

Institution: University of Bradford

1. Context and mission

The University of Bradford is a medium-sized university (~500 academic staff, 230 having significant responsibility for research, SRfR) with a 55-year history of the creation of knowledge through fundamental and applied impactful research, in line with our motto "Give invention light". Our activities are spread across four faculties (Life Sciences (155 FTE); Engineering & Informatics (90 FTE); Health Studies (121 FTE); Management, Law & Social Sciences (122 FTE)), using our Research and Knowledge Transfer (RKT) Centres to aggregate high-quality research capability that enables us to present a relevant and valuable offering to diverse industry sectors.

We operate an academic workload model (AWLM), underpinned by the principles of equity, transparency, efficiency and effectiveness to make sure each member of staff is given the opportunity to excel in their area(s) of strength, including being given sufficient time and opportunity to develop, undertake and publish their research. Wide engagement with the research community is actively encouraged; our academics are active within UKRI (having staff representation across the Research Councils and their Colleges), REF panels, editorial positions on high quality publications, and positions on technical committees for high profile international conferences.

Over the past five years the University has built upon its areas of academic excellence, developing our research portfolio such that we are now able to present UoA A4 and B8 for the first time. Following the appointment of Vice-Chancellor Professor Shirley Congdon in 2019, we have cemented our mission to drive sustainable, social and economic development through outstanding research and innovation in a values-led environment. During this assessment period, we appointed Bridgeman (initially as Pro Vice-Chancellor - Research & Knowledge Transfer, now Deputy Vice-Chancellor - Research, Innovation & Engagement) to reform our research leadership.

The University is a member of Yorkshire Universities (YU) and our VC is the Chair. YU is a mission group operating to maximise the contribution of higher education to the region, and beyond, through collaboration, where this generates greater impact and public benefit. While our research foci are global in nature, we use the City of Bradford as our local platform for international impact, reinforcing our status as the University of and for Bradford, whilst also making key international contributions to research and innovation.

Our university is situated in the youngest (~42% of the population is under 30) and one of the most international cities (more than 140 languages spoken) in the UK. Prior to the COVID-19 pandemic, its economy was growing rapidly. Gross Value Added (GVA) increased by 20% between 2010 and 2020, outpacing Sheffield, Newcastle and Nottingham. However, the District has higher than average levels of deprivation and a wide disparity in health and social outcomes between its poorest and wealthiest. Consequently, Bradford was ranked second least most socially mobile area in England by the Social Mobility Commission in 2020. We recognise and welcome the crucial role we play in the economy, health and wellbeing of our place. We were delighted to be positioned first in the recent ranking of universities' impact on social mobility, demonstrating that whilst being located within a city of relative disadvantage, we are a leader in this societal imperative. We make an important contribution to the education, skills development and social mobility of our local workforce and are delivering a strong outputs-focussed Action and Participation Plan. 46% of our students come from local communities and 72% of our graduates find employment in the region. As one of the largest employers in Bradford, we also contribute an estimated GVA of GBP130,000,000 to the total economy; with 1,222 employees and creating an estimated further 1,100 jobs in the supply chain.

We are a system leader; a vital part of the local recovery plan. We are an anchor institution of the Bradford Economic Partnership, a team of senior leaders from key organisations. The Partnership works to set the strategic direction and to support economic development and

regeneration in the Bradford District, demonstrating the University's key role in place-based leadership. We were proud to establish the Bradford Health and Social Economic Partnership which is implementing a transformational workforce development plan for the health and social care economy to improve skills and social mobility in Bradford.

Our local engagement through education and training includes schools outreach, involvement in regional networks and local partnerships with large scale initiatives such as the Industrial Centres of Excellence, Bradford Science Festival and the Bradford Literature Festival. We are a key partner in Bradford's bid for City of Culture, 2025. These partnerships have raised our profile, given us greater access to our target recruitment audiences, enabled us to share our assets and facilities and created KT opportunities for our academics.

