

Institution: Durham University (DU)

Unit of assessment: UoA15 Archaeology

Section 1. Unit context and structure, research and impact strategy

Archaeology at Durham has a worldwide reputation for research and impact that we always aspire to enhance. Embracing humanities, social sciences and sciences, our inclusive environment thrives upon collective endeavour and co-production and a commitment to address challenges of local, national and global significance with a critical eye. With 30 FTE Category A staff in this REF cycle, increasing numbers of projects, publications and postgraduates, the Department has invested in both appointments and infrastructure which have unlocked new pathways for research and engagement with a more diverse audience than ever before. Our vitality can be measured through:

- our outputs;
- new appointments and infrastructure, which together drive greater diversity and excellence (including ECRs as defined by REF);
- a community of Post-Doctoral Researchers (PDRs) that has increased by over 90% in this REF cycle;
- Research Post-Graduate (PGR) completions up 76% (51.4 in REF2014, 90.65 in REF2021);
- consistent grant success across an increasingly diverse range of sponsors (GBP4.5M RAE2008, GBP8.1M REF2014, GBP15.6M REF2021);
- a more integrated commercial archaeology unit - Archaeological Services Durham University (ASDU) - that co-produces world class research and impact e.g. Nepal/Sri Lanka (ICS-Coningham-*Accessible and Resilient Heritage in S Asia*), China (Kennet-Palace Museum Beijing), Ukraine (Chapman-AHRC *Tripillya Megasites*), and is the key to our regional engagement (e.g. Gerrard/Graves-Auckland Castle) (S.4);
- a well-supported impact agenda which addresses major challenges for our discipline, e.g. heritage protection (ICS-Leone-*Training in Action: North Africa* and ICS-Coningham) and the social inequalities and injustices of the present (ICS-Gowland-*Bodies of Evidence*).

Research structures and strategic aims

Our research environment is structured around six Research and Impact Groups (RIGs), a designation that reflects Durham's drive to embed impact and co-production. Four RIGs continue from REF2014; **Bioarchaeology (BioA)**, **Landscapes of Complex Society (LCS)**, **Northern Communities (NC)** and **Prehistoric Worlds (PW)**, while two have recently emerged – **Heritage Partnerships (HP)**, and **Material and Visual Culture (MV)**. These changes have enhanced vitality and global reach, multiplying and diversifying our partnerships (Figure 1).

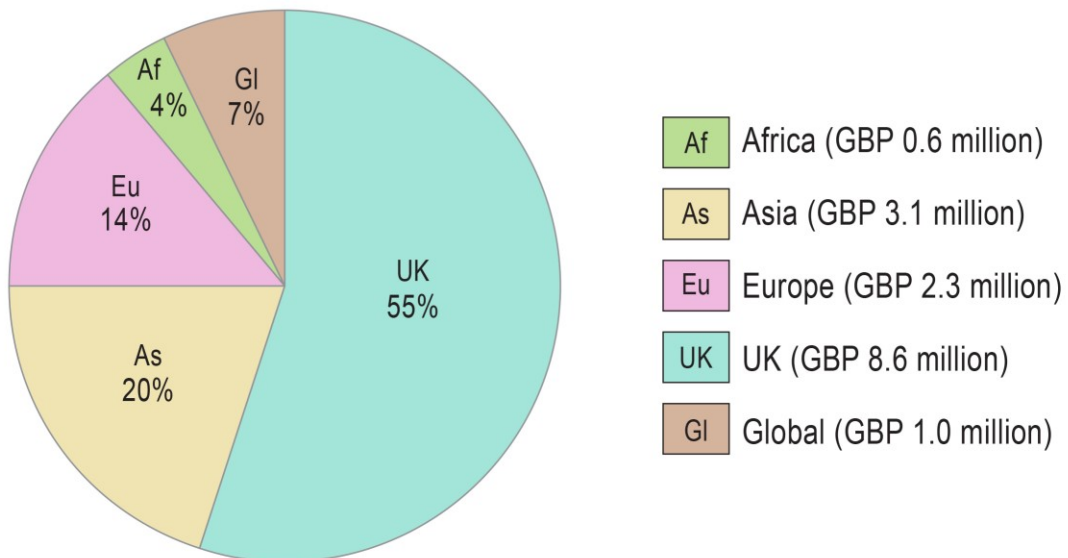
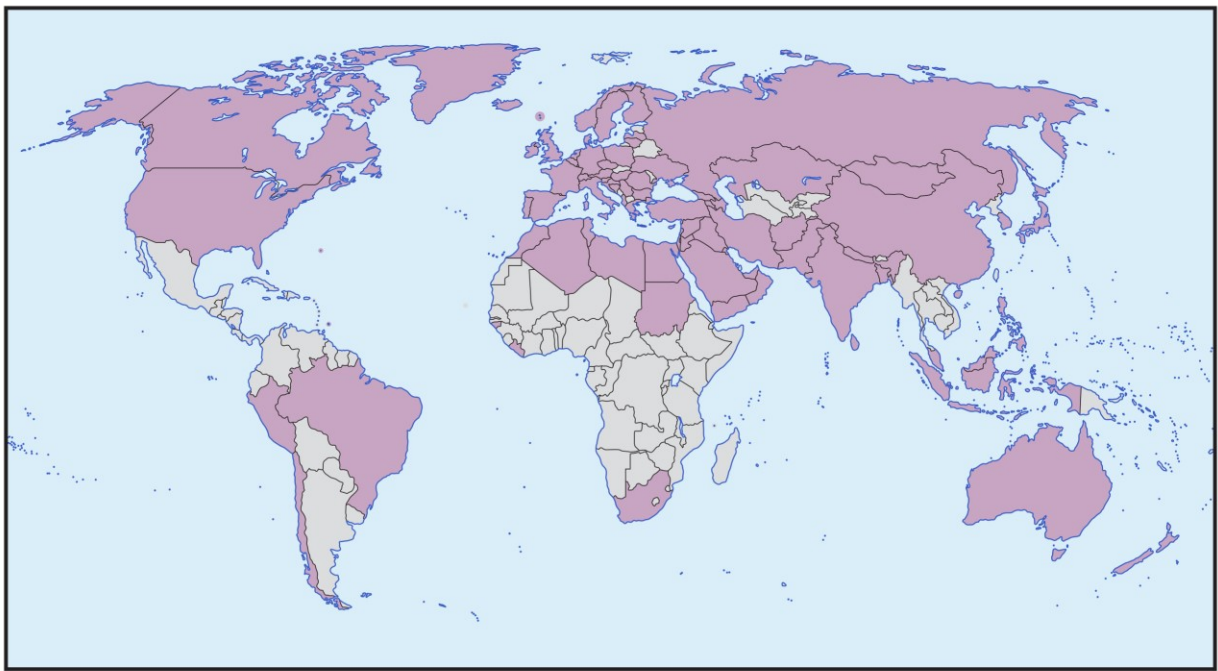


