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| Institution: University of Bedfordshire |
| Unit of Assessment: 24 |
| <p>1. Unit context and structure, research and impact strategy</p> <p>Contributors to Unit of Assessment (UoA) 24 lead novel programmes of research, extending knowledge and evidence-based interdisciplinary practice in the field of sport and exercise science, physical education, health psychology, behavioural science and public health. They harness innovative methodologies, interventions and strategies to solve real-world problems with considerable societal and economic impact at international, national and local levels.</p> <p>All eleven (11) staff whose outputs are entered into REF2021 are full members of the Institute for Sport and Physical Activity Research (ISPAR), based at the Bedford campus of the University of Bedfordshire (UoB). ISPAR facilitates translational applied research, enabling members to publish internationally recognised outputs with clear pathways to impact.</p> <p>ISPAR's strategic mission is: <i>to lead in the development of translational interdisciplinary research related to sport and physical activity, aimed at enhancing education, performance, health and well-being.</i></p> <p>All full members of ISPAR are employed within the School of Sport Science and Physical Activity (SSPA), with 400 hours per year ring-fenced to research and other scholarly activity (ROSA). These staff also sit on the ISPAR Board, namely [current staff]: Aldous, Charalambous, Chater, Fletcher, Hill, Jones (nee Stannard), Mitchell, Newell, Richards, Smith & Zakrzewski-Fruer [0.6fte]; and [former staff]: Bailey. The ISPAR Board works as a committee to oversee ISPAR activities.</p> <p>ISPAR also has affiliate members from SSPA and the Faculty of Education and Sport, who will be supported for the next REF period. These members, namely Baird, Dwyer, Ferrandino (nee Croft), Golding, Ives, Jones, Kozub, Pears, Robinson, Stewart, Wilson, Wu, Wild, Sammon, Bowler and Keyworth, also contribute to the research environment.</p> <p>Under the leadership of Chater and Mitchell since 2016, ISPAR has shifted its strategy from a pedagogy focus in REF2014, to a focus on human performance, physical activity, health, well-being and behaviour change for REF2021, with a specific objective to address the health challenges faced globally in society.</p> <p>The strategic aims of ISPAR are aligned with global public health goals, such as the United Nations 'Sustainable Goal 3: Good Health and Well-being', with Chater identified as one of ten <i>international influencers</i> of this UN goal by the President of the European Health Psychology Society in her annual address in 2018. Nationally, ISPAR has aligned itself with Sport England, governmental and public health objectives, including:</p> <ul style="list-style-type: none"> ● Achieving national behaviour change in relation to physical inactivity (and beyond) ● Supporting NHS need, such as the rehabilitation of those living with long-term conditions (to include 'long COVID') ● Sport policy (e.g. meeting the priority areas for Sport England, including increasing participation for women and girls) ● PE curriculum development (e.g. enhancing health literacy) ● A focus by Government and funders towards prevention (of long-term conditions), informed by behavioural science. <p>With this focus, ISPAR is well positioned as a leading institute in the area of 'moving medicine' and the benefit of physical activity, sport and PE for physical health and psychological well-being across the lifespan. This is evidenced through ISPAR staff and students providing direct consultancy and research to key stakeholders.</p> |

ISPAR undertakes collaboration, co-creation, consultancy and knowledge exchange with a range of partners:

- NHS providers: e.g. Bedford Hospital, Luton and Dunstable Hospital, Great Ormond Street Hospital, local GP practices, Total Wellbeing Luton (integrated physical and mental health service)
- Sports clubs: e.g. Watford Football club, Bedford Blues Rugby Club, Stevenage Football Club, Luton Town Football Club
- Stakeholder organisations: e.g. Sport England, Team Beds & Luton Active Partnership, Virgin Active, FIFA, New Balance, Paradance, Local Authorities, Public Health England, Public Health Wales, CHUMS (child emotional health), SHINE (Spina Bifida, Hydrocephalus), Diabetes UK, Richmond group of charities for the 'We are Undeatable' campaign
- Target populations: those living with obesity, diabetes, and cardiovascular disease, those with disabilities, school children, physical education (PE) teachers, elite athletes, blue-light services (police, fire)

A wide section of society benefits from ISPAR's research, embracing a broad spectrum of interdisciplinary perspectives. These range from life and biomedical sciences to the social sciences, seeking solutions to the physical inactivity epidemic and enhancing human performance in sectors related to sport, education, health and well-being.

ISPAR's interdisciplinary membership includes sports scientists, behavioural scientists, psychologists, biomechanics, nutritionists, exercise physiologists, sociologists, physical educators, coaches and policy professionals. Research spans the life-course, working with children and young people, often in school settings, to adults and older adults within the community, workplace and health care environments.

To achieve ISPAR's strategic mission, the Institute follows the following four objectives:

1. To foster **world-leading interdisciplinary research** related to physical activity and sport with individual, educational, societal and political impact;
2. To produce novel research to **determine the basic underlying mechanisms** for injury and disease prevention, treatment optimisation and human performance;
3. To develop, deliver and evaluate **evidence-based interventions** in areas related to physical activity and sport, to improve population health, well-being, performance, education and social inclusion with sustained impact;
4. To **collaborate with partners** to optimise the translation of research into practice in various contexts in a sustainable manner.

Strategic aim 1: To foster world-leading interdisciplinary research related to physical activity and sport with individual, educational, societal and political impact

Since her recruitment in 2016, Chater's leadership has facilitated the development of three ISPAR research centres that strategically align with the institute's core mission and objectives:

1. Centre for Health, Well-being and Behaviour Change (led by Chater);
2. Centre for Physical Education, Sport & Human Movement (led by Hill);
3. Centre for Physical Activity and Human Performance (led by Bailey and Fletcher until 2020; now led by Aldous and Jones (nee Stannard)).

These research centres are led by senior staff with strong national and international reputations in their fields. Staff and postgraduate research (PGR) students are aligned to at least one research centre and each centre hosts three special interest groups led by staff active in specific areas of research.