2. Strategy

Goals for research and impact during the assessment period

Over the majority of the assessment period, we have worked to an RKT strategy that focussed on *Advanced Health Care*, *Innovative Engineering*, and *Sustainable Societies*, delivering positive impact on the communities with which we engage. This was an extension of successful work that led to us being ranked second in the UK for the proportion of REF2014 impact case studies that affected the HEI's home city.

Recognising that fundamental research is essential feedstock to our translational and contract research activities and KT, we targeted a portfolio of 50% fundamental research, 25% translational and contract research, 25% KT, which has been broadly achieved. In 2017/2018 we posted Research Grants and Contract Income of GBP7,300,000 with ~60% attributed to a range of disciplines across strategic areas including Advanced Materials, Applied Health, and Archaeology, and held 105 research and 268 consultancy contracts.

Details of future strategic goals for research and impact over the next five years, across the institution

In 2019, we revised our Research and Innovation (R&I) strategy to focus on enhancing the excellence, significance and reach of our R&I activities across the University and lay out a framework for continuous improvement in the *quality* and *quantity* of our R&I activities.

Our R&I vision is to *empower and encourage our researchers to deliver internationally-leading, interdisciplinary research and innovation that will shape and benefit future societies*. The revised strategy targets investment in retaining excellence where it already exists and developing excellence in areas that are able to demonstrate potential.

To monitor our R&I performance, we focus on:

- Research quality, (3* and 4* outputs).
- Proportion of academics with SRfR.
- Proportion of academics holding external research grants.
- Proportion of academics supervising PGRs.
- Research grant income and funder diversity.
- Volume and quality of PGRs.
- Interdisciplinarity and collaborations.
- Impact on non-academic community in social or economic terms and engagement with commercial organisations (via our business and community engagement strategy).

Enabling and facilitating impact, identifying targets, and wider contributions to economy and society

Through our innovative business and community engagement strategy, we support several strands of engagement activity in the region, *viz.* improvements to graduate employability, peer-to-peer business networking and skills development, research and innovation collaboration, business incubation, and strategic engagement with business-focused groups. We assign

particular social value to developing collaborations between academia, organisations from public and private sectors and citizen stakeholders, in co-design/co-creation activities. We develop, maintain and strengthen new and extant collaborations with business, third sector and research institutions across the world, using our existing networks and developing new ones via opportunities such as the World Technology Universities Network.

We deliver impact arising from our research via our Knowledge Transfer strategy (KTS) and Impact strategy; the former focussing on innovation being “the matching of what’s needed with what’s possible for economic benefit and/or public good” and the latter adopting the UKRI impact definition: “the demonstrable contribution that excellent research makes to society and the economy”. The institutional impact strategy aims to expand the impact of our research and to enhance impact on public policy, society, health outcomes, and the economy; whereas the KTS mission is to foster match-making through relationship development and IP commercialisation. For example, the Centre for Applied Dementia Studies pioneered person-centred care research and, through international training courses in Dementia Care Mapping™, has reached thousands of practitioners. We received the 2015 Queen’s Anniversary Prize in recognition of this work.

The University’s Research and Innovation Services (RaIS) team works in partnership with our academics to nurture a sustainable environment for undertaking research and delivering impact of the highest quality for societal benefit worldwide. Via QR, we provide an internal Research Development Fund (RDF) for staff that supports sandpit events to generate concepts and ideas with colleagues from within and outside the University, follow-on funding to develop impact arising from research, the funding of policy commissions and symposia to provide academics with appropriate engagement platforms, IP funding, and internal and external celebrations of research via showcase events and personal rewards.

We have a very strong track record in SME support through local and regional collaborations (Access Innovation, Ad:Venture (ESIF); Digital Catapult Centre Yorkshire, Yorkshire Innovation Fund), as well as independently (SME Knowledge Network; KTP Office). We publish patents, agree licences and spin out companies at twice the rate per GBP spent on research by all EU-based research organisations; a rate that is comparable with Leeds and Manchester. Our licensing operations have benefited regional partners, such as Principle Healthcare and Arterius.