Figure 1: Global research activity by country (shaded purple) (above) and grant spend by global region (below)

In REF2014 we identified seven Strategic Research Aims (**SRA**): (1) to apply emergent science to rethink major cultural narratives; (2) to undertake meta-analysis; (3) to revitalise Durham’s research on material culture; (4) to cross boundaries and take up inter-disciplinary challenges; (5) to foster new research agendas; (6) to undertake new archaeological fieldwork and bring projects to publication, and; (7) to enhance our research links with external organisations. We have exceeded these expectations, our six RIGs driving an energetic and thriving research culture centred on external collaboration and interdisciplinarity.

Bioarchaeology (BioA) is a world-leading group which applies emergent science to explore different impacts on human and other animal populations (**SRA1**). Characterised by a breadth of expertise and international partnerships in 30+ countries, **BioA** projects embrace diverse geographical/temporal scales, set agendas and tackle ethical concerns. This RIG has established new methods to explore human-environment interactions in marginal regions and climate/change impacts (Milek-*Living with Vikings*); the dissemination/impact of agriculture through plants, animals and diet (Church/Rowley-Conwy); and the mobility and dietary histories of humans and animals (Montgomery-*Food and Identity in Ireland*) including a Bayesian mixing model for the reconstruction of diet through isotopes (Millard-*FRUITS*). Research on the health and well-being of varied demographic and social groups across the life course (RobertsC-*Global Health/Gowland-Mother-Child Nexus*), in changing contexts (e.g. Gowland-industrializing societies) and re-evaluations of past infectious diseases (e.g. RobertsC-leprosy, treponemal disease) complement the use of metadata to explore long-term health trends and inequalities (Gowland/Montgomery/Fernández-D/RobertsC) (**SRA5**). Methodological advances by this RIG are demonstrably relevant to research on human identity and identification and modern forensic contexts (Gowland/Montgomery-Peptides).

Landscapes of Complex Society (LCS) is a RIG of international significance generating essential research on notions of temporary centres and early urbanism (Chapman/Millard/ASDU/Moore,T) (**SRA6**). The Informatics Laboratory, a key resource for **LCS**, exploits evidence from both fieldwork and remote sensing to identify and interpret extensive trends in settlement and landscape change, such as the emergence of imperial landscape signatures in Asia (Lawrence/Philip-*Persia and Neighbours*), while new projects on slavery and inequality in Europe and the global south are opening up research possibilities on colonised landscapes in new regions (Gomes-C) (**SRA2,5**). Documentation and in-country collaborations (e.g. Philip-*EAMENA*) have produced new data for palaeoclimate and landscape productivity (Lawrence-*Climate, Landscape, Settlement, Society*). **LCS** also feeds into modern environmental challenges, investigating past responses to risks and hazards, from earthquakes in medieval Europe (Gerrard/Forlin) and South Asia (Coningham/Manuel/Davis) and the dynamics of human inhabitation in the Nile Delta (Wilson), to hydraulic technologies in arid landscapes (Bailliff/Jankowski). Fieldwork skills and large datasets generated by **LCS** projects (**SRA 2,5**) also drive the work of the **HP** RIG in the Middle East, North Africa (MENA) and South Asia (Philip/Leone/ Coningham), proving fundamental to the delivery of training to partners in these regions.