The research centres are tasked with and expected to facilitate the achievement of the strategic objectives of ISPAR. Centres meet monthly to discuss research-related activities, facilitate grant applications and paper submissions through discussion and peer-review, and identify cross-centre, cross-institute and interdisciplinary research opportunities. Examples of cross-centre research include the evaluation of Sport England's 'This Girl Can' campaign, by an MA by Research PGR student (Price) led by Hill (pedagogy and social justice), Chater (psychology and behaviour change), Wilson (sport policy and management) and Ives (sport policy and practice).

An example of a cross-institute programme of research is that on workplace sedentary behaviour and cardiometabolic health, with ISPAR staff: Bailey and Chater working alongside Professor David Hewson from the Institute for Health Research (IHR), all of whom co-supervised PhD student Ojo. This has fostered several other collaborations and successful grant applications, including £137,510 from Diabetes UK, testing an intervention to break up sitting time on diabetes management; and £99,977 from the Abbeyfield Research Foundation looking at sitting and sarcopenia. All ISPAR research is encouraged to be interdisciplinary (within and outside of ISPAR) and draw from a bio-psycho-social model, seeing the target population within a 'whole system' with the expectation of impact. ISPAR members actively seek out opportunities to disseminate their work for impact, through links with partners, speaking in arenas including the Houses of Parliament, and through media and public engagement.

The ISPAR board records progress, celebrates success, openly discusses rejection to balance disappointment, and nurtures motivation towards research. The ISPAR board and research centre meetings are minuted to capture this information, which are shared with the Education and Sport Faculty Executive Group and the university-level Research and Knowledge Exchange Committee. An online area within ISPAR's virtual learning environment (BREQ) and a dedicated space on Microsoft Teams enables research centre and institute-wide discussion, and sharing of materials, while also highlighting opportunities for grants, training, and staff/PGR development. An ISPAR newsletter supports the environment further and is disseminated to the broader university and research partners to facilitate wider awareness and impact.

Strategic aim 2: To produce novel research to determine the basic underlying mechanisms for injury and disease prevention, treatment optimisation and human performance

Understanding the bio-psycho-social mechanisms for the prevention and treatment of injury and disease, and processes for optimal learning and human performance are a particular strength of ISPAR. Staff discuss their unique selling points (USPs) to research at their annual ROSAs, with clearly developed areas of expertise: Mitchell (lower limb biomechanics), Charalambous (gait and posture), Fletcher (strength and conditioning), Aldous (environmental physiology), Jones (nee Stannard) (supplements), Zakrzewski-Fruer (breakfast consumption), Richards (cardiac functioning), Smith (cardiometabolic risk), Hill (social justice), Chater (behaviour change), Newell (metabolism), Bailey (sedentary behaviour). Working collaboratively across research centres as part of strategic aim 1, facilitates novel research and combined methodologies that extend scientific knowledge into the underlying mechanisms for injury and disease prevention, treatment optimisation and human performance ensuring a truly interdisciplinary approach. All research aims to extend existing knowledge, rather than solely contributing to the science, evidenced in this UoA's 3-4* outputs.

Strategic aim 3: To develop, deliver and evaluate evidence-based interventions in areas related to physical activity and sport, to improve population health, well-being, performance, education and social inclusion with sustained impact

Since developing the new strategic aims, ISPAR has built the research environment to support world-leading theoretically-driven and evidence-based research, ensuring that it is disseminated to key stakeholders.

The Active Herts Programme

- Chater's work on the 'Active Herts' community-based physical activity programme <https://www.activeherts.org.uk/healthcare-professionals/our-approach/> has been widely cited and generated strong impact. Active Herts has received over £1million from Sport England, local authority and partners, centrally led by Herts Sports Partnership, with Chater awarded £36,400 to facilitate the development, delivery (including training of registered exercise professionals in communication skills and behaviour change) and evaluation of the programme using the theoretical methodology of the Behaviour Change Wheel (BCW).
- Active Herts has reached over 4000 inactive adults from the Hertfordshire area who were at risk of cardiovascular disease and/or poor mental health, offering one-to-one support from an exercise professional trained by Chater and access to local exercise opportunities. The programme has significantly enhanced population-level physical activity engagement and well-being.
- This programme, developed through Chater's research which is focused on the Theoretical Domains Framework, the BCW, and the Behaviour Change Technique Taxonomy, was nominated for a Health and Well-being award in 2018 by the Royal Society for Public Health and has been used by Public Health England (PHE), the Local Government Association, the British Psychological Society and the University College London's Centre for Behaviour Change as a case study of best practice in the design, delivery and evaluation of theoretically-driven interventions.
- At the hub of the BCW, the COM-B model proposes that people need the capability (C), opportunity (O) and motivation (M) to change behaviour (B), providing a stepped approach to intervention development. Chater is an internationally recognised researcher in this area and has built capacity across ISPAR to use this approach. This is evidenced in outputs from Bailey, Smith and Zakrzewski-Fruer, and will feature in future outputs from Aldous, Richards, Mitchell, Hill and Newell currently in preparation. Active Herts features in the most recent Sport England guidance on Behaviour Change Design Principles, PHE's '*Achieving Behaviour Change: A guide for local government and partners*' and in a Sport England symposium highlighting the importance of behavioural science in programme design, delivery and evaluation. Aspects of this work have been disseminated at an all-party parliamentary group (APPG) event by Chater in the House of Commons on behalf of the British Psychological Society (Dec 2018) on ways to use behavioural science to tackle physical inactivity and obesity.
- To disseminate how to use COM-B to change behaviour to the general population, Chater, alongside a registered exercise professional from the Active Herts delivery team, and a client of the Active Herts legacy service Active Watford & Three Rivers, featured as part of a BBC documentary, (The Truth about Improving Your Mental Health, 20th January 2021, BBC One, 9pm), which saw a subsequent increase in referrals to the service after it was aired, and Chater has been an invited speaker in the main auditorium at Cheltenham Science Festival (June 2019) to discuss behaviour change, physical activity and obesity.