Regionally, we engage closely with the Leeds City Region Enterprise Partnership (LEP) through participation in numerous governance and working groups. The LEP is the sponsor of the Digital Health Enterprise Zone (DHEZ). We develop corporate relationships by promoting the benefits of innovation, training, widening participation and regional development projects, and in employing our graduates. We typically target regional SMEs and large organisations with premises in the region and identify appropriate academics for external innovation engagement.

Nationally we focus on partnerships with major organisations. We work with NHS partners on local healthcare projects with national impact, e.g. Better Start Bradford, Connected Yorkshire, Digital Bradford 2020, Enhanced Care in Care Homes Vanguard. We enjoy strong, multifaceted interactions with large, high-profile organisations whose strategic objectives map onto our academic themes including Ellen McArthur Foundation, the Circular Economy 100, Jaguar Land Rover (JLR), Morrisons, LCR LEP, Bradford Council, and many NHS organisations. These connections enable us to maintain awareness of the changing environment for innovation in the industry, to bid for major research collaborations, to develop supply-chain connections and to enhance our national reputation.

Strategic partnerships with global organisations represent a component of our international focus. We are highly active in China, having served BEIS as UK-China Focal Point for health innovation and continuing to operate a biannual series of Open Innovation (OI) Workshops funded by Chinese municipal governments. Our OI team secured British Council support for a UK-China Prosperity Fund project to stimulate bilateral education and mobility of innovating student entrepreneurs.

We build on our partnerships to deepen relationships and spread our influence more broadly. For example, following many years of contributing to the JLR in-house Masters programme in reliability engineering, six-sigma, quality engineering, and failure mode avoidance, we have joined the international SAFI Consortium of Renault, Airbus, PSA, Valéo and IAV (an automotive and transport engineering company), which operates in the field of statistical analysis, processing big data and smart data.

Our strategies recognise the vital role of partnerships to achieve impact. We recognise that support is required to facilitate our academic staff and external partners to maximise the impact of our research. Academics access internal support via the central Impact, Research Support, and Commercialisation teams. Support takes many forms, including access to bespoke impact training, and financial support to facilitate the realisation of impact. Training considers impact in a variety of contexts, including public policy, social, economic, and environmental outcomes, and commercial exploitation.

The RaIS team is tasked with increasing commercialisation, consultancy and IP across all faculties. RaIS works closely with academics and provides specialist skills and knowledge to support development of those novel ideas which show potential through to licensing or new venture creation. The team also provides awareness and skills training in IP and commercialisation to staff and students, enabling better quality in commercialisation activities whilst equipping the individuals concerned with skills that will benefit them throughout their careers.

Open research, ethical responsibility and research integrity

We perform to the highest standards of honesty, integrity and rigour in our research, informed by appropriate policies and procedures, ensuring open access to outputs and data for publicly funded research and compliance with the Research Concordat.

The University is a signatory to the Universities UK concordat to support research integrity, and to the San Francisco Declaration on Research Assessment, affirming our commitment to the responsible use of research metrics. In addition to Executive Board leadership and University Council oversight, we operate an expert group to ensure the responsible use of research metrics is reflected within core University processes.

RaIS delivers training on, e.g., use of social media and publishing for non-academic audiences using outlets such as *The Conversation*, which we use to increase accessibility of our research. An annual open research week was launched in 2017 with nationally-recognised expert speakers giving seminars. Our Open Access (OA) policy requires authors to ensure bibliographic details of all research outputs are recorded in the University's institutional repository on acceptance for publication, and that journal articles and peer-reviewed conference papers in the institutional repository are made OA via Green or Gold routes, subject to funder/publisher constraints. Authors (including PhD students) are required to acknowledge the source of research funding and must comply with the funders' policies relating to OA and research data management.

3. People

Staffing strategy

We offer equality of opportunity for academic staff to flourish and succeed in their research. We have explicit expectations of research performance, from Early Career Researcher (ECR) to Professor, and offer staff the opportunity to use their research successes to further their careers via a clear and transparent promotions process, the "Bradford Academic Career Journey".