Prehistoric Worlds (PW) continues to represent one of the key research strengths of Durham archaeology with high-profile projects from Palaeolithic art and technology (Pettitt-Neanderthal cave art; White-hand axes and cognition) to proto-urbanism and the origins/flows of metal in later prehistoric Eurasia (Moore,T-Bagendon/Bibracte; Chapman-*Trypillia mega-sites*; Roberts,B-copper/tin/bronze). This RIG sets agendas in early monumental architectures across Europe (Scarre/Roberts,B/Díaz-G), in sensory experience (Skeates-*Caves in Context*; Scarre-archaeoacoustics of Spanish cave art), and in digital visualisation (Díaz-G-*Making a Mark*) (**SRA5**). Big Data projects explore engagement with the dead in Europe and the Middle East (ME) over the *longue durée* (e.g. Scarre/Philip-*Invisible Dead*) (**SRA3**). **PW**'s success is underpinned by high levels of interdisciplinarity (e.g. visual psychologists, acoustic scientists) and collaborations with **BioA** (isotopes, aDNA and Neolithic-Bronze Age mobility and transitions: Montgomery/Rowley-Conwy/Gron/Fernández-D/Skeates) (**SRA1,4**). **PW** is also enhanced by high profile media work (Pettitt-BBC), community co-production (Roberts,B/DigVentures-*Barrowed Time*) and planning policy engagement (White-HS2/Aggregates; Moore,T-*REFIT*).

Material and Visual Culture (MV) represents a new research direction prompted by the strategic appointments of Draycott, Díaz-G, Badreshany and Williams. This group has enhanced connections with DU's Centre for Visual Arts and Culture (CVAC), Museums Service and Special Collections (**SRA4**). Projects frequently intersect with other RIGs, but are united by a focus on artefacts, monuments and imagery that underpin some major grant wins (e.g.

Semple-Worked in Stone/Corpus GBP578k). The RIG has revitalised our research on material culture and fostered new research agendas on the materiality of religion, belief, and identity (Brooks/Graves-Morton Cope/Draycott-iconography and identities), identifying new directions in the symbolic, socio-cultural and economic dimensions of monuments and artefacts (Díaz-G/Skeates/Pettitt) (**SRA3,5**). Members work with non-academic users to inform national and international collections management practices and develop better protection against theft and illicit trade (ICS-Leone). The group has given new impetus to artefact research, facilitated by digital visualisation and recording tools (Díaz-G-*Image Making and Mobility*) with new analytical facilities revitalising research on ceramics (Philip/Badreshany-CRANE) and metals (Roberts,B-copper/tin/bronze) (**SRA3**).

Northern Communities (NC) successfully expands our interests in north-east England and addresses a broader North European, Atlantic and Arctic context, engaging with research in **BioA** on marginal zones, climatic pressures and human-animal mobility (Church/Milek/Montgomery) and undertaking interdisciplinary, large-scale explorations of the lifeways and challenges facing northern communities (Semple/Gowland-*People and Place*) (**SRA1**). This RIG sets agendas and advises key stakeholders in NE England, e.g. Petts-Durham World Heritage Site (WHS), has extended public understanding of archaeology through a major exhibition and spin-off activities on the Scottish Soldiers excavated at Palace Green by ASDU (Annis/Graves and others) and has embarked on an ambitious Heritage Lottery (HLF) funded-engagement programme to extend archaeological skills to NE communities, enabling research co-production (Petts/ASDU-*Belief in the North*; Roberts,C-*St Aidan's church and crypt, Bamburgh* HLF) (**SRA7**). **NC** extends its reach by exploring recent social inequalities through *Landscapes of the Great Depression* (Petts), and new narratives concerning the health of industrial communities (Gowland/Millard) (**SRA4**).

Heritage Partnerships (HP) marks a step-change in our engagement with cultural heritage protection. Fieldwork-driven evaluation of key monuments and landscapes (ICS-Coningham), and collaborations drawing on remote sensing methods generated in **LCS**, have created extensive new base-level datasets (Philip/Lawrence-*EAMENA*) that underpin knowledge exchange, training, advocacy and the creation of new toolkits to assess and mitigate threats to heritage (ICS-Leone-HeDAP; ICS-Coningham-risk maps) (**SRA2,5,6**). Co-production and responsiveness to local needs are foundational: for example, we work in the UK with the National Trust (Skeates) and Historic Environment Scotland (Milek/Church), and with national and transnational heritage bodies overseas. We connect communities with their living religious heritage (e.g. Coningham/Petts pilgrimage sites in S Asia/UK), and work with disadvantaged communities in Europe and the global south, engaging them with the 'uncomfortable heritage' of their recent past (e.g. Gomes-C-archaeologies of enforced migration) (**SRA5,7**). We have mobilised our practitioner expertise to lead on heritage conservation agendas e.g. with the World Heritage Institute of Training and Research for Asia (Brooks) and ICOM-CC (Williams), and collaborate on training in museum skills in Jordan (Skeates/Badran-AHRC Newton award).

Powerful synergies between these RIGs create greater vibrancy in our research environment. Analysis of landscapes, archaeomaterials and isotopic analysis in combination, for example, is illuminating the organisation of commercial networks linking East Asia with the Mediterranean (Kennet/Zhang/Gerrard) and the exploitation of Bronze Age tin sources in Europe and the ME (Roberts,B/Badreshany). Research is also underpinned by major fieldwork programmes, e.g. Pettitt/White/Skeates-prehistoric cave sites, Scarre/Díaz-G-Neolithic/Bronze Age monuments in the UK and Iberia, Moore,T-Iron-Age oppida, and often integrates commercial archaeology with community participation and training e.g. Holy Island (Petts) and Auckland Castle (Gerrard/Graves).