Other influential projects

- Building capacity for research in this area further, Chater has trained other registered exercise professionals and health coaches as part of a recently funded (£2.2 million NIHR-HTA) READY trial that aims to test if physical activity can be used as a treatment for young people living with depression, and in a Diabetes UK grant (£137,510) with Bailey that will test if breaking up sitting time can help manage type 2 diabetes.

- Similar training has been provided to the Richmond group of charities, to representatives whose remit is the promotion of physical activity for Sport England's 'We are Undeatable campaign' representing Age UK, Asthma UK, Breast Cancer Now, Alzheimer's Society, British Red Cross, Versus Arthritis, Macmillan, Stroke, Diabetes UK, Mind, Parkinson's Society and the MS Society, using examples from Active Herts to support their organisational objectives.
- Internationally, Chater has disseminated this work as an invited speaker to the Moldovan Government, offering solutions to non-communicable diseases through physical activity. This involved work from her systematic review being translated into Russian and Romanian. Recent grant submissions led by Zakrzewski-Fruer (British Heart Foundation), Bailey (Wellcome Trust) and Wyld (MRC Public Health Intervention Development scheme) and PGR projects with police and fire services (Aldous, Richards, Mitchell) have used this behaviour change approach, benefitting from the interdisciplinary collaborations promoted in strategic aim 1.
- This behaviour change approach has been used to benefit the response to the COVID-19 pandemic, using 'roadmaps' from Chater's behaviour change training model, and research with other ISPAR members such as Bailey and Smith, to develop national guidance, published by the British Psychological Society that has been used within local authorities nationally, promoted by Public Health England and Public Health Wales and used as evidence to SPI-B and SAGE.
- Chater has further spoken in the House of Lords (Dec 2018) on ways to use summer sports clubs to support 'holiday hunger' in young people, linking Zakrzewski-Fruer (breakfast consumption), Newell (metabolism) and Hill (education and social justice) to future research opportunities.

Strategic aim 4: To collaborate with partners to develop innovative evidence-based interventions that optimise the translation of research into practice in a various contexts in a sustainable manner.

The way ISPAR collaboratively works with key stakeholders, wider research networks and community members has been revolutionised. In 2016, ISPAR had its first annual research conference, in which staff and PGR students presented their work to both disseminate and generate collaboration. It is attended annually by external physical activity and public health organisations and members of the public. The conference (annually led by Zakrzewski-Fruer and Chater) is supported by a monthly ISPAR Seminar Series (led by Aldous and Chater) in which internationally recognised researchers are invited to the university to present. The speakers are selected strategically to encourage collaborations that will strengthen the research priorities of ISPAR and its interdisciplinary objectives. These seminars have been online since March 2020, which has enabled international speakers (e.g. Australia), and a significant increase in attendance has been observed both internally and externally, widening ISPAR's reputation. Seminars are now live-streamed on YouTube by Newell, using a novel and vibrant digital platform to enhance engagement. ISPAR additionally hosts bi-weekly research training workshops, bi-monthly two-hour 'Shut Up and Write' sessions (to work on collaborative outputs and grants) and an annual research strategy away day, which includes 'research speed dating' to facilitate further collaboration.

ISPAR holds an annual 'BedsTalk', a campus-based community event, attended by over 100 delegates, designed to translate research findings into public practice and disseminate to the general population. Events focus on areas of research such as 2019's "*Pathways to health and well-being through physical activity*" and 2020's "*Promoting young people's health and well-being through physical activity*". The events promote public engagement in health-based physical activity and offer health checks (e.g. body mass index, blood pressure) to the local community. As part of the BedsTalk, ISPAR has created an #ActiveCampus movement, led by Bailey, Chater, Smith, Mitchell and Zakrzewski-Fruer, encouraging standing meetings and breaking up sitting time each

hour, based on their research into the benefits on cardiovascular and mental health, which the university's central HR department embraces.

Members and affiliates of ISPAR, specifically Richards, Charalambous, Bailey, Chater, Aldous, Ferrandino (nee Croft) and Wyld have links with Bedfordshire's Clinical Commissioning Group, local and national weight management services, local Healthwatch, Bedford Diabetes UK Support Groups, PHE, regional GPs, dieticians, and Active Partnerships, who all attend. Local children, adolescents, families and teachers via regional schools, (relationship-liaison through Hill, Baird, Sammon and Bowler), those from deprived areas via community groups, older adults via care homes and individuals with disabilities via local disability groups (relationship-liaison Ferrandino (nee Croft) and Mitchell) also regularly attend ISPAR events.

These events allow PGR students to meet stakeholders, service users, and those interested in either being part of, or funding, future research, or who may use ISPAR's research in an impactful way. The dissemination of PGR and staff research conducted within ISPAR to these groups has resulted in the development and success of collaborative research funding applications (e.g. the Medical Research Council and National Institute of Health Research), resulting in high-quality publications.

Frequently ISPAR engages the public and stakeholders, deliverers and commissioners in discussions on how they can become involved in research, either directly as participants or indirectly by providing patient and public involvement in PGR research and research grants, which further enhances ISPAR'S research environment. This ensures that the research in this UoA has a real-life impact, for example by helping people achieve the current physical activity guidelines. PGR students contribute to both the development and delivery of all events, and often use these occasions to collect data for their research.

Charities such as SHINE have partnered with ISPAR to deliver events encouraging individuals with disabilities to increase their physical activity, based on ISPAR's research and intervention strategies.

ISPAR engages the public with research at community events, such as the Bedford River Festival (14-15th July 2018) and the Bedford Running Festival (31st August & 1st September 2019), with estimates of 350,000 and 14,000 visitors. These events provide a platform to share research activities with the public and the chance to encourage physical activity and positive health and well-being within the community. Members of the public often enquire about opportunities to participate in research and several PGR students have used this as an opportunity to recruit and collect data (with planned prior ethical approval).

