

## Unit-level environment template (REF5b)

<b>Institution: Bournemouth University</b>
<b>Unit of Assessment: 15 - Archaeology</b>
<b>1. Unit context and structure, research and impact strategy</b>

a) *Unit Context and Structure*

Archaeology at Bournemouth is a thriving group of 39 staff collectively engaged in world-class agenda-setting research with global reach and significance. Our research philosophy emphasises the benefits of interdisciplinarity in order to achieve societal impact. This innovative, integrated approach reflects our institutional ethos and has stimulated £3M of central investment to enable ongoing expansion of our staffing, world-class facilities, and infrastructure. Our success in REF2014 has enabled a radical transformation in research culture and capacity. We have increased our annual grant income by 166%, to achieve a total return of £3,445,839 including grants from prestigious funders (British Academy, ERC, Leverhulme, and UKRI). We have achieved a 105% increase in staffing through landmark institutional investment in multiple new academic posts and by creating a vibrant early career and postdoctoral researcher community (Table 1).

Table 1. Staffing profile for Archaeology at Bournemouth University over the REF review period.

Archaeology at Bournemouth	Staff Number		Full-time equivalent (FTE)	
	2014	2020	2014	2020
Academics	13	20	12.2	17.8
Researchers	1	11	1	9.8
Demonstrators and Technicians	3	5	3	4.8
Research Consultancy	1	3	1	3
Total Staffing for UoA15	18	39	17.2	35.4

Our research is structured across four themes underpinning our current success and future research and impact strategies: **T1: People, Communities and Identities:** diet, subsistence and mobility; human bioarchaeology; cultural identity; modelling of socio-economic transitions. **T2: Animals, Plants and Environments:** the socio-cultural importance of animals in human societies; dynamic long-term human/environment ecodynamics; faunal, sedimentary and climatic proxies for palaeoenvironmental reconstruction; modelling of hominin and modern human landscapes. **T3: Artefacts, Places and Land/Seascapes:** remote sensing/geophysical techniques; material culture, production and consumption; human maritime activity. **T4: Digital Method and Practice:** computational approaches including modelling, visualisation and simulation.

Building on these strengths, we have used the following integrated research and impact objectives (**R1-4**) to transform our research environment by:

**R1: Targeting research towards key societal challenges.** ‘An embryonic research cluster in environmental change and its effects on humans’ highlighted in 2014 has been a major focus for expansion, for example the development of early agricultural/horticultural systems and their social, cultural and environmental implications. We have created two major new interdisciplinary research institutes to stimulate research growth in this area:

- Institute for Studies of Landscape and Human Evolution (ISLHE).* Led by Reynolds, ISLHE examines the interplay between climate and dynamic landscape processes, and their role in human evolution (£390,434 institutional investment, one new FTE).
- Institute for the Modelling of Socio-Environmental Transitions (IMSET).* Led by Jenkins/Coward, IMSET focuses on the use of novel computational approaches to long-term

**Unit-level environment template (REF5b)**

archaeological and environmental data to tackle major societal challenges relating to sustainability (£1.2M institutional investment, four new FTEs).

**R2: Expanding the scale and scope of our global reach.** Our research and impact activity now spans five continents with the majority of academic staff engaged in funded international projects, including development in areas which are new to us i.e. Alaska (Davies, NERC); Southwest Asia and Egypt (Schutkowski, ERC/H2020); Ethiopia (Best/Maltby, AHRC); New Zealand (Brown, Leverhulme); Spain and Tanzania (Welham, British Academy/AHRC); Vietnam (Coward, AHRC).

**R3: Capitalising on our breadth of expertise to maximise our societal impact.** We have used long-standing relationships between our researchers and research users/beneficiaries to develop genuine partnerships and forms of co-production that maximise our societal impact. Our success in this is exemplified by nine match-funded PhD studentships with World Heritage Sites such as the Roman Baths, national and international NGOs (e.g. the National Trust and Waterloo Uncovered), and a national award-winning community research project (LoCATE – DEFRA *Green Park Award* 2019) (see Sec.4).

**R4: Redefining research and dissemination in the light of emerging impact and societal challenges.** We created a UoA15 'Impact Champion' role (Smith) to work with our institutionally-funded 0.5FTE UoA15 Impact PDRA (Foster/Randall) and 1FTE Faculty Impact Officer. Alongside a departmental Recruitment and Outreach Officer (Jenkins, then Coward), this team has transformed the societal impact of our research. They have enabled us to embed impact development and review into personal research plans for all colleagues, and to identify support for successful applications for both internal (£8,173) and external funding (£73,382 AHRC, Follow on Funding, Maltby/Best) to enable further impact activities.

We have used our research and impact objectives to spearhead the innovative use of archaeological research to address contemporary societal issues, including the United Nations' Sustainable Development Goals (SDG). This is illustrated in our research portfolio, and exemplified in our impact case studies:

- ICS1: [text removed for publication]
- ICS2: We used our leadership of the novel interdisciplinary project investigating past interactions with domesticated fowl (**T2**) (Best/Maltby) to highlight vital synergies between human and chicken health and wellbeing. We demonstrated the impact of this globally significant primary food source on food security, zoonotic disease and environmental sustainability, using activities based on SDG4 (Quality Education) and SDG5 (Gender Equality).
- ICS3: Our research on Stonehenge (**T3**) (Darvill/Welham) has been critical to the preservation of a globally significant landscape for future generations and, via our input into the new visitor centre, to ensuring that the economic and wider societal benefits of this site are fully realised. We also used the innovative interdisciplinary Human Henge project (Darvill) to directly address SDG3 (Good Health and Wellbeing), achieving compelling outcomes with significant implications for the role of archaeology in the wellbeing agenda.

*b) REF 2021 Research and Impact Strategy*

We will use the energy and vitality of our success since 2014 to advance our global reputation for world-class research and impact, achieving this through the following strategic objectives:

**O1: Target societally driven research:** we will build on **R1** to develop projects that confront global challenges, particularly focusing on issues of climate change (SDG13), health and wellbeing (SDG3) and food and water security (SDGs 2 and 6). We will use our disciplinary strengths in sustainability and the wider cultural and natural heritage agenda, e.g. modelling human ecodynamics (through ISLHE/IMSET) (**T1/2/4**), and maritime archaeology (**T3**), to enable innovative impact agendas.

**O2: Stimulate inter and transdisciplinary research:** we will continue to increase the range and diversity of our work, identifying and forging strategic collaborations with new internal and external collaborators across other disciplines. We will continue to diversify our sources of research income,

### Unit-level environment template (REF5b)

building on existing success (e.g. Darvill/ Human Henge, HLF Funding) to provide mentorship across the UoA in this area, as well as continuing to leverage support from our central interdisciplinary Institutional Strategic Investment Areas, particularly *Animation, Simulation and Visualisation*, and *Sustainability and Low Carbon Technologies*.