We actively promote a culture that supports staff via our wellbeing services which have been designed to help staff take control over their wellbeing and contain a wealth of resources and signposting to University services and to relevant external organisations.

We operate many forms of flexible working including homeworking, part-time hours, job shares,

flexitime, compressed or annualised hours, career breaks, staggered start and finish times or self-rostering, with additional support and benefits for staff returning from a career break, including phased return. We operate a nursery (children from 3 months to 5 years), discounted for staff and students.

Our recruitment policy is to attract and retain high calibre academic staff, capable of undertaking excellent research. Crucially, we recognise the varying development needs of staff at all levels of expertise and experience, and seek to identify and grow nascent talent, rising stars and aspiring research leaders.

We support our academic staff in meeting expectations via appropriate allocations of time in the AWLM and a commitment to a robust and transparent sabbatical policy, and via direct internal financial investment. Under the DVC (RIE)'s leadership, we have introduced a series of initiatives to enhance the research culture, including a major programme of inward investment for research, researcher development, robust and meaningful mentoring, peer review and 5-year personal action plans. We have introduced Research Writing Retreats where staff are given 2 or 3 days to spend focussing entirely on completing a research writing task as well as more frequent, half day "Shut Up & Write" sessions. Our Organisational Development team organises a core programme of staff learning and development events for personal and professional development, designed to support staff in the achievement of our strategic objectives.

We are signatories to the Technician Commitment which provides development opportunities via the National Technicians Development Centre (<https://www.bradford.ac.uk/about/our-structure-and-organisation/our-technicians/technician-commitment>, <https://nationaltechnicianscentre.ac.uk>).

Our annual Performance Development Review process affords all academic staff (irrespective of REF eligibility) the opportunity to discuss research activity and outputs with their line manager and to advise of any individual circumstances that may affect research activity. This is a transparent process that operates at a local level and is used by managers and employees to discuss and agree expectations and individual performance objectives, taking into account other workload factors and disciplinary norms. In 2018, we introduced Personal Research and Innovation Plans (PRIPs) to support staff in their research planning. Focussing only on R&I activities, the PRIP asks academics to consider their anticipated research activities (grant applications, publications, industrial liaison, etc.) for the forthcoming five years. This is reviewed annually and is used to inform PDR discussions and research performance expectations.

Concordat to Support the Career Development of Researchers

We recognise the need to maintain a pipeline of academic talent. Throughout the REF period, we have been a signatory to the *Concordat to Support the Career Development of Researchers*, and signed up to the revised version, launched in November 2019. DVC (RIE) leads our approach to the ongoing management of Concordat compliance. UoA-specific Environment Statements provide details of fora for ECRs that are run within faculties. Our RDF prioritises applications from ECRs for pump-priming projects, conference attendance, and PhD studentships.

Postgraduate research students

PGRs play a vital role in sustaining our vibrant research community. We understand the global need for highly-skilled, agile and flexible researchers in the future and so we provide our PGRs with every opportunity for personal and professional development via our PGR Framework. The Framework provides multiple training and development opportunities that help our PGRs and their supervisors determine a personalised and progressive plan for PGRs to meet their potential. In addition to developing the skills required to ensure project success, PGRs access training that develops skills, understanding and qualities represented by the Researcher Development Framework to become competent, independent, highly-employable researchers.

All faculties and relevant professional services contribute development sessions to a central

offer, so that any candidate from any discipline may access anything of relevance from the shared offer. This avoids duplication, whilst fostering a collaborative research culture where candidates routinely meet, network with, and learn from peers and experts inside and outside their immediate field.

The Framework comprises:

1. Personal self-audit and regular needs analysis to ensure that both project-specific, and advanced transferable, researcher skills are developed.
2. Expert- and PGR-led workshops and seminars on a variety of topics and skills.
4. Cross-institutional transdisciplinary events (e.g. PGR Lounge, 3-Minute Thesis, PGR Conferences).
5. L7 research methods modules from all faculties.
6. Opportunities to access external training (e.g. via the White Rose ESRC DTC).

