoA outside of the two groups continue to receive support with the aim of developing their research profiles. Two members of the five staff have recently completed PhDs (Liefeth in 2019 and Mierzwinski in 2020). Support for these staff focused on providing full funding to cover tuition fees, funding for conference attendance (Liefeth = 1, Mierzwinski = 3), and study leave as part of a package of overall support (Liefeth = 36, Mierzwinski = 107 days). Support for other staff has included MSc by Research fee waivers (four awarded to Law), an international laboratory visit (Jordan to Oslo and Akershus University College), support to host an international visiting scholar (Dr Kelly, University College Dublin, Ireland, Law), and funding to support attendance of 11 national and international conferences (e.g., Annual Congress of the European College of Sport Science and International Sociology of Sport Association World Congress)

Support mechanisms, training and supervision of PGR students

We have had a small number of PGR student completions within the UoA over the REF period (6.0 FTE total). MPAW has had six PhD completions, with two of these students being jointly supervised with colleagues in UoA3. One further completion was in the sociology of sport and leisure by a member of staff (Mierzwinski).

YSJU has well-established processes for induction, training, and monitoring of PGR students. Formal reviews of PGR student progress are conducted every six months by academics external to the supervisory team. Progress is monitored centrally four times a year (by Research Degree Committee). All supervisory meetings are logged. Supervisory teams are made up of multiple academic staff from the PGR student supervisory register. To be added to the register, staff are required to meet stringent criteria for PGR supervision eligibility pertaining to engagement in research, continual professional development and formal YJSU training. Endorsement from Heads of School or School Research Leads is also required. Applications are assessed by a central committee of senior research staff (again, by Research Degree Committee). It is mandatory that all supervisory teams have at least one member of staff with experienced supervisory status (have previously supervised a PhD student to successful completion). In addition, all PGR students have a PGR tutor who is available to provide support outside of the supervisory team.

All students undertake needs analysis periodically and an individually tailored training programme is created. The needs analysis is based on competencies in the Vitae Researcher Development Framework. Support is provided by supervisory teams and via a centralised PGR training programme that includes core and supplementary workshops at each year of study. Like our staff training programme, our PGT training programme aligns with the Vitae Researcher Development Framework. Core parts of the programme include Research Ethics and Integrity, General Data Protection Regulation (GDPR) for Research, Data Management, and Copyright and Intellectual Property rights. These sessions are compulsory for all PGR students.

A range of other central and local support is available to PGR students that include (1) access to centralised services (e.g. Student Services, Chaplaincy, Library and Learning Services, Careers); (2) access to a stipend of up to £900 (£450 part-time) to support travel and consumables associated with their research and professional development; (3) access to the YSJU Graduate Centre providing study space and remote access to a range of specialist software (e.g., AMOS, MPlus, Comprehensive Meta-Analysis); (4) opportunity to complete a postgraduate certificate in academic practice to achieve associate fellowship of the Higher Education Academy (HEA); (5) administrative support provided by the School and Research Office and (6) various PGR events held throughout the year (e.g., Three Minute Thesis (3MT), Bake Your Thesis, and the annual PGR conference).

Within Sport and Exercise we also have a longstanding research seminar series to provide opportunities for PGR students to see other high-quality work and network with leading researchers. Over the REF period, there have been 23 talks as part of this series and other initiatives (e.g., an annual professorial address). These talks are organised by members of staff and are made available to staff, PGR students and advertised across the university. Seven of the talks have been provided by professors from other universities including three from outside of the UK (Professor Bosch, University of Amsterdam, Netherlands; Professor Hodge, University of Otago, New Zealand; Professor Dunn, University of Alberta, Canada).

We believe we provide an excellent environment and experience for our PGR students. During their PhD programmes MPAW students all published at least one peer-reviewed paper and presented at national and international conferences. One of these students was awarded the American Psychological Association dissertation of the year, one was awarded a British Association Sport and Exercise Sciences conference award and another was awarded a British Association of Personality and Individual Differences conference award. Two students were also awarded "Research Excellence Awards" based on the recommendation of external examiners of their doctoral theses. In terms of the destinations of MPAW PhD graduates, one student is a business performance manager at Network Rail, one is a Practice Education Lead within the NHS, and all the others hold full academic posts (lecturers and senior lecturers) at universities in the UK; London School of Economic and Political Science (LSE), Leeds Beckett University, York St John University, and Newcastle University.