Building capacity for the next REF: Several SSPA staff members who were not entered into REF2021 will receive support to enter the next research assessment. For example Baird, Ferrandino (nee Croft), Wilson and Wyld are being supported through ROSA mentoring and active research teams to provide guidance, opportunities and motivation to build research profiles. ISPAR's strategic aims will continue, with adaptations to the research environment, such as re-branding the special-interest groups to 'research labs' to support researchers' progression into more leadership roles (including supporting Aldous and Jones as new research centre leads since the departure of Bailey in 2020). An annual report celebrating all achievements (e.g. income capture, publications, PGR progression, impact) will also be produced.

2. People

Recruit: Staff from research intensive universities, e.g. University College London (Chater), University of Westminster (Newell), and Nottingham Trent University (Jones nee Stannard) have been recruited to SSPA since 2014 to support the development, implementation and leadership of ISPAR's strategic aims. Research expertise is important when recruiting new staff and internal promotions.

Retain: Promotions to senior research positions, such as to professor (Chater), reader (Mitchell), and senior lecturer (Aldous, Bailey, Richards) have helped to retain research active staff, some of whom who had been offered positions elsewhere, thereby providing security to leadership roles and greater responsibility for career development. Peer-to-peer mentoring is supported as a route to growing the leadership from within the UoA and building early career researcher (ECR) profiles, widening the full membership of ISPAR.

Nurture: All members of ISPAR participate in annual and interim professional development appraisals (ROSAs), led by Chater. This provides research mentoring for short-, medium- and long-term goals. Staff identify their USP and opportunities to enhance their research agenda and outputs. Mitchell line manages SSPA staff and evaluates progress against the ROSA objectives during one-to-one personal development appraisals (PDAs).

ISPAR offers seed funding and fees-only PhD studentships, to kick-start new collaborations, research projects, and equipment purchases. One example is the PHeW (police health and well-being) project, which funded two MSc by Research projects (Yates and Kucuksca), with a multi-disciplinary supervisory team (Richards, Mitchell, Aldous, Chater, Wyld) that provided physiological and psychological screening to Bedfordshire Police as part of its 'blue-light' health and well-being initiative, informing future occupational health interventions. This extended to ISPAR-funded PhD student (Brierley) delivering an office-based intervention at Kempston Police Headquarters, producing significant reductions in sedentary behaviour and improvements in physiological and psychological outcomes.

Aldous, Chater and Ferrandino (nee Croft) continue researching the physiological and psychological health of 'blue-light' workers (firefighters) with an externally-funded PhD student (Beckett). Seed-funding has increased the number of staff who have supervised to completion, thereby expanding ISPAR's supervisory capacity.

Funding from QR allocation supports attendance at external courses, events, conferences, first-aid training, data collection, transcription and printing. All staff and PGRs are encouraged to present their research at the ISPAR annual conference, the annual UoB Staff Conference, ISPAR's monthly seminar series and at external community-facing events. Every year, a member of staff/PGR represents ISPAR at the Student BASES conference and British Psychological Society Division of Health Psychology conference. Staff are encouraged to include these costs in external funding applications to ensure sustained support.

SSPA/ISPAR submits an annual capital bid request to the university for substantial pieces of equipment to support research objectives. During this REF cycle, the successful bids have averaged at ~£70k per year.

ISPAR benefits from horizon scanning of funding opportunities from the Innovation and Enterprise Team, supporting grant applications, project management, research training and impact generation. One-to-one support is available from the Learning Resources and Service Excellence (LRSE) team of academic librarians for research (e.g. systematic reviews) and dissemination (e.g. open access). These teams contribute to ISPAR away-days to ensure staff are well informed.

Links with local hospitals have been strengthened, through the research of Bailey, Richards, and Charalambous. Professor Robert Thomas, Consultant Oncologist at Bedford Hospital has been appointed and, alongside Wyld, Newell, Chater, and Richards, will lead the Bedford arm of an international GAP4 trial funded by Movember to explore the benefits of physical activity for those with prostate cancer. This expands ISPAR's work into prehabilitation before surgery and 'moving medicine,' using physical activity to benefit long-term conditions.

Postgraduate Research (PGR) student growth: To widen ISPAR's interdisciplinary research and achieve the core strategic aims, an investment of £78k from QR funding was made in 2016 for six funded (fees-only) PhD studentships. Supervisory teams were asked to be interdisciplinary and internationally-relevant with real-world impact. This has successfully built supervisory

capacity, with an increase in less experienced staff joining supervisory teams. All teams include an experienced supervisor with Chater or Mitchell joining teams if needed to meet the required level of experience and provide staff mentoring. Where a supervisor takes maternity leave, they remain on the supervisory team, providing support to the student via Keeping in Touch (KIT) days with an interim supervisor assigned to provide the accessible contact. Thirteen (13) ISPAR/SSPA staff (Aldous, Chater, Charalambous, Ferrandino (nee Croft), Dwyer, Fletcher, Zakrzewski-Fruer, Hill, Ives, Jones (nee Stannard), Mitchell, Richards and Smith) currently supervise PGR students, plus Bailey now acting as external supervisor.

PGR recruitment: The way ISPAR recruits PGR students has been transformed. Supervisor capacity has increased with the redefined structure above and staff advertise proposed projects both internally and externally, increasing recruitment. Since the 2013/2014 intake, 98 PGRs were registered and/or active within ISPAR. Of these, 34 are currently active (x20 PhD; x14 MSc/MA by Research); one PhD is interrupted (maternity leave); four were terminated (e.g. due to ill health). There are currently nine (9) doctoral students beyond the internal progression and upgrade points (PP1/PP2) who are set to complete in the next REF period.