**O3: Pioneer computational approaches:** linking to O1/O2, IMSET has enabled us to create a critical mass of new expertise in the area of modelling and computational archaeology (Davies, Riris, Silva, Vander Linden). Institutional investment has supported further growth in digital methodologies, practice and quantitative approaches via a three-year PDRA post (Human-Computer-Interactions, Zhao), combined with the 2019 appointment of our new Head of Department (Gillings) and transfer of the AHRC-funded researcher (Eve). We will continue to target resource to this area to nurture transformative research approaches.

**O4: Expand our national and international partnerships:** we will use our experience in creating and sustaining strong regional partnerships to build capacity for engagement on a broader scale, including regions new to our UoA, such as South America and the Arctic. Our two Research Institutes will be a particular focus for fostering this development, via strategic appointments to Steering Groups, hosting international interdisciplinary conferences and attendance at strategic key events e.g. The United Nations' Climate Change Conference (COP26).

**O5: Increase our ECR and PGR numbers and strengthen provision:** we will use a strategic approach to ensure we continue to attract internationally competitive research fellows via prestigious funders (British Academy, Leverhulme Trust, UKRI Future Leaders Fellowships) and through roles in large-scale funded projects. We are firmly committed to the UKRI Researcher Development Concordat and will continue to build on this sound foundation to further enhance our high-quality research training experience for ECRs.

#### c) Supporting Interdisciplinary Research

Supporting interdisciplinary research is at the heart of our research ethos and we have prioritised leveraging competitive central funding to achieve this, and to ensure the continued vitality and growth of our research environment. We have used influential positions on our institutional interdisciplinary Strategic Investment Areas to create connections with cutting-edge researchers across our university, collaborations which have won substantive investment in our two Research Institutes, and a range of funded doctoral studentships and Student Research Assistantships. This has led to new projects with researchers in computer animation, ecology, education, health, psychology, and sociology. These relationships underpin our continued sustainability and vitality and have attracted external funding, for example, the Virtual Avebury project (Falconer/Welham, AHRC/EPSRC Immersive Experiences), linking visual and audio virtual environment specialists, learning technologists, heritage professionals and archaeologists. To support further interdisciplinary opportunities, we have deliberately arranged for our postdoctoral researchers and PGRs to share offices with their counterparts from our sister department, Life and Environmental Sciences.

In order to further support growth of this priority area we have also resourced several major interdisciplinary conferences, most notably:

- The international *Connected Past* network conference in 2017 (Coward is a founder member) brought together researchers from archaeology, history, physics, mathematics, and network and data science to investigate the use of network methods to enhance our understanding of the human past.
- *Computer Applications in Archaeology UK 2019* was integrated with the renowned *BFX Festival* (visual effects, animation, games technology) to foster links between a diverse range of researchers interested in cultural heritage, especially digital forms of engagement with heritage. We used this platform to create a cross-university *virtual heritage* research group combining the expertise of over 20 academics across law, psychology, health, animation and more, with which we are developing future cross-council research projects.

## Unit-level environment template (REF5b)

### d) *Creating an Open Research Environment*

The critical importance of an Open Research Environment to our UoA was formally recognised in 2018 with the creation of the role of Open Data Champion (Reynolds) to promote and facilitate these principles. We have 100% compliance with our Open Access Publication Policy and have attracted £22,840 of the competitive Institutional Open Access Publication Fund to support 13 outputs; five of these by ECRs, including co-published doctoral research. We are also committed to making our work more inclusive by publishing in languages other than just English, including: Arabic, French, German, Latvian, Russian, and Spanish.

We are committed to increasing open access to our research data. An extensive zooarchaeological database on chicken remains and metrical data from over 1,250 archaeological assemblages in Europe from the AHRC chicken project will be made available on the Archaeological Data Service by Best/Maltby during 2021, and we are dedicating researcher time and QR money to ensure further substantive legacy projects achieve publication and associated data deposition via our new institutional repository (BORDaR), e.g. Dewlish Roman Villa (Hewitt), and Knowlton Henge complex (Gale).

We also promote open-source software and code sharing, ensuring that data can be (re)produced, archived and shared in non-proprietary/open data formats. To this end, we have invested in training and support for: Snuffler open source geophysics software for our regional project involving local societies (LoCATE); Reflectance Transformation Imaging; Structure from Motion open source image processing software; and R open source statistics software.

### e) *Research Integrity*

Research integrity is fundamental to all our research, and many of us (e.g. Hambleton, Maltby, Reynolds, Schutkowski) play key roles on institutional ethics panels (Science and Social Science). Institutionally mandated ethics training for all staff and PGRs is enhanced by support and advice from a dedicated departmental ethics panel, informed by the relevant ethical, legal and professional frameworks including the Chartered Institute for Archaeologists' Code of Conduct and the British Association for Biological Anthropology and Osteoarchaeology Codes of Ethics and Practice. All research activities are required to comply fully with these codes and meet the highest ethical standards, firstly via an online assessment process and then for higher-risk projects via a thorough assessment by the relevant panels.

## 2. People

### a) *Staffing Strategy*

We have achieved a vibrant and sustainable research environment through a staffing strategy that recognises and values collaborative working and the effective sharing of knowledge and experience.

**S1: Creating a vibrant and diverse ECR community.** We have dramatically increased our ECR numbers from two in 2013 to 12 from 2014-20. Our continued success in achieving large research grants has enabled us to recruit five PDRAs. We have deliberately targeted research fellowship applications and our research excellence has been recognised with the award of one of these per year since 2016 (Leverhulme Trust x 2, Brown/McCartney; British Academy, Elliott; and Marie-Sklodowska-Curie Fellowship, Nicolas). We have used our position as one of the premier research groups in our institution to leverage the matched Leverhulme fellowship costs, and gained from competitive institutional schemes for new ECR posts: Davies (1FTE, 60 months IMSET), Foster/Randall (0.5FTE, 33 months; bioarchaeology/impact), Kharobi (1FTE, 34 months; bioarchaeology), Pitman (1FTE archaeological science, PDRA in 2014, now permanent lectureship), Silva/Zhao (1FTE digital archaeology, 36 months), Riris/Silva (2FTEs permanent lectureships IMSET), Rennie (1FTE, now permanent lectureship in our sister department of Life and Environmental Science).

**S2: Increasing the number of colleagues on permanent and long-term contracts.** We have invested in nurturing and developing ECR careers through mentoring and support, combined with effective use of an institutional six month 'bridging funding', to facilitate continued employment



## Unit-level environment template (REF5b)

between funding sources. Our success is exemplified by the fact that three ECRs have achieved permanent positions with us (Pitman, Reynolds, Silva), while two others have returned to us from other institutions e.g. Elliott in 2019 (PDRA in 2014, now a British Academy Fellow), and Best in 2018 via AHRC Follow-on Funding (PDRA 2014-17). Three quarters of our Category A eligible staff are now on permanent contracts, while the rest are on fixed-term contracts related to projects of more than two years in duration.