As new research ideas emerge, so our RIGs have developed, creating a flexible ecosystem of loosely joined users and research partners. After reviewing our REF2014 strategic research aims in 2016 and again in 2019 in response to the university's *Research Strategy 2017-27*, we can demonstrate significant and sustained progress in all seven SRAs. Research coherence

and collaboration is driven by department seedcorn funds, horizon-scanning by the Director of Research (DoR) and Research Office (RO) and opportunities for discussion at Research Committee (RC). We do not set financial targets but expect RIGs to deliver across a mixed portfolio of grants, publications, partnerships, impact and public engagement and PGR recruitment. Success is monitored by Research Committee (RC), chaired by the DoR and comprises the Head of Department (HoD), RIG convenors and PDR and PGR representatives. RC offers support and encourages change, where required. Annual Research Away Days provide opportunities to think 'outside the box' and inform our research strategy; the Board of Studies confirms policy changes.

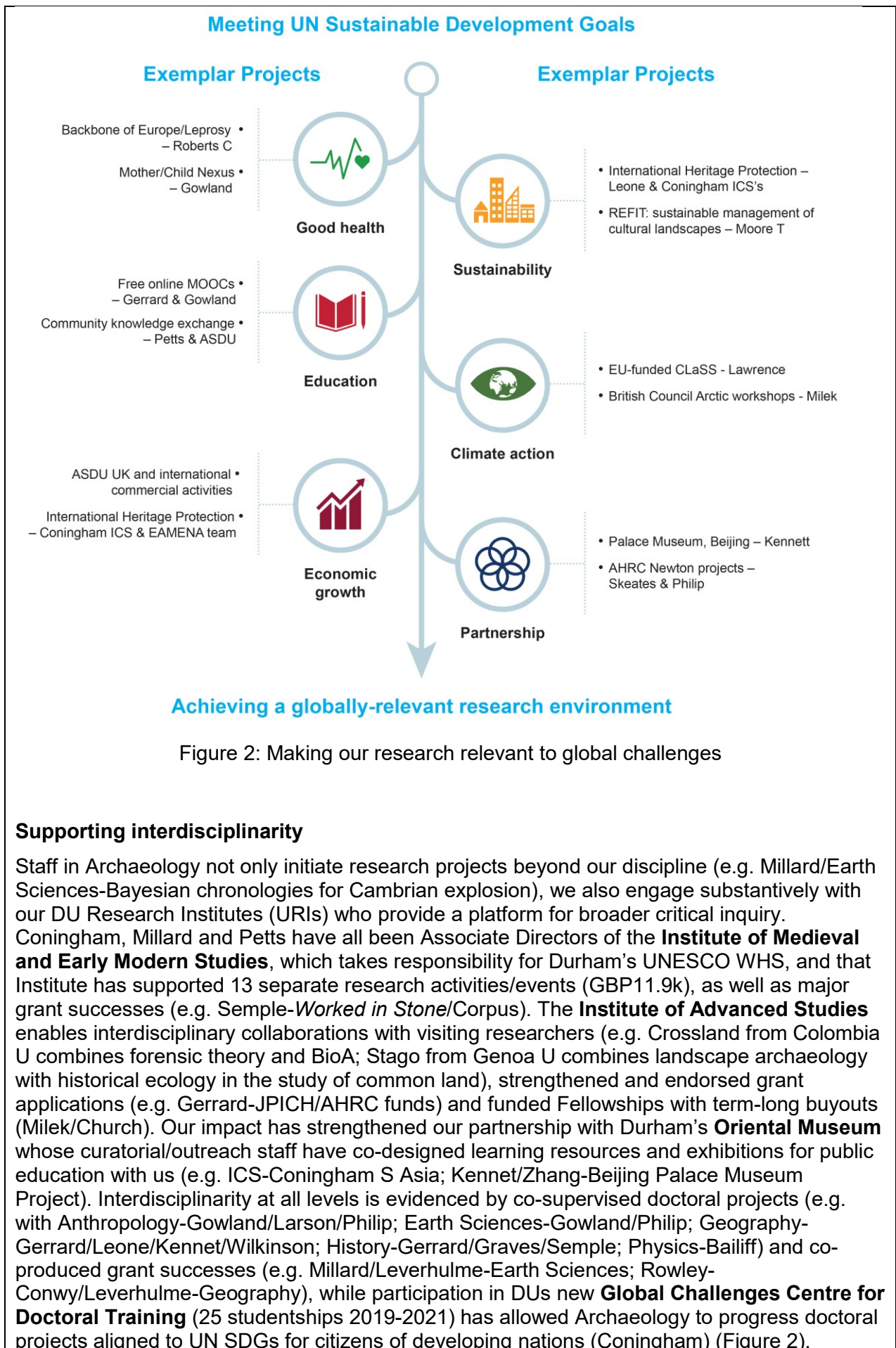
With an eye for interdisciplinarity and reach we have appointed **Professors in Practice** to ensure better connections between Durham's research and the world beyond academia. Wilson (2019-Historic England) provides expertise in the historic environment and Staniforth (2019-ex-National Trust) on the conservation of historic structures. They also sit on our newly established **International Advisory Board** alongside Battle-Baptise (UoMassachusetts Amherst-historical archaeology/African diaspora), Heron (BM-archaeological science), Holbrook (Cotswold Archaeology-commercial archaeology/industry), Jing (UoBritish Columbia-East Asian archaeology/material culture), and Meskell (UoPennsylvania-ethnography/heritage). Members serve a term of 3 years and bring knowledge/experience of national/international priorities to the Department, strengthening the reach and direction of our RIGs and enabling us to use our research (and teaching) to network with a changing world.