PGR completion: Twenty-six (26) doctoral degrees have been awarded since 2013/2014 (similar to REF2014 with 25 completions). ISPAR additionally has a strong tradition of MSc/MA by Research success, which often translates to peer-reviewed publications, and has seen 37 MSc/MA by Research awards made since REF2014.

PGR community: ISPAR has a vibrant PGR community who are introduced at induction to ISPAR's strategic aims and expectations. Research outputs are encouraged as the PGRs rite of passage from day one. The induction programme includes a morning of formal activities including a welcome from the Institute Director (Chater) and group activities. Presentations are given by existing ISPAR members relating to research centres, and existing PGRs welcome new members to the community. The faculty marketing assistant explains how to engage with social media and mainstream press to ensure positive exposure for research activities. Chater discusses the highs and lows of publications, and ways to embrace the skills of a productive researcher (e.g. writing 'power hours' with no distractions). All PGRs and staff are encouraged to create profiles on ResearchGate, Google Scholar and ORCID, and to know their own metrics (e.g. citations when published, H-index) and those of researchers they admire. PGRs meet their supervisors over refreshments and then all attend an evening social event, with a group photo. This welcome and induction is in addition to the formal PGR induction processes provided by the Research Graduate School (RGS).

PGR training: The ISPAR PGR training series has been co-created with PGR students and supervisors. Topics include: 'How to perform/write a systematic review', 'Writing for publication and impact', 'Grant writing and fellowship applications' and more specific topic areas such as 'Intervention design, delivery and evaluation'; 'Fidelity of interventions'; 'Feasibility studies and randomised controlled trials' and practical areas, such as using SPSS, NVivo and Qualtrics.

PGRs are encouraged to attend postgraduate taught (PGT) classes, and shadow their supervisors, on topics such as research methods and behaviour change, both for professional development and peer-review teaching experience.

When developing the ISPAR PGR training seminars, the four domains of the researcher development framework managed by Vitae (<http://www.vitae.ac.uk/>) were considered. ISPAR workshops focus on work-related, as well as research-related skills development, such as data analysis, preparing a CV, applying for academic posts, conference presentations, and writing for publication. Also, students are provided with advice on career development individually by their directors of studies and senior research staff.

Research training is also provided by the RGS alongside English language support if needed. In addition to individual supervisory tutorials, and the training provided by the RGS and ISPAR, PGRs can access sessions delivered by the university's Centre for Learning Excellence. If PGR students

have more specific requirements, such as first aid certification, hepatitis B vaccination, or training in specialist software, they are funded by ISPAR. PGRs are also encouraged to attain Higher Education Academy associate fellowship, supported with writing retreats, workshops and teaching opportunities.

PGR support: All ISPAR PGR students and staff can access disability and mental health support, counselling, financial advice, careers and employability advice. ISPAR PGRs are assigned approximately £1,200pa for consumables, smaller pieces of equipment, training sessions, external courses, travel to free events/lectures/workshops or for data collection, first aid training, transcription and printing.

Annual visit to King's College Medical School

To support the strategic aim to facilitate interdisciplinary research into the underlying mechanisms for disease, injury prevention and treatment optimisation, ISPAR offers an annual visit to the Gordon Museum and Cadaver Rooms at King's College Medical School in London. Students and staff have enjoyed workshops in the cadaver rooms and Gordon Museum, under guidance from a medical doctor, examining healthy and diseased specimens. This is a fascinating opportunity to see first-hand the anatomical impact of diseases such as diabetes, cancer, obesity and cardiovascular disease, comorbidities associated with physical inactivity.

PGR autonomy - Junior ISPAR (J-ISPAR): To facilitate the growth of the research environment, in 2018 under Chater's leadership, the ISPAR board developed a Junior Institute for Sport and Physical Activity Research (J-ISPAR), to be led by PGR students for PGR students. All PGR students were involved in early discussions, covering the need, desire and outline of what this might look like, facilitated by Chater, Zakrzewski-Fruer and Mitchell. PGR students agreed on the name, agenda and terms of reference of J-ISPAR, and internally peer-nominated a committee of at least five other ISPAR PGR students to lead J-ISPAR.

The ISPAR board agreed to provide J-ISPAR with annual funds to support the research environment. Examples on spend include expenses for a group trip to listen to desired speakers, and hosting of pizza seminars. The J-ISPAR meets monthly and reports to the ISPAR board on a bi-monthly basis. J-ISPAR is now well established, strengthening the PGR community, with social activities both with and without their academic mentors. J-ISPAR has an active Twitter account (@IsparJunior) which the PGRs use regularly to share their research, advertise recruitment opportunities and engage with wider academic debates.

PGR representation to ISPAR Board

Two J-ISPAR representatives sit on the ISPAR board, which discusses and supports the progress of all PGRs. The student representatives' provide a PGR-co-created report and are given the floor at the start of the ISPAR board as a priority standing agenda item. The ISPAR board minutes all points for celebration (progression points, publications, dissemination, successful funding) and issues raised by J-ISPAR, alongside the institute response and actions.

PGR career development

ISPAR/SSPA have a focus on preparing research students for future careers. A number of our MA/MSc by Research students and taught postgraduate students were awarded high achiever scholarships by UoB for achieving a first class undergraduate degree, giving them a 50% discount on their first year of postgraduate study. Several PGR students are employed to deliver guest sessions to undergraduate students in their area of research, providing valuable teaching experience.

As evidence of the success in preparing PGRs for the student-to-staff progression, five former UoB doctoral students have graduated from ISPAR (Bailey, Aldous, Ives, Richards, Smith) and been employed as full-time members of academic staff within SSPA during this REF period. Chater is also a former UoB graduate, who was appointed a lecturer/senior lecturer across psychology and SSPA from 2005-2012, prior to her appointment at University College London (UCL), and then returned to SSPA in 2016.