**S3: Obtaining strategic investment in nascent research areas/Attracting researchers with an interdisciplinary focus.** Our success in gaining competitive institutional investment for five posts associated with the two research institutes IMSET and ISLHE has been fundamental to our growth. We have also focused on recruiting interdisciplinary researchers (e.g. Eve, Elliott, Gillings, Rennie, Reynolds, Riris, Silva, Vander Linden) and/or those based in other disciplines (e.g. Davies - geography, Zhao - computing) to bring new approaches and experience as well as to increase the scope of our interdisciplinary collaboration and research (see **O2**).

**S4: Facilitating flexible careers that reflect our inclusive values.** We have strongly supported flexible working patterns to create an inclusive and welcoming working environment for all. This has enabled retention of experienced colleagues at all career stages who have needed to alter patterns of work to enable caring responsibilities or to attain an alternative work/life balance (see Sec. 2c).

### *b) Staff Development*

We have used our award-winning Institutional Research Development and Support initiatives and training (see Institutional Statement) to build on the Concordat to Support the Career Development of Researchers in fostering the transformation of our research environment. Our full-time centrally funded research facilitator, focused on identifying and supporting applications, has contributed to our success in recruitment, enabling further applications to prestigious funders and the development of research and impact activities. We have benefited from:

- £90K of research incentive scheme through a 5% return on recognised income of large grants (Gillings, Jenkins, Parham, Schutkowski, Welham),
- funded research leave (Welham, one year (2014) and Gale, six months (2015)),
- six months post-adoption/maternity/paternity Faculty research leave for academics established as part of our Athena SWAN commitment (benefiting one ECR female colleague in 2016),
- two fully-funded doctoral (Maltby) and one funded post-doctoral positions (Schutkowski) from success with prestigious grants,
- central pump-priming support for new research e.g. Stantis (ECR) £1K, Welham £3.7K,
- external one-to-one grant development support for seven colleagues (3F/4M), and an extensive selection of grants academies, writing retreats, and dedicated funder/funding stream workshops e.g. AHRC, British Academy, ERC, Leverhulme.

To stimulate and facilitate exchanges between academia and external non-academic institutions that support our integrated research ethos we have strategically targeted central funds and have been awarded:

- £101,660 of Higher Education Innovation Funds enabling us to employ researchers to further develop work in ISLHE, our research consultancy BUARC, and with partners such as the Roman Baths,
- nine competitive 50/50% match-funded doctoral research studentships (see Sec. 4).

To complement this exceptional institutional research support, we have initiated a new focus on personalised research development for individual research activities. This has allowed us to tailor UoA support depending on career stage and provides us with an overview of our research and impact activities, making us more agile in identifying and responding to the needs of our group as we grow and develop our research base. We have done this by introducing the following initiatives:

## Unit-level environment template (REF5b)

- Annual *Personal Research and Impact Plans*, which form the basis for individual discussion with the departmental and UoA leadership team,
- A workload planning model which allocates 40% of time towards research, and reduced workloads for ECRs to support their development,
- A formal mentorship scheme involving all colleagues across our department and the wider institution where appropriate. Colleagues are encouraged to select their own mentor,
- Access to competitively allocated departmental QR funds (see Sec. 2c),
- Financial support to attend and/or present at one or more international conference or training event per annum (see Sec. 4a).

### *c) Supporting and Promoting Equality and Diversity*

We have achieved a demonstrable shift to an inclusive and understanding culture by embedding equality and diversity in our behaviours and values. In 2014 our leadership team was made up of senior male colleagues and was thus not reflective of the community as a whole. We have therefore radically reformed our management structures to offer equity of opportunity for roles and a more even distribution of responsibilities. We have made adjustments within roles (e.g. role shares) to ensure the inclusion of part-time and ECR colleagues. We now have an inclusive, 52%F/48%M leadership team creating development opportunities for everyone.

These positive changes are reflected in our departmental application for a Bronze Athena SWAN Award (result pending), and our involvement in the University-wide Women's Academic Network. We have committed to gender balance at events, e.g. weekly research seminars and Pitt-Rivers Lecture (50/50% F/M since data collection began in 2016). We have raised the profile of diversity in our research area by engaging with agenda-setting national initiatives including hosting exhibitions such as Trowelblazers' *Raising Horizons* (2018) and the National Trust's *Breaking Ground, Female Archaeologists at Avebury* (2019). With the support of our central Equality and Diversity team, we are regularly reviewing our practices and data to further embed an intersectional approach, thus enabling an inclusive research environment.

#### *Supporting researchers with caring responsibilities and those with disabilities*

We have supported both flexible and part-time working to promote a positive work/life balance (**S4**), with 4F/3M colleagues using this option, which is in strong contrast to REF2014 when only three returned colleagues were in part-time posts. We schedule teaching loads to be congruent with caring responsibilities and extra-university requirements via a transparent process, e.g. all departmental meetings are between 10am and 4pm, with our research seminars at 4pm. Colleagues with disabilities have benefited from the introduction of a full time Faculty Health & Safety Officer (2017) liaising between the department and Institution, and from the Institution's work with 'AccessAble' to provide detailed access information for all buildings and facilities.

Our institution offers a more generous maternity/paternity/adoption leave provision than required by law. Colleagues with parental responsibilities also have access to flexible and convenient childcare via on-site childcare provision for ages three months to 14 years through an on-campus nursery and pre-school (ages three months to five years, Ofsted Outstanding) which runs throughout the year, and our Sport BU team holiday childcare (ages five to 14) which runs during the Easter, summer and Christmas holidays. Colleagues may request the use of QR or other internal funds for childcare whilst at conferences.

#### *Recruitment, career development and progression*

We have created tangible change by adopting an inclusive approach to recruitment, progression, and research development. All colleagues engage with institutionally provided equality, diversity and inclusivity training. We have mixed-gender recruitment review processes for all staff and research students, and we are proactive in including ECRs on these panels, reflecting our inclusive values and commitment to staff development. We interview all applicants meeting the minimum requirements for a role who have declared a registered disability.

### Unit-level environment template (REF5b)

Our promotions process now explicitly addresses part-time working and periods of leave, and advice and support is available for all colleagues through university-wide group and one-to-one sessions. Female colleagues are further supported by advice available through the Women's Academic Network and female-only promotion workshops. Our success in mentoring and personalised support can be evidenced in a positive increase in academic promotions 4F/2M from 2009-14 to 6F/3M from 2014-20. This includes: four female colleagues to Principal Academic; one to Associate Professor; and one to Professor. Four colleagues with part-time roles and/or who have taken extended periods of leave have achieved promotion during the review period.