Future strategic goals

Building on this interdisciplinary focus, the strength and structure of our research environment and the vitality of our RIGs, our vision is to:

- 1) rethink narratives around major episodes of change in human communities (e.g emergence of inequality, health challenges, urbanism, ancient empires, major diasporas) (**LCS, NC**);
- 2) set new agendas for understanding human resilience and survival in relation to challenging environments, catastrophes, and disease, and to assess their impact on the well-being of past and present communities (**BioA, NC**);
- 3) pioneer new questions/narratives around cognitive evolution and technological change among early human populations, exploring monumentality, sensual experiences, and material and visual cultures (**PW, MV**);
- 4) advance a regional to global vision for a broader and sustainable programme of archaeological skills training and education which is relevant to emerging economic, social and political challenges, working in partnership with national/transnational agencies (**HP, NC**);
- 5) integrate our research and commercial infrastructure (**BioA, MV, HP**);
- 6) collect and analyse exciting new primary data through innovative programmes of problem-oriented field and laboratory-based research (**all RIGs**).

In these ways we will mobilise our research to develop a globally relevant research environment, meeting some of the world's key sustainable development goals (SDGs) (Figure 2).



Promoting a culture of research integrity

Our research culture is informed by institutional policies (REF5a/2.3). Training for staff on good research practice and governance is delivered by the **Durham Centre for Academic Development**, with additional activities conducted within the department. All research projects (staff, PDR, PGR) are guided by the *Ensuring Sound Conduct in Research* code of practice, which ensures that staff are fully briefed on ethics. Documentation must be approved by our departmental Ethics Committee and, where appropriate, the Faculty Ethics Committee. Given our global reach, the conduct of research must be open, inclusive and relate to the wider policy objectives of stakeholders (e.g. Moore, T's *REFIT* project investigates land ownership, designations and notions of public interest in the UK, Germany and France). The UNESCO Chair in Archaeological Ethics and Practice in Cultural Heritage (Coningham), one of only 3 UNESCO Chairs in archaeology worldwide, was created in 2014 "to initiate programmes that advance teaching, learning and research in areas that are a priority for UNESCO". Our UNESCO team has been co-designing solutions and training programmes to encourage heritage protection alongside inclusive participation, development and promotion at living heritage sites. The appropriation of cultural artefacts is addressed by e.g. Leone (ICS), while the ethics of excavation/exhumation and examination of human remains has been unpacked in high profile legal contexts (ICS-Gowland) and explored through two FutureLearn Massive Open Online Courses (MOOC) in 2019 with 26,000 learners between them to date (Gowland/Gerrard/Roberts,C). We have contributed to both the 2019 BABAO Codes of Ethics, Practice and Digital Imaging and the Codes of Practice of the American Association of Physical Anthropologists Repatriation Committee (Roberts,C).

Progressing towards an Open Research environment

Our output return is 100% compliant with the REF Open Access rules, and we celebrate the improved research visibility afforded by OA. 800+ departmental outputs are freely available through our institutional repository, **Durham Research Online** (see REF5a/2.4), with over 20,000 downloads to 50+ countries during this REF cycle. We have also published 50+ Gold OA journal outputs since REF2014 using the institutional RCUK Block Grant, support from grant bodies such as Historic Environment Scotland, departmental funding, and international publisher deals, and are moving towards OA for fieldwork monographs (e.g. Bagendon, Paithan). A high proportion of OA papers are co-produced with PGRs and PDRs (20+), many of these supported by departmental funds. Our data in public archives are well used (e.g. Trent Valley Project-White 1000+ page views and Wearmouth-Jarrow-Semple 2300+ page views, 600+ downloads through ADS). Major funded projects enable the free release of substantive data sets (e.g. *Worked in Stone/Corpus* – since 2017 13 volumes released OA, catalogue entries for 3505 monuments and 9792 images, registering 21,418 separate users and 454,167 unique page views worldwide). We also commit to OA by freely releasing our commercial grey literature reports with 95% of ASDU output publicly available online (c.2650 reports since REF2014). The university **Research Data Management Policy**, effective from August 2017, guides the governance, storage, and disposal of research data. The university **Research Data Service** supports staff on best practice regarding data access.

Section 2. People

Staffing and recruitment

Since 2014, six colleagues are no longer at Durham; Larson and Richards moved institutions, Caple and Chapman retired, Wilkinson sadly died, and Sewell left academia. Our seven new appointments have been calibrated around our research and impact strategy, and we have sought out new skills. Long and short-lists are always representative of disciplinary diversity and academic demographic, pushing our recruitment worldwide. The University Strategy urges us to employ 'the very best people and let them pursue their research interests in a cooperative and well supported working environment.' We aim to do so.