Technical Staff: The technical team supporting ISPAR are fundamental to the research environment and, as such, their CPD is a priority. Annually, the technical team travels to other university laboratories (Luton campus, St Mary's and Bucks New University) to exchange information, good practice and explore research collaboration. The team attends the Elevate event in London, which is the UK's largest physical activity trade show, where the latest fitness, sports science and physical activity products are displayed by over 350 exhibitors. With over 300 presentations on sports science and physical activity to observe, this ensures up-to-date knowledge of developments across the sector.

Equality, Diversity and Inclusion (EDI): ISPAR aims to ensure that research is accessible to all, meeting EDI objectives. Social justice is a particular focus of ISPAR's Centre for Physical Education, Sport and Human Movement. A special interest group around social justice education was formed in 2018 led by Hill, as a collaboration between ISPAR and the Institute for Research in Education (IRED), combining shared research interests around race and gender equity. This aligns with the ISPAR strategy to foster interdisciplinary work and social inclusion; the latter by researching and tackling issues faced by students from minority ethnic backgrounds, those who are first generation university students, and those who commute to university. During COVID-19, ISPAR has promoted the hardship funds and laptops available to PGRs to support their progression. For International Women's Day (08-03-2019), ISPAR used social media messaging to share research around women's sport and physical activity, specifically media representation and female participants in physiology research, as a platform to encourage girls' participation in PE and sport, and gender neutral sport. An ISPAR-led Women's Group was formed in 2019, focussing on understanding and disseminating issues that women in sport/physical activity, and/or higher education may face. PGR students who have researched this area under the supervision of Hill and Chater were showcased at the 2020 ISPAR annual conference.

3. Income, infrastructure and facilities

Income: This UoA has generated **£319,716** since REF2014, which includes funding shared with IHR (£6,558 per institute) for a cross-faculty PhD studentship (supervised by Chater and Pappas in IHR) to investigate an integrated physical and psychological health service 'Total Well-being Luton'; and £8,654 allocated to the PHeW research project from Bedfordshire Police. The global research environment is competitive, making income generation challenging. Moving forward, ISPAR members will have a target income *submission* of £50,000pa, with collaborative research and larger grants encouraged. ISPAR has also received consultancy income, such as £10,500 for commissioned inquiry work from a manufacturer of running shoes.

Digital Infrastructure and Facilities: To facilitate ISPAR's strategic aims, the digital infrastructure surrounding UoA24 has been transformed since REF2014:

- **ISPAR website:** has been substantially reformed, now highlighting staff and PGR profiles, successful income capture, publications, partnerships and ISPAR news. As an externally-facing environment, it aims to encourage other partners and prospective PGRs to collaborate with and join ISPAR/J-IPAR: <https://www.beds.ac.uk/ispar/>
- **BREO and Teams:** are now used to host all relevant research, dissemination and training materials, along with research centre, J-IPAR and ISPAR board minutes;
- **Grant tracker:** extending what is provided by UoB's central bid support team, ISPAR has developed an editable tracking document to list grant applications that have been successful and unsuccessful for comparison and guidance, and those that people are working on to facilitate collaboration;
- **Publication tracker:** an editable record of published papers enables ISPAR to record outputs and generate an annual report for celebration;
- **PGR community:** PGRs have their own space to connect and share documents, hold discussions, both on a Blog via BREO and as a conversation in Teams, with a calendar for PGR training and social events.

Physical Infrastructure and Facilities: The estates infrastructure has changed beyond recognition with a £110m redevelopment of the University of Bedfordshire campuses.

Bedford campus

The physical estates and facilities have been developed to facilitate world leading, impactful research. In January 2015, the new Gateway Building (£14m) was opened on the Bedford campus boasting flexible learning spaces, such as a Harvard-style lecture theatre, PC and Mac suites, independent study rooms, various sized meeting rooms, high-quality teaching spaces with standing and treadmill desks, informal learning spaces, lecture theatres with standing desks, a coffee shop and a new student services centre. As a result of substantial, annual capital bid funding led by Mitchell, the sports science and physical activity laboratories have had significant equipment upgrades alongside purchases of cutting-edge equipment and the manufacture of bespoke rigs and platforms for innovative research.

Further development includes:

- National standard 300-seat sports arena;
- All-weather, multi-use AstroTurf games area;
- High-tech fitness centre;
- Outdoor basketball/netball/tennis courts;
- Sports Therapy and Rehabilitation Clinic (£2.5m);

This has allowed ISPAR/SSPA to develop the UoB Community Exercise Clinic, led by Wyld, attended by those with long-term conditions, facilitated by ISPAR PGRs, and meeting our strategic aim to support *moving medicine*.

Luton campus

In 2014, the new Postgraduate and CPD Centre (£17m) opened on the Luton campus with:

- 4,254m² of space over five storeys;
- State-of-the-art IT and AV equipment;
- Lecture theatres, (including two Harvard-style);
- Informal learning spaces;
- Quiet study areas;
- Student lounge.

In October 2016, a new library (£30m) opened on the Luton Campus with 24/7 access to:

- 7400m² of space over seven storeys;
- 154,000 books on six km of shelves;
- 916 study spaces;
- Laptops available for loan;
- 530 new PCs;
- Study hub for guidance on academic skills.

In June 2019, the new £40m Science, Technology, Engineering & Maths (STEM) building opened on the Luton campus offering:

- 6000m² of new teaching space for STEM subjects;
- Large, flexible, computer laboratories and workshops;
- State-of-the-art facilities including specialist containment labs, simulation spaces, analytical labs and sterile facilities;
- Science and Engineering Outreach Centre to promote the value of science and engineering to local schools and the wider community.

These facilities support staff and student health and well-being, providing excellent facilities for sport, physical activity and learning, alongside state-of-the-art facilities for research and public engagement.

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

Research Collaborations: ISPAR members collaborate nationally and internationally, to include Europe, Australia, New Zealand, Columbia, Canada, America, Nepal, Kenya, South Africa and China. ISPAR's research has helped inform several local (e.g. Bedfordshire/Hertfordshire Local Authorities, County Sport Partnerships), national (e.g. Public Health England; British Psychological Society, Sport England) and international (e.g. Moldova, Qatar) strategy documents.