We have substantially improved our gender and age balance at senior levels through our focus on supporting progression for all colleagues. We continue to prioritise this by establishing visible senior female role models, using development opportunities including the Aurora programme (Gerdau-Radonić/Jenkins), institutional leadership programmes, and the specific promotion-related advice highlighted above. We have successfully mentored colleagues to create opportunities for research leadership and development, and increased the number of female colleagues in influential roles including: Coward, Jenkins and Reynolds as Deputy Director/Directors of our two new research institutes IMSET and ISLHE; Welham as convenor of the University's Strategic Investment Area of Animation, Simulation and Visualisation; and Jenkins, Stantis and Welham on institutional internal research funding panels and committees. Within the department, Welham and Wilkes have held leadership roles of Head of Research and Deputy Head respectively. Externally, Welham served as Vice-Chair then Chair of University Archaeology UK (2014-19), is a Strategic Reviewer for AHRC, and has been nominated to the REF2021 Panel.

Our commitment to embedding equality and diversity in our practice is demonstrated in the construction of our REF2021 submission which was led by a mixed gender and grade team. All members of this, and our mock REF reviewers, completed the Marshalls Equality and Diversity training as outlined in our Institutional Code of Practice. We demonstrated institutional and sector leadership in gender equality by ensuring blind reviewing of each REF output by 1F/1M academic, with a return that reflects our commitment to supporting diverse research careers (Table 2).

Table 2: REF2021 profile for Archaeology at Bournemouth University at the census date

Archaeology at Bournemouth	Gender		Contract	Grade		
	%Female	%Male	%Part-Time	%Researcher	%Lecturer/Senior Lecturer/Principle Academic	%Associate Professor/Professor
Category A returned staff	37	63	26	30	48	22
Lead output author	36	64	20	24	44	31
Impact contributors	50	50	50	17	17	66

To support career development, we provide all colleagues with staff development funds for conference attendance, training etc. An initial Faculty system (2014-16) provided up to £3K to academic staff from the QR allocation based on a sum of points for research activity e.g. PGR supervision, numbers of publications, submitted grants etc. In 2017 a competitive departmentally-administered process was introduced which we used to ensure an open application process overseen by a mixed gender review panel that included the UoA Leadership Team, ECRs and other colleagues (via an open call); since then we have distributed funds of between £1-3K to 24 individuals or teams (8F/9M).

**Unit-level environment template (REF5b)***d) A sustainable and integrated PGR community*

We have a vibrant PGR community of 11 students which achieves an average of three completions per year and a total of 22 during the review period. Our commitment to excellent researcher development is exemplified in the success our PGRs have had in obtaining a range of postdoctoral positions including fellowships (e.g. Norwegian Research Fellowship, University of Gothenburg) and lectureships (e.g. Universities of Exeter, Groningen).

The combination of our external partnerships and our 100% success rate in winning competitive institutional funding has provided 11 fully funded studentships (nine match-funded through research council grants and non-academic partners, and two fully funded through institutional schemes). Our AHRC Capacity Building Doctoral Student Block grant (2011-17) also supported two new studentships in the census period.

Our Doctoral College supports us in maintaining an inclusive and robust recruitment process, enabling us to foster a diverse PGR community. We are committed to mixed gender recruitment review, panels and supervisory teams and actively encourage ECRs and postdoctoral researchers to engage with all aspects of PGR support. All supervisors must engage with a one-day training course every three years to ensure best practice and the exchange of experience with regard to supervisory practice and procedure. Our high-quality training and supervision of PGRs has been recognised via Welham's award of *Recognised Research Supervisor* as part of the UK Council for Graduate Education's new *Supervision Recognition Programme* in 2019.

We prioritise placing PGRs (including our MRes students) at the heart of a rich, stimulating and engaging research culture and have worked hard to enhance communication between PGRs and other colleagues at all levels. Our PGRs are included on all email and communication lists and invited to all meetings. They present talks in our research seminar series and contribute to presentations on research done by members of their supervisory team. Our PGRs also take the lead in organising the annual Faculty PGR Research Conference, gaining valuable experience in presenting their research and in achieving important academic and transferable skills in conference organisation and events management. Their elected representative liaises with the wider institution, sits on our Athena SWAN Self-Assessment Team, and has regular meetings with the Deputy Head of Department (previously Head of Research) to provide a forum for reviewing progress in an ongoing Action Plan. In March 2020, a weekly 'Departmental PGR zoom coffee' was instigated with the Head of Research and our Research Administrator to support health and wellbeing within our PGR community whilst remote working.

All full-time doctoral students have individual desks and computing facilities and are co-located in dedicated PGR rooms alongside students from our sister department Life and Environmental Sciences, to foster interdisciplinary synergies (O2). Our part-time students have access to hot desks in the same rooms. All doctoral students (including self-funded students) are provided with 1K per annum to support individual training and development needs, and our match-funded students frequently have access to further support via our partners. We support the career development of researchers beyond the requirements of the Vitae Concordat via a comprehensive training programme provided by the Doctoral College (see Institutional statement). PGRs are integrated into opportunities to showcase their research and take part in outreach opportunities in order to develop valuable science communication experience; for example, University Archaeology Day and University Anthropology Day.

Post thesis submission, we support students to develop their publication record by using QR funds to enable the three-month employment of PGRs, with academic mentoring, to facilitate publication of doctoral research. Awards have been made to three female students (100% of those who were eligible), resulting in publications in journals including: *Journal of Archaeological Science*, *Geoarchaeology* and *Internet Archaeology*.

<b>3. Income, infrastructure and facilities</b>
---

*a) Income*

The success of our interdisciplinary approach and highly integrated research and impact strategies, coupled with world-class institutional research support (see Sec. 2), is demonstrated by a major uplift



## Unit-level environment template (REF5b)

in annual research income (£420K in 2013/14 to £725K in 2019/20) (Figure 1) and a significant increase in awards from prestigious national and international funders.