There are currently 9.0 FTE PhD students in the UoA: 7.0 FTE in MPAW, 1.0 FTE in PATCH, and 1.0 FTE in sociology. This cohort are already showing signs that they will be high-quality researchers. The three MPAW PhD students due to complete in February 2021, for example, have already authored/co-authored six journal articles and presented at 11 national and international conferences. This cohort is also adept at producing outputs alongside their research to reach and engage a wider audience, including six contributions to outlets such as Psychology Today, The Conversation, and Government Gazette. This is the direct result of our strategy to promote impactful research and train PGR students (and staff) who can produce it and disseminate it effectively so to reach end-users.

It is noteworthy that four of our current PhD students are also Graduate Teaching Assistants (GTAs). Sport and Exercise were the first subject area to employ GTAs at YSJU. GTAs are employees of the university and receive all the benefits of this status (e.g., holiday pay, access to health plan, pension contributions), including access to all staff CPD provided by the university (e.g., research grant writing, research impact training, and public engagement training). We have also taken other steps to ensure we continue to provide an exceptional experience for our PGR students. For example, since 2016 it has been our practice to include external supervisors on the supervisory teams of PhD students to provide additional networking opportunities and external expertise. These supervisors are mostly from abroad; Lakehead University, Canada (Dr John Gotwals), Umeå University, Sweden (Dr Henrik Gustafsson), Dalhousie University, Canada (Dr Simon Sherry), University of Queensland, Australia (Dr Elizabeth Edwards), and University College Dublin, Ireland (Dr Seamus Kelly).

3. Income, infrastructure and facilities

External research income

The UoA remains in its infancy in terms of successful competitive research income (total HESA research income £40k). However, we have had some success (e.g., Swedish Research Council) and we are making progress. Applying for competitive research income is now a much more widespread and engrained activity in Sport and Exercise. Competitive bidding activity has increased substantially (11 for REF2014 versus 31 bids for REF2021 or 2.20 per year versus 4.43 per year) and the number of academic staff who have been applicants on bids has increased (4 in REF2014 versus 13 in REF2021). We consider changes regarding who we are bidding with and to as a signal of progress, too. We now have a more developed and extensive network of collaborative bidders that include more research-intensive universities (e.g., University of Bath, University of Birmingham, University of Hull) and have submitted to a larger range of funding bodies in the UK over this REF period when compared to the last (e.g., Cancer Research UK, The British Academy and the Economic and Social Research Council [ESRC]) and internationally (e.g., World Anti-Doping Agency, Union of European Football Associations [UEFA], and National Institutes of Health)

Our successes have mainly come via commissioned research with regional and national organisations to complete small-scale applied research and evaluations (e.g., NACE [£2k], Goalball UK [£2k], and National Collaborative Outreach Partnership, NCOP, [£4k]). These projects involve working closely with external organisations to identify a particular research question and then applying staff expertise and skills to address these questions. In addition to HESA research income, we have also secured funding for MSc by Research fee studentships from external organisations for similar projects (NCOP [£11k]) with some projects also being interdisciplinary and involving other UoAs (UoA4; Ben Cohen Standup Foundation [£3k]). This approach is allowing our staff to develop their ability to work collaboratively with external organisations and strengthening our external partnerships. These projects and types of research align with the YSJU and UoA priority of impactful research. Over time, we aim to increase the financial value of this work and use the work as a platform for competitive research grant applications.

Successful research bidding is a priority for the UoA and central to our plans to strengthen our research culture and make research sustainable in the subject area. As of 2019–2020, for the first time, all staff in the UoA had targets for research grant submissions as part of their performance review. Training has also been provided for all staff focused on grant writing and a structured mentor scheme is currently being developed to support academic staff in this process.

Infrastructure (university and unit).