Collaborative research and income generation: Bailey has formed collaborations with world-leading researchers, Professor David Dunstan (Baker Heart and Diabetes Institute, Australia), Professor Stuart Biddle (University of Southern Queensland, Australia), and Dr Charlotte Edwardson (University of Leicester) to further develop ISPAR's sedentary behaviour research and successfully bid for funding. Bailey's group also collaborate with Professor of Applied Disability Sport, Vicky Tolfrey-Goosey, at Loughborough University securing funding from Heart Research UK to conduct the first study worldwide investigating the effects of interrupting sedentary behaviour on cardiometabolic health in people with a spinal cord injury. Zakrzewski-Fruer is part of the International Life Sciences Institute (ILSI) Europe Expert Group on the 'Health relevance of lowering post-prandial glycaemia in children and adolescents through diet', leading research in this area. Chater has successfully been awarded research income of ~£5million in the current REF period as principal investigator (PI), local-PI (in multi-site trials) or co-applicant. Her collaborator institutions include University College London, King's College London, Loughborough University, University of Hertfordshire, University of Buckingham, University of Manchester, Ulster University, Queen's University, Cardiff University, the University of East Anglia, University of North Carolina and Monash University. She is an Associate of the world leading UCL Centre for Behaviour Change (CBC), led by Professor Susan Michie, working closely with the CBC, to share research and consultancy opportunities and enhance the impact the collaborative teams can have, specifically within public health.

Networks & Partnerships - Building translational scientist-practitioner-policy communities: A particular strength within ISPAR are the links to national networks to support others to reach their full research potential. Chater has been instrumental in the development of many of these.

The Health Psychology and Public Health Network: In 2013 Chater and a small team, many of whom were her former students, were awarded £10,000 seed-funding from the Director of Public Health in Hertfordshire to co-develop the Health Psychology in Public Health Network (HPPHN). When developing this network, the core mission was to bring together academics, practitioners, commissioners, elected members and public health consultants for the common goal of improving population health, aligned to ISPAR's strategic aims. Chater became Chair of the HPPHN in February 2017. In September 2017, ISPAR hosted a HPPHN event that saw academics, public health consultants and practitioners from across the UK join to discuss issues related to education, training and behaviour change approaches to increase physical activity levels and enhance population health. Chater spoke at a PHE event in April 2017 on ways to use behavioural science in public health and welcomed Duncan Selbie, Chief Executive of PHE as the HPPHN conference keynote in February 2018.

The Behavioural Science and Public Health Network: With significant investment from PHE (£20,000), as Chair of the HPPHN, Chater oversaw its re-development to become the Behavioural Science and Public Health Network (<https://www.bsphn.org.uk/>) in June 2018, to widen the Network's reach and impact. The BSPHN became the 'community of practice' for PHE's Behavioural and Social Science Strategy (Sept 2018): *'Improving people's health: Applying behavioural and social sciences to improve population health and well-being in England'* ([https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/744672/Improving Peoples Health Behavioural Strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/744672/Improving_Peoples_Health_Behavioural_Strategy.pdf)). Chater was a co-author of this strategy, developing and influencing policy nationally.

Under her leadership, the BSPHN has received recognition as a Learned Society Member of the Academy of Social Sciences and has hosted a series of successful events with eminent speakers, including those leading the health and well-being agenda in Sport England, Active Partnerships

and PHE. The network has successfully created BSPHN regional hubs that offer CPD for public health professionals, receiving over £65,000 from Health Education England to support this. Chater's work in this area is disseminated to ISPAR members and PGRs, whom are encouraged to attend events to facilitate networking opportunities.

Academic citizenship influencing policy: In July 2019, Chater was elected as Chair of the British Psychological Society's (BPS) Division of Health Psychology, enabling her to continue to build networks to support health, well-being and behaviour change. ISPAR receives £10,000 financial recompense for time allocated to this role and the prestige that comes with the leadership of a national professional body. In this role, Chater sits on the BPS Senate, and has pledged to promote health psychology in the *prevention* agenda. Since COVID-19, she has led a BPS COVID-19 Behavioural Science and Disease Prevention taskforce, developing a series of guidance documents for government and local authorities: (<https://www.bps.org.uk/member-microsites/division-health-psychology/resources>), some of which have been used as evidence to SPI-B and SAGE. The public health teams of the UK four nations have used this guidance, and Chater has presented to the four nations and cabinet members by invitation at a PHE 'Lunch and Learn' session. The guidance documents include theoretically-driven recommendations, drawn from Chater's behaviour change research, for:

- physical activity <https://www.bps.org.uk/sites/www.bps.org.uk/files/Policy/Policy%20-%20Files/Covid-19%20Public%20Health%20Road%20Map%20%E2%80%93%20Physical%20activity.pdf>
- and
- sedentary behaviour <https://www.bps.org.uk/sites/www.bps.org.uk/files/Policy/Policy%20-%20Files/Covid-19%20Public%20Health%20Road%20Map%20-%20Sedentary%20behaviour.pdf>

Other preventative behaviours, such as self-isolation and hand hygiene, are also included, some of which have been co-developed with colleagues from the World Health Organisation. Chater has represented Health Psychology internationally, as the UK National Delegate to the European Health Psychology Society (EHPS; 2012-2018).

Mitchell is Chair of the Division of Biomechanics and Motor Behaviour at the British Association of Sport & Exercise Science (BASES), BASES board member, Chair of BASES Learning and Development Committee at BASES and is a member of the International Ankle Consortium.