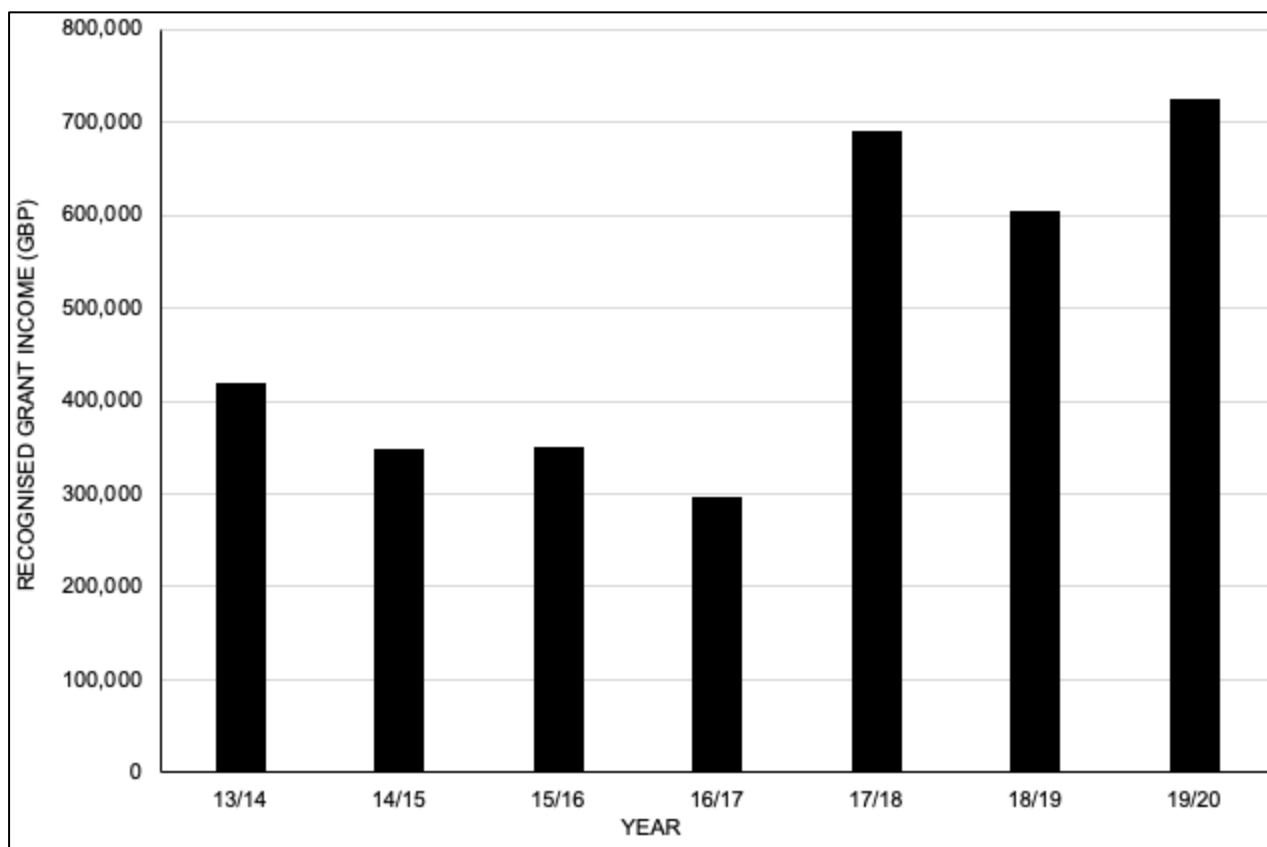


Figure 1: Increase in income per annum for Archaeology at Bournemouth University

We have created a critical mass of globally recognised research leadership in our four research themes (**T1-4**). This is exemplified by our work on the socio-cultural importance of animals in human societies (**T2**), whose significance was recognised by the award of a £2M AHRC Science and Culture grant for the project: *Cultural and Scientific Perceptions of Human and Chicken Interactions* (2014-17) for which Maltby brought together 22 partners, generating innovative interdisciplinary research outputs. The success of our integration of research and impact strategies is also demonstrated by Parham's £2M success in gaining UK Government LIBOR funds for work on HMS Invincible (2017-21), and Parham and Palma's £315K award from Historic England and the HLF for the analysis of the 17<sup>th</sup> Century Swash Channel Wreck (2013-14) (**T3**). We have further used the high profile of these two projects to leverage over £300K of donations to support the purchase of diving and conservation equipment, expanding our research capacity in this area. Alongside this success, we are creating the next generation of research leaders through our outstanding ECR Fellowship and AHRC ECR projects e.g. Jenkins' work on early farming in Southwest Asia (2014-15) (**T2**).

We have used our world-class research reputation and exceptional research facilities and infrastructure to form academic partnerships that have resulted in multiple grant successes with: the AHRC (Rapa Nui, Polynesia [Welham, 2011-17] (**T3**), Songo Mnara, Tanzania [Welham, 2011-16] (**T3**), and SUNDASIA, Vietnam [Coward, 2016-20] (**T1/2**)), and the European Commission (European Research Council Advanced Grant, Enigma of the Hyksos [Schutkowski, 2016-21] (**T1**), Interreg Atlantic Area, ECOSAL, [Brisbane, 2014-6]). Interdisciplinary collaboration within our own institution has also achieved cross-Research Council (AHRC/EPSRC) awards with the Virtual Avebury project (Falconer/Welham 2018) (**T4**). In kind research success includes NERC radiocarbon dates (Maltby 2016) enabling the spread of chickens in Europe to be traced.

We have used small grants to successfully enable the growth of emergent research areas, for example, British Academy/Leverhulme Trust Small Grants (Schutkowski, Welham) and Local/Learned Society Grants (Hewitt, Wilkes). Further income for knowledge exchange activities has been achieved through the HLF (Darvill, Gale, Palma, Parham), and other charitable bodies

## Unit-level environment template (REF5b)

(Darvill, Parham, Smith) (see Sec. 4), whilst our archaeological research consultancy provides an important income stream to combine research and professional practice.

### *b) Infrastructure and Facilities*

Our world-class infrastructure and facilities comprising over 400m<sup>2</sup> of dedicated on-campus archaeological research laboratories, stores and collections rooms, enable cutting-edge research outputs. Our active collaboration with other disciplines is supported by unlimited free access to our Faculty's excellent analytical science laboratories and equipment, geomatics software and facilities (available on and off campus), and state-of-the-art rapid prototyping facility (3D printing), as well as a new mixed reality development laboratory, part of a £25M Institutional infrastructure investment to support the interdisciplinary development of animation, simulation and visualisation.

Our position as one of the premier research departments within our Institution has afforded us major capital investment, including a £2M laboratory refurbishment in 2014, and c.£100K per annum for maintenance and upgrade of equipment. In 2017, our LIBOR funding success and innovative partnership with the Maritime Archaeology Sea Trust (MAST) allowed us to open the largest maritime archaeology research facility in England, with an additional 200m<sup>2</sup> space to support our archaeological diving operations and equipment for the conservation of underwater heritage, thus ensuring our continued global leadership in maritime heritage at risk (**T3**). We are the *only* research centre in the UK capable of excavating artefacts directly from the seabed, recording and conserving them, and passing them on to a receiving museum.

Alongside our trailblazing new marine facilities, we have continued to enhance our £1M of field, survey and remote sensing equipment, maintaining our position as global leaders in field-based research (**T3**). This is evidenced through our role in multiple funded excavation projects, including fieldwork at Stonehenge and Avebury where Eve, Darvill, Gillings, and Welham have been part of seminal research that has changed our understanding of the nature of these globally important landscapes and monuments.