The UoA has three senior research roles: SRL (0.4 FTE at professorial level; Hill), chair of School Research Ethics Committee (Madigan) and public engagement lead (Brislane). The SRL is responsible for strategic development of research within the school and by virtue of this position is a member of the University Research Committee (URC) that provides oversight of the university's strategic plans for research, as well as issues pertaining to research integrity and research ethics (via devolved membership of university and school-based ethics committees). The Chair of Research Ethics Committee is responsible for implementation of YSJU Research Ethics Policy at School level and is also a member of the University Research Ethics and Integrity Sub-Committee. Finally, the public engagement champion has oversight of public engagement activity in the schools, working with the Business Development and Knowledge Exchange Office (BDKEO) to seek out and co-coordinate public engagement activities within Sport and Exercise.

Sport and Exercise has also benefited from a new central Research Office (RO). The RO includes a head (1.0 FTE) and a further six staff (5.15 FTE staff). The RO is responsible for overseeing research governance and compliance at YSJU, supporting grant applications, managing PGR and staff research training, and monitors research performance in the schools.

This has relieved staff in the UoA of many administrative duties associated with research supervision, allowing us to maintain a high-quality experience with larger numbers (one especial highlight was that in 2018 YSJU was ranked first in the UK in the Postgraduate Research Experience Survey for overall experience with our UoA scoring joint highest at YSJU for the quality of “Research Culture” sub-category that year). The RO has also directly improved the level and quality of support associated with research grant applications. This is evident both in the increase in number of grant applications in the UoA, as well as the increased range and type of grant applications.

The work of the RO is also complemented by a new BDKEO. The BDKEO includes a director (1.0 FTE) and a further 14 staff (13.5 FTE). The BDKEO is responsible for supporting schools in increasing the range and scope of applied research, business development, and knowledge exchange at YJSU. This office is now our main conduit for impact and public engagement for the UoA. It has already helped us to gain accreditation for Knowledge Transfer Partnerships (KTPs) and registered the university with Innovate UK as an approved KTP knowledge base deliverer. The first KTP at YSJU is due to include one of the longstanding partners of Sport and Exercise (York City Knights Rugby League Club). The BDKEO was integral to YJSU achieving Silver Watermark accreditation from the National Co-ordinating Centre of Public Engagement (NCCPE). Our community-focused work at our Sport and Recreation Campus was central to YJSU achieving Silver Watermark accreditation from the National Co-ordinating Centre of Public Engagement (NCCPE) led by the BDKEO, as were several ongoing research projects, including one that examines the role of fandom in combating loneliness (Mierzwinski and York City Knights Foundation). Moving forward, the BDKEO will be central to our increased engagement with businesses, policy makers, professionals and civil societies (e.g., charities, associations) and our aim of research impact being fully embedded in our research culture and practice.

Facilities

One of the largest changes since REF2014 is that Sport and Exercise has now relocated to its own campus. The campus is a 20 minute walk from the main campus. It is a 56-acre site of sport and recreational facilities offering access to outdoor 3G football pitches, tennis courts and netball courts. There are also community allotments, walking trails and a bowling green. A new indoor tennis centre and 3G rugby league pitch is due to be completed in 2021. The main sports building on the campus includes an indoor sports barn, a strength and conditioning suite, a sport and exercise injury clinic, teaching classrooms, and a social area and café. There are 28 community users, including professional sports teams, domestic and international sports academies, disability sports clubs, and outpatient rehabilitation groups. Estimated footfall from community users in 2019 was over 85k. It has provided us with a fantastic site for partnership building and data collection.

Our Sport and Recreation Campus includes our new high-performance laboratory (HPL). This was completed in the summer of 2019 to coincide with the move of Sport and Exercise to the new campus. It is a large flexible space designed to allow physiological and biomechanical testing to take place in tandem and provide greater opportunity for interdisciplinary research. This arrangement is a notable departure from our previous facilities that included two smaller laboratories. To allow this type of usability, in addition to moving our existing equipment, we invested a further £158k in new equipment in 2018-2019. The HPL is an impressive space that emphasises open and visible working, miniature and mobile equipment, as well as moveable audio-visual equipment and storage. It also provides a humidity- and temperature-controlled environment to ensure standardised conditions for physiological testing. It is accessible via a programmable card-based system for controlled and secure access.