Relationships with Key Research Users, Beneficiaries and Audiences: Hill is associate editor of *Frontiers in Sport and Active Living: Physical Education and Pedagogy*. Charalambous is a reviewer of six peer-reviewed journals including the *Journal of Sports Sciences* and *Sports Biomechanics*. Fletcher is a reviewer for ten peer-reviewed publications including *Journal of Strength and Conditioning Research* and *British Journal of Sports Medicine*. Newell is a reviewer for *Frontiers in Sports and Active Living*, *Nutrients* and the *International Journal of Sports Nutrition and Exercise Metabolism*. Zakrzewski-Fruer peer-reviews for several journals, including *Applied Physiology*, *Appetite* and *PLOS One*. Chater is an editor and co-founder of *Health Psychology and Behavioural Medicine*, and the *Behavioural Science and Public Health* publication and reviewer for numerous journals such as *Translational Behavioural Medicine*. She is an invited stakeholder on the Sport England advisory panel for the new physical activity campaign, 'We are *Undefeatable*' to support those living with long-term conditions; a Versus Arthritis physical activity adviser, and sits on Luton and Bedford Borough Council's healthy weight strategy groups. She has furthermore been an invited advisor and co-author to the NIHR-themed review of physical activity interventions, launched in July 2019, and has supervised an intern within PHE's Physical Activity team. She has provided evidence based on her research to several APPG inquiries on the future of Obesity Services, and led the media interactions (with over 300 global outputs) of a co-authored obesity report published by the British Psychological Society.

Wider Activities and Contributions to the Research Base, Economy & Society: ISPAR staff have been invited to give keynote addresses including: The House of Commons APPG on 'Psychological Understanding of Obesity'; the House of Commons Roundtable on Obesity; the

House of Lords Roundtable on Holiday Hunger and Street Games; the Cheltenham Science Festival main auditorium session on 'Obesity: Who is to Blame'; GlaxoSmithKline Human Performance Laboratory Webcast on 'The developing athlete: considerations to support energy for growth, maturation & physical performance'; numerous events for the British Psychological Society; Behavioural Science and Public Health Network; Public Health England; Team Beds and Luton County Sport (now Active) Partnership; Bedfordshire's Physical Education Conference, and the London Marathon Medicine Conference, to name a few. ISPAR and SSPA contributed data to the Physiological Society and Guild HE report, 'Sport & Exercise Science Education: Impact on the UK Economy', which was recently launched at the Houses of Parliament.

Hill and her team have led work on social inclusion and community engagement with research on social justice to ensure that pre-service or in-service teachers are well prepared to engage all young people in physical education and physical activity, with the aim of reducing marginalisation and stereotypes. This compliments research by Bowler and Sammon on health-based rather than sport-based PE, shared through networks for practitioners, helping over 1000 PE teachers implement this health-based pedagogical model.

External PGR Supervision: ISPAR staff have supervised additional external PGR students:

- Chater (University of Hertfordshire, 2xPhD; University College London, 2xPhD; Loughborough University 1xPhD; three of whom have completed);
- Mitchell (University of Hertfordshire, 1xPhD);
- Zakrzewski-Fruer (Loughborough University, 1xPhD)
- Smith (University of Derby, 1xPhD);

These support collaborative working and contribute to ISPAR's strategic aims by extending interdisciplinary research, reach and impact. Chater is also supervising four health psychology 'Stage 2' trainees (at University of Bedfordshire, University of Buckingham and King's College London) registered through the British Psychological Society's accredited supervisor route, enabling Health and Care Professions Council (HCPC) registration as Practitioner Psychologists, with income and/or outputs related to this attributed to ISPAR. This further supports our impact nationally and continues to grow collaborations with our research partners. With support from PHE, cabinet members and the Director of Public Health in Buckinghamshire, one of these trainees is fully funded (£122,000) by Buckinghamshire Council. Chater is developing a national blueprint for this training model, with PHE and Health Education England's support. Several staff additionally supervise PGRs across the university, with Hill supervising a PGR in the Institute of Applied Social Research (IASR), and Chater and Bailey supervising PGRs in the Institute of Health Research (IHR), facilitating cross-faculty collaboration.

Examination of PGRs by ISPAR/SSPA Staff: Staff are actively involved in serving as external examiners. In the current REF period:

Chater has externally examined nine PGRs:

- Six PhD (Leeds Beckett University, 2020 - Dietary behaviours of elite athletes; University of Leeds, 2019 - Stress on eating behaviour; Ulster University, Northern Ireland, 2017 – Children with complex health needs; University of Sheffield, 2016 – Physical activity and university transition; Newcastle University, 2015 – Adolescent eating behaviour; Ulster University, Northern Ireland, 2015 – Mental health);
- One DHealthPsych (Staffordshire University, 2019 – Health Psychology portfolio);
- Two PhD by publication (Coventry University, 2017, Behaviour change and impact; University of Worcester, 2017, Healthy eating in children).

Charalambous has externally examined three PGRs:

- PhD (University of Lincoln & Sheffield Hallam University - biomechanics)
- MSc by Research (Canterbury Christchurch - biomechanics)
- Plus three MSc by Research as internal examiner

Mitchell has externally examined three PGRs:

- MSc by Research (Swansea University, 2018 - Golf biomechanics).
- MSc by Research (University College Dublin, 2019 – Syndesmosis sprains in rugby)
- PhD (Loughborough University, 2019 – Ankle sprain biomechanics)

Newell has externally examined one PGR:

- MSc by Research student (University of Birmingham, 2019 – Carbohydrate metabolism and performance)

Changing the Game by Changing the Players (ERASMUS+): With European Union Erasmus+ funding, ISPAR staff have explored how sport could be used as a tool to empower young people, women and girls. This involved engagement with six organisations across four European countries, the findings of which were presented at a conference at the University of Bedfordshire in December 2017. This interactive event allowed students, staff and local employers to share findings, promote best practice and foster innovation around sport and social outcome. The project enhanced ISPAR's research environment, developing knowledge of sport and social outcome in innovative ways; broadening horizons of sport from a European perspective; and providing networking opportunities. Following the events' success, further Erasmus+ funding has been secured (by Wilson), who will be supported for the next research assessment.