During the REF period, we introduced *PGR:Connect*, a peer support initiative to provide connectivity and mental wellbeing for our PGRs. Funded by the OfS PGR Catalyst Fund, this initiative was part of the Catalyst Network, which aims to establish shared practice for supporting mental wellbeing in the PGR community. The project has an emphasis on preventative early intervention initiatives and the development of a peer support model within which a healthy, thriving and connected PGR student community can be cultivated; one that will last beyond the Bradford PGR experience.

Equality and diversity

We are at the vanguard of equality, diversity and inclusion (EDI) and place EDI at the centre of our mission and ethos, recognising that a diverse workforce increases impact. EDI is promoted via a specific strategy that uses a comprehensive approach to address inclusion, enhance representation and participation of under-represented groups and encompasses the entire academic community of staff and students. Archibong, a leader in inclusion and diversity, is PVC-EDI. We have recently appointed four senior academics to the 50% role of Associate Dean-EDI (one in each faculty) and will shortly appoint two further 50% roles to cover the Professional Services directorates.

Our Centre for Inclusion and Diversity (CfID) delivers activities designed to support the development of an inclusive culture for all. CfID organises regular seminars, networking and support events celebrating diversity (e.g. International Women's Day Speed Networking in 2019 and 2020), as well as the annual Rosa Parks Symposium that has run for 16 years. Archibong led the EU-funded project, GENOVATE, which resulted in development and implementation of gender equality action plans in several member institutions.

We were one of the first institutions to form a Neurodivergent Staff Support Network, one of five staff/student networks that seek to provide a supportive networking environment; influence the University's EDI agenda; contribute to policy and decision making; act as a consultative body to the University on matters relating to EDI; and celebrate success (the others being gender, race, LGBT+, and disability). Our achievements are evidenced in our award as the Times and Sunday Times University of the Year for Social Inclusion 2020.

In addition to our Athena SWAN (AS) awards, we are a University of Sanctuary and are working towards a Race Equality Charter Bronze award as well as becoming a dementia-friendly institution. AS actions are embedded in key strategies to mainstream AS principles across all functions, including our COVID-19 Recovery Plan.

We operate mandatory EDI training, in addition to training in the effective management of staff, undertaking PDRs (both as manager and employee) and mental health awareness.

Details of how we have given regard to EDI in the construction of our REF submissions across UoA are provided in our Code of Practice. An examination of the demographics of our submission shows a distribution of 25% Professor, 24% Reader/SL, 46% L/(S)RF, with the remaining 5% being senior management. Our academic staff at 31/07/2020 is 46% female overall and our REF return comprises 31% female staff. The data from the last available gender pay gap survey in March 2019 show for staff with SRfR a mean gender pay gap of 10.3%. We are taking action through our Pay Gap Action Plan to close gaps including monitoring of pay gap rates on an annual basis, increasing diversity of recruitment, and supporting the career progression of female staff.

4. Income, infrastructure and facilities

Strategies and supporting activities for generating research income

The institutional R&I strategy incorporates the mechanisms for supporting research and enabling impact, as outlined in section 2. Support is provided to all our academics through the RaIS team which works in partnership with our academics to nurture a sustainable environment for undertaking research of the highest quality. Support provided by the RaIS team includes facilitation of workshops and tools to identify funding, resources to help proposal development and research project management, and access to a team of specialists to assist with work on IP, legal contract development, ethics, impact and dissemination. RaIS runs the RDF programme, including the hosting of targeted cross-institutional sandpit events focussed on forthcoming or anticipated calls for funding.

During the REF period, we have invested significantly in our bespoke research information system that helps academics identify funding opportunities, calculates costs to perform research in order to complete grant applications in compliance with funder requirements, and manages projects post-award.