Innovative partnerships with local landowners ensure us access to over 76,500m<sup>2</sup> of land on local private estates, enabling the continuation of cutting-edge research in bioarchaeology, forensic archaeology and anthropology (**T1/3**). This augments the facilities available in our globally recognised human bioarchaeology laboratories. Here we have invested in equipping with a state-of-the-art portable digital X-Ray machine and 3D recording facilities to foster interdisciplinary studies, such as funded doctoral research using photogrammetric techniques to study evidence for trauma and conflict. To sustain our global reputation for expertise in bioarchaeology, we continue to build our internationally important human skeletal collections, now including remains from over 900 individuals dating from the Neolithic through to the 20th century. These world-class facilities support collaborations with top-tier international research institutions such as Michigan State University, who regularly travel to Bournemouth to use these resources and work with our researchers.

Our ground-breaking research on animals, plants and environments (**T2**) is supported by dedicated zooarchaeological and environmental laboratories with a reference collection of over 500 known large and small mammals, including fish and birds, as well as licenced specimens of rare and endangered species. These world-class facilities attract visiting international researchers including US researcher Pamela Crabtree (British Academy Visiting Fellowship 2018), who collaborated with Hambleton and Maltby on animal exploitation in early farming communities in Transcaucasia and the development of northern European medieval towns.

To further develop our distinctive use of environmental micro-proxies and geochemistry to address societally relevant research questions (**T2**), we have introduced a DEFRA approved foreign soil store, revamped our environmental processing facilities, digital imaging suite, and invested in two portable X-Ray fluorescence analysers and a new environmental Scanning Electron Microscope (£93K). This has enabled important outputs by Elliott and Jenkins that address issues of water availability and management, human sedentism and agricultural practices.

We have excellent technical support from our dedicated archaeological team (see Sec. 1a), and our interdisciplinary focus also enables access to seven other highly-trained demonstrators and technicians in the Department of Life and Environmental Sciences, who support research in

## Unit-level environment template (REF5b)

geoinformatics, elemental and isotope analysis, and forensic science. An online equipment and room booking system, and a full-time Faculty Resources Officer dedicated to maintaining our field and survey equipment to an extremely high standard, ensures we can take full advantage of our world-class facilities. We are also committed to the development of the research and careers of our technical staff, as evidenced by the fact that two have gained permanent lectureships in UK universities.

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

#### *a) Arrangements, Support for and Effectiveness of Collaborations, Networks and Partnerships*

To foster interdisciplinarity and achieve the societal impact agenda which is deeply embedded in our work, we have increased the scale and scope of activities to support collaborations. Our success is demonstrated by the expansion of our funded research across five continents, and by the fact that 58% of our REF eligible research outputs are produced with external collaborators. Important new academic partnerships have included the University of Vienna, enabling the ERC-funded Hyksos Enigma project. Continuing to develop this area underpins our future strategic objectives (O1-5), and we have established the following arrangements to support these activities:

i) **Increasing the number of research seminars and high-profile events.** We have formalised our weekly research seminar series, benefitting from over 50 external speakers from a diverse range of over 30 organisations from across the globe. We advertise these seminars both within the Institution and through our network of external partners (O4, see Sec.4b) to encourage interdisciplinary engagement (O2). The series is led by ECRs mentored by established academics, enabling our ECRs to build their skills and networks (S1/O5). This successful model has been adopted by our active student archaeological society. In 2017 we established an annual *Pitt Rivers* lecture, sponsored by the Prehistoric Society, which achieves audiences of 150+ from both academic and professional backgrounds and the wider public. We have also hosted a range of conferences and meetings to support collaboration including: the Professional Zooarchaeology Group (2019) (T2); Human Henge: Historic Landscapes and Wellbeing (2018) (T3). We will host the Prehistoric Society Europa Conference (T3) and the British Association of Near Eastern Archaeology in 2021 (T1/2). We have used £1.5K of our QR funds annually to support travel costs for these events, and benefit from additional support (including administration, advertising, and catering) through our central events management team.

ii) **Increasing resources for research networking.** We have used ~£20K p.a. to support colleagues' attendance at conferences, workshops etc., allowing us to maintain an influential presence at over 60 national and international strategic networking opportunities.

iii) **Expanding our Visiting Fellow/Professor network.** We have expanded this from 22 individuals in 2014 to 35 in 2020. This includes new partners to foster research addressing key societal challenges (R1/O1) and to support the international growth of our research themes: e.g. Musée de l'Homme, Paris (T1); The Council for British Research in the Levant, Jordan (T2); the International Commission on Missing Persons, The Hague (T3); and the University of Gothenburg (T4). We have used prestigious funders to support international collaborations, e.g. a 2014 Leverhulme Emeritus Fellowship for Brisbane to work with Russian colleagues on the archaeology of Novgorod.

iv) **Expanding our student placement scheme.** We have facilitated 287 undergraduate placements (72 international) across 25 countries and 97 organisations. In 2014, a new 30-week option was introduced to extend our existing five-week compulsory element, allowing us to create new, and deepen existing, research partnerships, e.g. with the UK National Parks and regional museums.

v) **Supporting membership of learned societies/research/professional organisations.** Departmental funds support one subscription per colleague, an important commitment to integrated research and impact strategy.

vi) **Developing legal frameworks to enable the loan of research equipment.** We have developed new partnerships to gain the maximum research output from our extensive equipment base (see

**Unit-level environment template (REF5b)**

Sec. 3b), as exemplified by the LoCATE project via which we loan geophysical equipment to local community researchers through a partner organisation (see Sec. 4c, x).

*b) Relationships with Key Research Users, Beneficiaries or Audiences*

We have significantly expanded our activities during the review period to maximise impact from the research conducted across our UoA (**R3/R4/O4**), in particular focusing on key societal challenges (**R1/O3**). ECRs and PGRs are fully integrated into this activity (**O5**) and indeed often take the lead, working with more senior UoA members to develop their skills. We target the following audiences/beneficiaries/users:

i) **The Public.** Our attendance at multiple events and exhibitions reached tens of thousands of individuals across the globe. We used our annual institutional *Festival of Learning* (2014-18) to support public engagement in our research, e.g. a two day 'Maritime Archaeology Festival' at Bournemouth Pier (500+ attendees) and two interdisciplinary 'Meet Your Inner Monkey' events (200+ attendees) at Hengistbury Head Visitor Centre. Engagement and participation are embedded within all research excavations, including site tours for ~6,450 attendees at our projects between 2014-20, and training and hands-on experience for over 50 volunteers. Nationally, we regularly participate in, organise, and contribute to public events such as: Café Scientifique; the British Science Festival (2015-ongoing); the Science Tent at Bestival (2014, attended by 60,000 people); and the Women In Science and Engineering (WISE) Festival in 2020. We have attracted extensive media coverage of our work both in the UK and internationally and from 2016 have reached a total news readership of at least 17.71 million.