Three appointments have strengthened existing research areas. Lawrence (**LCS**) brings expertise in remote sensing and GIS and the Middle East. Fernández-D (**BioA**) has capitalised on investment to develop and deliver our new aDNA laboratory, while Díaz-G (**PW/MV**) combines work on Neolithic Europe with expertise in digital imaging. Taking us in new directions, Milek's skills in geoarchaeology and interests in the North Atlantic create synergies with **NC** and **LCS**. Gomes-C's work in South Atlantic empires, supported by start-up funds for work in Guinea Bissau, underscores our growing interest in colonialism and globalisation in **HP** and **LCS**, while Draycott's focus on ancient art is fundamental to the new **MV RIG** and collaborations with Durham's **Centre for Visual Arts and Culture**. Williams, appointed on the teaching track, brings international practitioner expertise. Investment in the **Durham Archaeomaterials Research Centre (DARC)** and our strategy to appoint laboratory managers fusing research/commercial roles for sustainability (Andrieux/Badreshany/Moore,J) have delivered a step-change in our capability in archaeometric, isotopic methods, material culture research and commercial analysis (see below S.3).

Current staff (PDRs see definition on p.1)

There have been 19 academic staff promotions since REF2014, all but one of our Cat A appointments being on non-fixed term contracts. Our *emeriti* still contribute to long-standing projects, both through publication (e.g. Chapman/Millard-*Trypillia megasites*), and grant-winning (e.g. Cramp/Semple-*Worked in Stone/Corpus*). Since our major recruitment in 2004-06, staff retention has been outstanding with substantive leadership development. Of this cohort Coningham, Scarre and Semple have all served as HoD, while junior appointees Church, Gowland, Leone, Semple have been promoted to Grade 10. Major administrative roles are allocated on a 3-year cycle to ensure succession planning, with care taken to balance roles according to gender. Senior staff chair committees or hold roles outside the Department (e.g. Gowland Associate Exec-Dean for People and Culture in Faculty of Social Sciences and Health; Roberts,C on University REF Steering Group). They also support the development of PDRs, ECRs and 'consolidator' staff (the cohort above ERCs). The latter often hold deputy roles (e.g. Milek as DHoD), while ECRs assume entry-level administrative roles. The unit engages fully with Postdoctoral Research Fellow (PDRF) schemes such as Marie-Curie (8 since REF2014), British Academy (1), University Co-Fund Fellowships (5) and Newton schemes (Gron). In REF2021 we registered 52 PDRs, compared to 27 in REF2014, reflecting a rapid growth in grant funding.

Staff development strategy

We foster a safe and inclusive environment that nurtures personal development for all. We welcome PDRs and academic staff with a Department and DU induction programme ensuring they can quickly learn the University's policies, processes and practices and feel at home in their new environment. A 1-year probation period allows for an intensive supportive approach with regular mentor meetings aligned to research, teaching and citizenship targets. In line with this, in 2019/20, we expanded our existing mentoring for probationers/ECRs/ PDRs to a formal mentoring programme for all academic staff, recognizing that experienced staff can also benefit from support.

We empower our PDRs and ECRs and celebrate all staff achievements. PDRs are encouraged to join the Research Staff Association, est. 2014 (see REF5a/3.4) and all are offered Annual Review appraisals with full access to bespoke and University training (e.g. GIS training spring 2019 for incoming PDRs). We have adopted the 2019 *Concordat for the Career Development of Researchers* and PIs are fully engaged with PDRA progression. Our PDRs and ECRs play a key role in organising RIGs and a PDR representative sits on Research Committee and we support their career progression through training/workshops (e.g. around Impact and Brexit uncertainty), skills audits and interview training. We encourage PDRs/ERCs to maintain publication streams arising from their doctorates or previous projects, and support conference attendance and project start-ups. We have met c.50 PDR requests for funding since 2016, granting up to GBP600 per/person (e.g. Hopper-Tiblisi; Orsini-Corsica). PDRs and ECRs make

vital contributions as partners in our research and through the development of impact (e.g. Nebbia/Leone ICS). They are fully supported to submit grant applications via scoping meetings, pitch-to-peers ideas sessions (e.g. via NERC, AHRC liaison groups), peer-review and feedback, and mock panels (e.g. Lawrence ERC Starting Grant), and to engage in major international collaborations (Fernández-D-Kinship *Structure of the World's First Houses/Roberts, B-Tin in Bronze Age Europe*).

The benefits of training at Durham are evidenced by the 220+ outputs co-produced by Durham Category A staff and PDRs since REF2014 (that is 35%+ of our total), and the progression of many PDRs to competitive university positions e.g. UoBologna (Pucci-D), UoBordeaux *chaire junior* (Lopez-R/Sparacello), Bryn Mawr (Bradbury), East Washington University (Buchanan), prestigious research posts e.g. the Max Planck (Perri), UCL (Nebbia), UoWollongong (Jankowski), CISC (Utrero-A) and to senior national appointments e.g. Minister of Culture Iraq (al-Dafar), Director for Museums Saudi Arabia (Alonasi).