Infrastructure and facilities

Historically, the University has provided significant investment in a suite of RKT Centres across various disciplines and these continue to act as beacons of research excellence. The Institute for Cancer Therapeutics, the Centre for Chemical and Biological Analysis ("The Analytical Centre"), the Biological Services Unit, the Polymer Interdisciplinary Research Centre, civil engineering laboratories and Bloomberg suite are all examples of locations where excellent research is undertaken, and tangible, meaningful impact is delivered.

The Analytical Centre offers an impressive range of sophisticated and specialist analytical equipment and is the hub of analytical science at the University for both research and commercial projects. We offer an array of analytical techniques and services to academics across the University and many industrial clients. Within the Analytical Centre is based Project CAYMAN. This is an exciting 3-year GBP1,600,000 ERDF programme which establishes new high-field nuclear magnetic resonance (NMR) facilities and is dedicated to delivering R&I projects to regional SMEs. The collaborative projects use NMR facilities to characterise macromolecular materials and complex chemical mixtures in order to help develop new products and optimise current manufacturing processes. In addition, CAYMAN offer funded training to facilitate KE between ourselves and regional SMEs to demonstrate the benefits of modern NMR.

Our Polymer IRC laboratories boast internationally leading, award-winning interdisciplinary manufacturing research in control of structures of polymers through processing, for enhanced or novel product properties, with over GBP25,000,000 leading edge facilities in ~4500m² laboratories. Our solid phase orientation for precision micro to large scale production is unique worldwide, and oriented shape memory polymers are being exploited in the medical sector for stents and fixations. We also have world-leading ultraprecision micromoulding of polymers, exploited in medical technology. Extensive modelling and characterisation capabilities include leading edge optical and thermal imaging of processes, combined AFM and confocal laser scanning microscopy for biological evaluations, and micro CT. The laboratory's current research portfolio of relevant and aligned external grants and contracts has value over GBP12,000,000.

During the REF period, we have invested in a high-performance computing facility and in a Research Computing Service Owner role to facilitate the widest use of the facility across the University. Our HPC streamlines large-scale numerical modelling, machine learning and big data. Users of the service are broad in discipline, undertaking large-scale health data analysis, digital reconstruction of cultural heritage after conflict or disaster, and chemical process optimisation.

More recently, we have invested significantly in high quality research facilities and space such as the DHEZ and the Wolfson Centre for Applied Health Research (in collaboration with the University of Leeds, Bradford Institute for Health Research, and the Wolfson Institute); the latter being supported by high quality new appointments (Gardner – Prof; Randell – Prof; Reilly – Prof; Daly-Smith – Reader). Staff in the Wolfson Centre delivered the Bradford Community Connectors scheme funded via UKRI's Enhancing Place Based Partnerships programme to investigate and improve the health, wellbeing and experiences of health services for local communities, whilst the DHEZ was used to deliver a 'world first', as the mass Novavax COVID-19 vaccine trial began at UoB.

Beyond the University, staff regularly bid for access to national research facilities and we have an established track record in the use of the STFC / Wellcome Trust Diamond Light Source, EPSRC Archer HPC and the NERC radiocarbon laboratory.

Equality and diversity

We believe that everyone should be provided with equal opportunities to flourish and succeed in a research environment that enables them to do so. Consequently, the DVC (RIE) works with the CfID to take a strategic lead in promoting EDI in the R&I environment at the University. He works with staff and students to identify barriers and challenges for EDI and supports the development and implementation of effective practices to overcome them.

Via our Research Environment Action Plan, we strive to provide a stimulating and inclusive research environment which attracts, values and supports the intellectual contributions of academic staff, contract researchers, and PGRs from diverse backgrounds; and to engender multidisciplinary team-working supported by seminars, workshops, and sandpits. In doing so, we continue to pursue the expanded AS Charter principles of gender equality in research to advance the representation of women (and men where appropriate). We have undertaken a rigorous process to ensure that our REF returns adequately represent gender balance and personal circumstances which may limit an individual's opportunities, details of which are available in the approved Code of Practice.