ii) **Special Interest Groups.** We have built strong relationships with such groups, especially locally (e.g. Dorset Natural History and Archaeological Society; South Wessex Archaeological Association; Council for British Archaeology Wessex; Poole Harbour Heritage Project; East Dorset Antiquarian Society; the Dorchester Association; University of the Third Age).

iii) **Heritage Institutions.** Close working relationships with a number of local and national heritage institutions allow collaboration to enhance the research base of their displays and educational activities and provides valuable platforms for outreach and engagement of a variety of audiences. Partners are local (e.g. Salisbury Museum, the Ancient Technology Centre), national (e.g. British Museum, English Heritage, National Trust, Natural History Museum, Museum of London), and international (Institute for Mummy Studies, Italy; the Sea War Museum, Denmark).

iv) **Schools and Colleges.** Our Director of Outreach and institutional Schools and Colleges liaison colleagues continue to develop close working relationships with (pre-)schools and colleges at all levels across the south of England. We have visited over 20 institutions and worked with 400 teachers and pupils, providing activities that demonstrate how our research informs on food security (**T1**), climate change (**T2**) and cultural/biological identity (**T3**).

v) **Health and Social Care.** We are committed to inclusive engagement with diverse communities (**R1/O1**) and have developed new partnerships with: Dementia groups, Age UK, Dorset Adult Asperger's Society, Bournemouth Society for the Visually Impaired, the Restoration Trust, Resettlement and Care for Older Ex-offenders and Prisoners, and HM Prisons. We are extending this approach internationally, e.g. our 2019 work with prisoners facilitated by the Cook Islands Minister for Culture and Correction.

vi) **Police and Coroner.** Cheetham, Hambleton, Rennie, Schutkowski, and Smith have used their research expertise (**T1-3**) 62 times to support police/forensic services in the identification, recovery and reporting of skeletal finds as non-human, archaeological/anatomical material, or modern remains requiring police/forensic attention. Their work is both regional (e.g. Dorset Police Authority with whom we have a legal Memorandum of Understanding, Dorset Coroner Service), national (West Midlands Police), and international (e.g. Bochum Polizei, Germany, Rennie's work in medicolegal contexts in Namibia and South Africa).

vii) **Statutory and Professional Bodies, and Policy Makers.** Our involvement with statutory and professional bodies enables us to build on our research to exert considerable influence both within our discipline, and in government policy relating to heritage in the UK and internationally (**R1/O1**)



**Unit-level environment template (REF5b)**

(e.g. the Department for Culture Media and Sport, the Ministry of Defence, the Royal Navy, the Oman Ministry of Heritage and Culture).

viii) **Local Authorities and Organisations.** We have built strong and meaningful links with partners in our region and beyond (**O4-6**), firstly by developing match-funded doctoral studentships (with Dorset County Council/ Dorset AONB/Heritage Lottery Fund (Gale); Bournemouth, Christchurch and Poole Council/Heritage Lottery Fund (Pitman); the Roman Bath Museum/ Bath and North East Somerset Council (Brisbane); the Dorset Museum (Smith)), and secondly by leveraging our network of Research Fellows/Professors (e.g. the LoCATE Project).

ix) **Commercial Archaeology Providers.** Our in-house archaeology consultancy BUARC enables us to develop impact from research in **T3**, and we have excellent research links with other UK commercial companies that cross all of our research themes. Darvill is Chairman of the Board of Directors of Cotswold Archaeology, and we have also established a close working relationship with MoLA including institutional visits and commitments to develop collaborative working around the digital heritage agenda (**T4/O3**).

*c) Wider Contributions to Society*

Our integrated research and impact strategy, including REF2014 research and impact objectives (**R1-5**) have enabled us to understand and develop the contributions made by activities within our UoA. In addition to our Impact Case Studies, research in our UoA has:

i) **Enhanced learning and participation for the general public.** The influence of our public engagement activities is clear; we play pivotal roles in major science outreach events with demonstrable impact across the UK (e.g. the British Science Festival, where in 2019, 86% of attendees reported an increased awareness of scientific research and 70% reported an increased interest in science more generally). Our other activities have led to many participants returning to study or going on to regularly volunteer with other organisations (e.g. Past Participate; the Dorset County Museum). Our impact has been recognised through a Dorset Archaeological Awards 'Highly Commended award' for public engagement for fieldwork in Poole Harbour during 2019 (Pitman).

ii) **Inspired creativity.** Our research has underpinned various forms of artistic expression including: song and dance installations, e.g. 'Songs of the Sea' based on our maritime research and activities as part of 'The Imagination Museum'; theatrical productions, e.g. based on our research on the Langton Herring Iron Age Mirror by the Museum Makers, a creative group for adults with learning difficulties; photographic art by Lieven Lefere, created as outcomes of our forensic archaeology and prehistoric research excavations and incorporated in international exhibitions.

iii) **Enhanced cultural heritage interpretation.** Our research has been used for content in multiple international organisations. Examples include: the reconstruction of vernacular buildings for display at the Eco-village of Al Ma'tan, Jordan; digital imaging of the Ridgeway Vikings for Dorset Museum; Britain's earliest case of tuberculosis at Wimborne Museum; video content for the Cook Islands Museum; a travelling Stonehenge exhibit (Australia/Belgium/USA) and a trans-regional Atlantic salt making trail (Portugal, Spain, France and the UK).

iv) **Contributing to economic prosperity via the creative sector.** Our research has played a pivotal role in attracting more visitors to the south-west region through an improved cultural offer. The Swash Channel Wreck exhibition of our research at Poole Museum in 2014 (75,000 visitors) became a permanent feature in their maritime gallery, contributing to a 71% rise in annual visitor numbers from 103,275 (2014) to 176,672 (2019) (<https://www.visitbritain.org/tourism-business-research>).

v) **Improved social and educational inclusion of marginalised groups.** Coupled with (ii), our impact here includes maritime arts projects involving inmates from three prisons, resulting in public displays of their work. Participants valued '*the opportunity to be involved in something .... that would normally be off bounds to them*', and a ship model was donated by a prisoner to Victim Support for their reception area as a means of '*putting something back*'.

vi) **Informing education provision with respect to SDGs.** Our research has underpinned the creation of teaching packs across all research themes. Examples include: content supporting

**Unit-level environment template (REF5b)**

heritage education to inspire sustainable development, delivered to 150 students on the Cook Islands.