For the first time, we now also have a separate dedicated research laboratory. The dedicated research space was developed in consultation with the laboratory director (Carter) to ensure it met the needs of PATCH. The PATCH group have expertise in the use of ultrasound technologies for the assessment of vascular and cardiac structure and function, and cerebrovascular function. Their dedicated laboratory includes a Terason vascular ultrasound

machine that enables 2D and Doppler imaging of arterial intima media thickness, diameter, blood flow, shear stress and endothelium dependent arterial dilation (flow-mediated dilation). To assess cardiac structure and function, the group has a Vivid i echocardiographic system that provides 2D, M-mode, Doppler and tissue-Doppler capacity. Cerebrovascular blood flow and function are assessed using bilateral transcranial Doppler ultrasound (DWL). Equipment to objectively assess physical activity and sedentary behaviours have also been purchased. Activities in the HPL and research laboratory are supported by two specialist technicians (2.0 FTE) who are located on-site (both appointed in 2016).

In total, the UoA has benefited from investment of £9.2m in capital projects in Sport and Exercise since 2014 to meet our strategic aim of creating a sustainable and enabling research environment.

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

Research collaborations, networks and partnerships

The unit has made significant progress regarding its research collaborations, networks and partnerships since 2014. At a local level, we now have memorandums of understanding in place with both York NHS Teaching Hospital and York NHS Mental Health Hospital that include a commitment to collaborate on research and knowledge exchange, and in the latter case a licence agreement for use of space in the hospital. (Both hospitals are located within walking distance of our sports campus.) These two partnerships are strategically important to our aspirations to produce world-leading and internationally excellent research and the type of research we would like to conduct in the future. We have also purposefully sought out research partners at local and at national level to provide staff with opportunities to build their personal networks, gain experience working with external organisations and enhance their likelihood of attracting competitive research funding. At local level, we are working with a range of community users of our facilities (e.g., Coronary Support Group). At national level we are working with a variety of organisations, including NCOP, ConnectSport, NACE and Goalball UK.

Increasing interdisciplinary research is a priority for Sport and Exercise. Our intention is to work closely with colleagues within our school structure to support this type of work. Our collaboration building so far within the school has focused on strengthening links with Biomedical Science who offer complementary expertise, technical skills, and purpose-built laboratories that can enhance our research. To date, there has been one successful joint MSc by Research supervision between Biomedical Science and MPAW focused on psychoendocrinology with another awaiting examination. This work has produced one peer-review publication that systematically evaluated existing research examining perfectionism and cortisol. Two further collaborative grant submissions have been made, one on obesity, maternity and vascular health with PATCH and the other on endocrinological markers of stress with MPAW (funders: Wellbeing of Women and SMarTen). This exciting collaboration holds a great deal of promise for developing research within our UoA and will be the focus of investment over the next REF cycle.

Collaborative research with other universities in the UK and abroad has also helped enhance our reputation and improve our research capability. In all, we have increased the number of collaborating institutions in the UK from 12 (REF2014) to 28 (REF2021) and abroad from 6 (REF2014) to 68 (REF2021) (Source: Web of Science/InCites). Our international collaborators include a number of prestigious institutions that has broadened the networks available to us (e.g., University of Alberta, University of Basel, and University of Hong Kong). This work has been facilitated by a number of initiatives that include laboratory visits (e.g., Brislane to University of Colorado, US), hosting international collaborators to share technical expertise (e.g., J. Dunn, University of Alberta, Canada) and sharing equipment (e.g., University of the West of Scotland, Beaumont).

Wider activities and contribution

Staff are encouraged to support the research community and we have recorded a substantial increase in publications, editorships, editorial board memberships, ad-hoc reviewing for journals and conferences, grant reviewing, research degree examination, invited talks, and other public engagement activities (e.g., media interviews). These are identified below.