Our REF management group, whose remit integrates all research and impact activity, meets regularly with academic staff to maximise output quality, advising on publication and open access requirements, and to highlight opportunities for collaboration. Staff are offered individual advice on their publications, grant proposals, research and impact plans. The Department Progression and Promotion Committee (DPPC) reviews academic staff and PDR performance annually, providing written and verbal feedback. We link our REF management group and DPPC guidance to our formal mentoring programme by encouraging staff to share recommendations with their mentors in discussions around career development.

Meetings with staff by the REF management group identify and mobilise support for emergent impact (GBP22k in support for new initiatives since REF2014 e.g. RobertsC-skeleton science for care-home residents). Impact is embedded in PDR/ECR experience through annual impact workshops. ICS authors have meetings to review needs and receive departmental investment (GBP28k since REF2014) and prepare bids to the University's Research Impact Fund (c.GBP43k awarded for 11 projects) (REF5a/2.5). These initiatives have raised staff profiles through e.g. co-production of new modes of visitor engagement with the National Trust (Skeates), and by sponsoring free places for regional police on our Body Recovery CDP training programme (Gowland). We encourage grants and projects where research directly underpins impact-facing agendas e.g. *REFIT* funded by Joint Programming Initiative on Cultural Heritage and Global Change (JPICH Moore, T) and AHRC follow-on funding for impact and engagement for *Tales of the Frontier* (Hingley).

Academic and business exchange is stimulated by trustees (Gerrard-Cotswold Archaeology), Northern Bridge AHRC placements and collaborative projects with social businesses (e.g. DigVentures). Our investment in infrastructure and technical expertise has significantly increased DU's commercial activity and facilitated knowledge exchange with 50+ businesses (see below). Over 30 staff have undertaken continuing professional development ranging from national qualifications in health and safety (NEBOSH) to postgraduate awards in archaeology and business management via DU programmes, while impact and engagement activity is integral to the University's Academic Progression process (e.g. instrumental to Leone/Gowland to Grade 10).

Supporting research

Our Workload Model affords 20% time for research for all Cat A staff, with additional allocations for doctoral supervision, the management of major grants and research activities including impact. Since 2014 we have weighted research and impact activities equally. All Category A staff had University research leave within this REF cycle (55 terms granted overall to 30 members of staff; equally weighted M/F), with additional leave for impact-related work for Leone and Gowland. We offer 1 term of leave in 7 with *pro rata* arrangements for p/t colleagues. Teaching and technical staff have 1 day per week for practitioner research and development. Those with caring responsibilities or health issues are equally supported with

temporarily reduced teaching and citizenship loads and extra research leave granted to 4+ colleagues following major health and caring issues.

Staff are assisted throughout the research process from application to post-award. The DoR and Senior Research Administrator work with Research and Innovation Services (RIS) to horizon-scan for new funding opportunities, identify strategic changes in the funding climate, and work with individuals and RIG teams to develop new bids and support them with start-up funding. We specifically offer annual seedcorn funding to sustain PDRs/ECRs with independent projects and grant-bids of their own (GBP14,600 since c.2017).

Research Committee reviews grant applications, successes, and impact activities to monitor RIG performance, identify good practice and offer feedback. The new university progression framework embeds equity of opportunity for mentoring, feedback and promotion.

The university's Research Grant Incentive Scheme draws down 10% of net research grant overheads into staff research accounts; a similar sum goes to the department budget. 'These incentives are carried forward and used flexibly to support research objectives' (REF5a/3.3), e.g. enabling illustration/editing to ensure timely completion, meeting OA costs for publication of major fieldwork monographs (e.g. Bagendon, Paithan, Tiber Valley). This scheme also facilitates strategic investment, enabling PIs to develop major collaborative grant bids e.g. ERC Lawrence.

Training and supervision of research students

Durham has attracted outstanding doctoral students, recruiting 13.5 FTE p/a since REF2014. We seek synergies with our RIGs and our infrastructural investment to build research momentum, working to secure internal and external funding. During this cycle 37 RCUK studentships were awarded and 10 Durham Doctoral Studentships. A further 33 students have had partial or full funding support from a variety of UK and international awards, enhanced by collaborations with external organisations such as museums (e.g. Davies-Barrett AHRC CDA with BM; Prosser AHRC CDA with NMS). Both Semple (2015) and Gerrard (2018) have won awards for *Excellence in Doctoral Supervision* (nominated by their students). Cross-institutional supervisions are discussed in S.4.

We appraise the training needs of doctoral students on arrival, then annually, ensuring their access to a wide-ranging departmental training programme with more than 20+ events through the year. We meet the PGR cohort regularly to discuss their experience: individual students record supervisory outcomes monthly in online blogs. Annual reviews monitor progress and supervision, and incoming students have the option of a second year PGR mentor to advise them.