vii) **Contributing to processes of commemoration, memorialisation and reconciliation.** As detailed above, our role in identifying skeletal remains has deep significance for bereaved families, for example, the identification of individuals who had died in unknown circumstances; the repatriation of exhumed remains to the UK in compliance with family wishes; and the analysis of a probable refugee found on a Dorset beach. The expertise we have provided to the police and coroner's services within the UK, and international contexts, has also saved taxpayers' money and freed up state resources. Our research also underpins our masters level education, which has contributed significantly to the field, with 14 of our recent MSc graduates in search and recovery going on to become members of specialist teams (e.g. Blake Emergency Services; Kenyon International Emergency Services, specifically in relation to the Grenfell Tower, Germanwings and MH 17 disasters; International Commission on Missing Persons and International Committee of the Red Cross).

viii) **Influencing Professional Bodies and Learned Societies to define best practice and formulate policy on a national and international scale.** In the role of Chair of the Advisory Panel on Burials in England (Historic England and Church of England) Schutkowski oversaw the 2017 production of the updated *Guidance on the Care of Burials in England*. Smith now serves on this panel and contributed to the updated BBAO (2017) *Guidelines to the Standards for Recording Human Remains*. Furthermore, in 2016 and 2017 Smith presented on national training sessions for professional archaeologists regarding *Human Remains in Commercial Archaeology* for Historic England. The Standard Operating Procedures for the Investigation of Mass Graves we developed in 2008 are still in use by the International Commission on Missing Persons.

ix) **Contributing to the protection of heritage assets.** We provide research expertise to the Portable Antiquities Scheme and facilitate reporting procedures under the Treasure Act (Cheetham, Russell, Smith). Our research has underpinned £6,050 of successful grant applications enabling Dorset Museum to secure objects for public interpretation and future research. Internationally, our research has contributed to the understanding and development of five UNESCO World Heritage Sites, including contributions to management of Tràng An, a Landscape Complex in Vietnam where we provided data, training and hardware to the management board (Coward), and in 2018 our research supported the designation of the UNESCO World Heritage Site of the Caliphate City of Medina Azahara (Welham). Our research in Jordan has contributed to the protection and preservation of the vernacular village of Al Ma'tan and its development as an eco-tourism destination (10 chalets, an ecocamp, restaurant and café). A film based on our AHRC-funded research highlighting the importance of the ethnographic heritage of Jordan was screened at the inauguration of the village, an event hosted by the Jordanian Ministry of Tourism and Antiquities and attended by 60 people.

x) **Informing public attitudes and values with respect to the care of the natural and historic environment.** To support care of heritage assets in our region, we have created LoCATE, a community archaeological survey project in partnership with 10 local interest societies in Dorset and Hampshire and the New Forest National Park Authority. We have provided equipment and training to 30 participants who have then gone on to use their new skills to investigate 11 prehistoric sites, many of which were previously unknown. LoCATE has '*transformed the skills and capabilities of local heritage groups*' and is ...'*what archaeological partnerships should be all about*' (Gill, British Archaeology March April 2019, 34-35). On a national stage we have also engaged with the public on how the archaeological record can inform future societal resilience to climate change (R1/O1/O2), e.g. our participation in WISE 2020 '*Back to the Future*' as part of a plenary session at the British Library (60 attendees).

#### d) *Engagement with Diverse Communities*

Our integrated research and impact strategy has enabled us to highlight this as a significant area underpinning our future strategic objective (O1) and enabling us to transform the accessibility and inclusivity of our activities (R1/3/4). We have diversified our practice to enable people to encounter our research in a more accessible and innovative way (e.g. at unexpected locations), as exemplified

## Unit-level environment template (REF5b)

by sessions at festivals, and themed comedy nights (see Chicken Impact Case Study). We have directly targeted engagement with diverse communities, as seen in the Stonehenge Case Study, which exemplifies our collaborative work to bring quantifiable health benefits to individuals with chronic mental health problems via 'Human Henge'. We are now working directly with veterans via 'Waterloo Uncovered' (Eve) and have previously worked with prison communities and individuals with learning disabilities.

### e) Indicators of Wider Influence

We play an important role in influencing and contributing thought leadership to the discipline. We are all Fellows or Members of learned societies, and/or professional bodies, often in influential roles (e.g. Darvill, Chairman of the Nomination Committee for the European Association of Archaeologists, Vice President of the Royal Archaeological Institute, Member of the Historic England Advisory Committee; Parham, Trustee of the Alderney Maritime Trust; Randall, Hon. Treasurer of the Prehistoric Society). We are regularly called on to referee for international journals such as *Nature*; *Science*; *PNAS*, *PLOS ONE* and publishers including *Routledge*, *Springer*, *Cambridge/Oxford University Press*, and we have served on a variety of editorial boards, e.g. McCartney, *Mariners Mirror*; Coward, Associate Editor *Journal of the Royal Anthropological Institute*; Schutkowski, co-editor *Natural Science in Archaeology*.

Our pioneering contribution to research has been recognised through multiple awards including the Society for Nautical Research 2018 'Anderson Medal' for McCartney's work reinterpreting the Battle of Jutland, and the 2014 *Reg Vallintine Achievement Award* for Historical Diving Achievement for Parham's work on Bronze Age shipwrecks. Welham was part of *Rethinking Durrington Walls* which won the Current Archaeology Research Project of the year award in 2017, and Hewitt's impact on regional research agendas was recognised through a Dorset Archaeological Society *Ian Horsey Lifetime Achievement Award* in 2015.

We continue to influence the discipline through our contributions to national and international committees, exemplified by Jenkins' membership of the national Climate Heritage Network, and our thought leadership is recognised through regular international keynotes, e.g. Coward *Human Distinctiveness: wisdom's deep evolution*, 2017, Welham *Nordic Archaeological Sciences* 2018, and Jenkins *International Meeting for Phytolith Research* 2020. We review for a range of grant awarding bodies including Marie Curie, Gerda Henkel, and the ERC, and Maltby and Welham have been elected to the AHRC Peer-Review College (Maltby 2014-ongoing; Welham - including Strategic Review (2019-)). In 2019, Maltby was commended for an 'outstanding contribution to the work of the AHRC over the past year' by Ian Henderson, Head of Operations at the AHRC.

### f) Our Contribution to the Sustainability of the Discipline

Our agenda-setting integrated research and impact strategy, and the transformative effect of our work, demonstrates that we are leading the discipline to address fundamental societal challenges and agendas, responding to global problems, including the United Nations' SDGs, such as health and wellbeing (SDG3), and climate action (SDG13) (R1/R3/O1). Through investment in our pioneering interdisciplinary research institutes IMSET/ISLHE and our focus on engagement with diverse communities and society as a whole, we are opening up new frontiers which are redefining both the role of archaeologists and the significance of our practice over the next decades.

We are thus charting new approaches to support the long-term sustainability of our discipline and stimulating world-leading research and impact. The radical transformation of our research environment is also cultivating a flourishing generation of global research leaders who will ensure the sustainability and vitality of archaeology by working across disciplinary boundaries to make it central to the key challenges of the 21<sup>st</sup> century.