Publications. Since 2014, in total, UoA staff (13.0 FTE) have authored and co-authored 126 journal articles (81% in Q1 journals), 22 book chapters and edited three books.

Editors and editorial board memberships. Two members of staff have positions as a co-editor, senior section editor, and section editor at three international journals (Hill, Madigan); *Scandinavian Journal of Medicine and Science in Sport* (Hill), *European Journal of Sport Science* (Madigan), and *International Journal of Sport Psychology* (Madigan). The same two staff are also editorial board members of a further four journals: *Journal of Sport and Exercise Psychology* (Hill), *Sport, Exercise and Performance, Psychology* (Hill), *Performance Enhancement & Health* (Madigan) and *Journal of Sports Sciences* (Madigan).

Ad-hoc peer-review journal reviewing. Staff in the UoA have recorded a total of 233 completed ad-hoc peer-reviews following invitation from editors since 2014 (or ~36 per year) for academic journals outside of work undertaken in their roles as editors. Most of this reviewing has been by members of MPAW (208 total).

Conferences and abstract reviewing. UoA staff have authored and co-authored 123 conference presentations. Staff have also reviewed international scientific conference submissions for the International Society of Sport Psychology (ISSP) (2017, Hill) and European Federation of Sport Psychology (FEPSAC) (2019, Hill). Staff have also given talks as part of invited symposiums at six conferences: FEPSAC (Hill), International Society for the Study of Individual Differences (Madigan), European College of Sport Science (Madigan), ISSP (Hill, Madigan, Mallinson-Howard), The British Association of Sport and Exercise Sciences (Madigan) and Southern History Society (Cock).

Grant reviewing. Staff have also reviewed grant applications for the IOC Olympic Studies Centre (2017, Hill); Chief Medical Officer Directorate, Scotland (2017, Hill); National Science Centre, Poland (2019, Hill, Madigan); ESRC Research Grants scheme (2019, Hill); Heart Research UK (2019, Brislane); Social Sciences and Humanities Research Council of Canada (2020, Madigan, Mallinson-Howard) and Czech Science Foundation (2017, Madigan).

Research degree examination. UoA staff members have externally examined four PhD degrees – two in the UK (Northumbria University and Staffordshire University, Hill) and two abroad (University of Alberta and Lakehead University, Canada, Hill). They have also externally examined two MSc by Research degrees in the UK (University of Birmingham and University of Kent, Hill).

Invited talks to scholarly societies and external organizations. Members of the UoA have given invited talks at various scholarly societies and external organisations: Department for Education (Hill), Royal Northern College of Music (Hill), Universities UK (Hill), Westminster Insight (Hill), Royal College of Veterinary Surgeons (Hill), Yorkshire Philosophical Society (Mallinson-Howard), Student Minds (Hill), The Brilliant Club (Hill), UEFA (Law) and the Football Association (Vaughan).

Media/public engagement. Staff have contributed widely to media/public engagement activities. Some examples include: Pint of Science (worldwide science festival with 600 events across the UK aimed at bringing science to the public [Carter]), Café Scientifique (Mallinson-Howard) and 9 articles for *The Conversation* (a media outlet that publishes work from the academic and research community under a Creative Commons license [Hill=3, Smith=4, Madigan=1, Swain=1]) that have received over 500k reads around the world and have been the basis for more than 98 national and international news stories, and 26 press interviews for radio,

Unit-level environment template (REF5b)

newspaper and television. Staff have also been consultants for television and theatre productions, and layperson books (AH). Outside of this work staff have provided over 40 workshops for students and teachers at schools and colleges.

Nominations and awards. Staff members of the UoA have been nominated and received a number of awards: short-listed for Young Researcher Award (Madigan, European Federation of Sport Psychology, 2015), nominated for European Journal of Sport Science 2019 Best Paper Award (Madigan, Hill), and awarded American Physiology Society Best Article of the Year (Carter, 2018).

Committees. Staff have also been on the organising committees of two conferences (Postgraduate Research Society, Swain; British Sociological Association Postgraduate Conference, Mierzwinski). One member of staff is the secretary for the Leisure Studies Association (Swain).