We view PGRs as partners and offer desks in shared offices in the Department. They have first class IT facilities (e.g. 13 high-spec workstations in the Informatics Lab), the same access to inter-library loans as staff and are able to recommend library purchases. PGRs play a full role in the Departmental seminars and RIG activities (all are members of at least one RIG), which they help to shape as well as running their own seminar series. Our Research Dialogues programme provides funding (GBP500) for larger PGR-led thematic workshops (e.g. *Archaeological Pedagogy in a Global World; Climate Change and Human Society*). Some of these events have led to edited books (e.g. Gowland with PGRs for *Care in the Past*, 2017). Students can apply every year to our internal funds for conferences and travel (c.GBP7500 annually) and they are supported to apply for external funding. We deliver annual impact workshops for our PDRAs/PGRs and use seedcorn (22k since REF2014) to support new engagement and impact initiatives (e.g. workshops for pupils with learning needs, Jarrow Hall (Mui, PhD, 2015-16), as well as encouraging impact-related PGR projects (e.g. Laidler, AHRC-funded PhD 2019, *The Impact of Archaeology in NE England*).

Training for teaching is well-established with 36+ PGRs opting to take the Durham Excellence in Learning and Teaching Award, which leads to Associate membership of Advance HE. Outside the department, the **Durham Centre for Academic Development** (DCAD) offers a comprehensive Researcher Development Programme with training in languages, academic writing, skills support, numeracy and time management, for example. The Maths and Stats Lab offers resources, courses and a drop-in service. The **Durham Counselling Service** organises well-being workshops and generous time allowances are given for PGRs with family needs, alongside relocation advice and information on schools and full access to University Hardship Funds. The University's **Careers and Enterprise Centre** (CEC) delivers employability skills through workshops given by graduate employers. Our membership of NERC and AHRC doctoral training centres also provides bespoke training (e.g. GIS, photogrammetric techniques) while AHRC placements are well used (e.g. *Current Archaeology* magazine, Suffolk County Council, and museums including BM and Moesgaard). Placements are also offered through ASDU: PGRs Evans and Treasure being employed full-time following the completion of their PhDs.

We have a high doctoral completion rate - 83% within 4 years (90.65 completions: 61%F, 39%M) - while 80+% of this cycle's cohort have academic publications arising from their theses. Those co-authored with staff include Church/Treasure (2014 *PPS* prize-winning UG dissertation published 2017 in *Environmental Archaeology*), Semple/Mui (co-editing *Life on the Edge* volume). Continuing Professional Development is vital to 'work-readiness' and is promoted through the department, colleges, and the University's CEC which partners with leading employers. In this cycle we have started a PGR and PDR development series (grant writing, Open Access, REF, achieving impact) while a Careers Day in March 2020 included a PDRA-PGR session focused on honing applications for post-doctoral positions.

	No. of Individuals
Academic/University teaching post	11
University post-doctoral researcher	33
Other HE	3
HE (total)	47
Commercial archaeology/consultancy	17
Heritage/museums	12
Professional Archaeology (total)	29
Government	3
Education	2
Industry / Business	7
Destination unknown	9
Total	97 (90.65 FTE)

Table 1: Destinations of PhD completions in this REF cycle

Durham PGRs have gained academic positions at York (Piper) and Bahrain University (Alsadeqi), joined Heritage Malta (Azzopardi), the National Museum Service in Saudi Arabia (Alonazi), and taken-up PDRF positions globally including a British Academy Fellowship (Panayides) and a Leverhulme Study Abroad Studentship (Brown). Our PGR employability is strong (Table 1) with 47% now in HE employment.

Equality and diversity

We are leaders in EDI at Durham: two of our staff sit on the University's Athena SWAN self-assessment team and one on the University's Race Equality Charter self-assessment team. As Faculty Lead for EDI since 2019, Gowland is addressing structural inequities across Durham's four Faculties. We are a welcoming, multicultural and inclusive department: our PGRs, for example, have enrolled in Archaeology from 43 countries from across Africa, the Americas, Europe and Asia. We foster an ethos of care for everyone and support colleagues with difficult

personal circumstances to continue their research and impact work by reallocating teaching and service activity. Since 2018 we have trained four mental health first aiders and hosted joint staff-student events to increase awareness of mental health issues. We have implemented fully the university's policies on work-life balance and wellbeing, supporting three late career staff to move to fractional contracts, ensuring *pro-rata* research leave (9 terms), and assisting grant applications and publication (e.g. Bailiff OSL).

Gender

The award of Athena Swan Bronze in 2017 confirms our work in relation to gender and our application was used as an exemplar by AdvanceHE. A departmental submission for Silver is planned for 2021. Gender ratios among Cat A staff have moved from 70:30 (REF2014 M:F) to 60:40 (REF2021) and 10 of the 19 academic promotions in this cycle have been achieved by female staff, while 33% of Grade 10 staff are female, compared to 8% in REF2014. This we attribute to: 1) the new Department Progression and Promotion Committee (DPPC) which reviews all staff annually against transparent benchmark criteria; 2) the growing contribution of impact activity in promotion decisions, and; 3) a greater awareness of gender and intersectional issues within the Unit e.g. gender bias in publishing was evaluated by our staff working for *Antiquity*.

Since 2018 our Workload Model has measured load by gender and seniority leading to transparency of workload, roles, and improved opportunities for progression. With 50% of current male Professors aged 60+, and fractional contracts now a late career option, we will soon attain gender parity. Among PDRs, 57% are female, from 8+ countries, while 61% of our PhD completions in this cycle were female.

Parental leave

Since REF2014 we have supported 7 periods of paternity and one of maternity leave, granting all requests to return to work part-time as part of shared parental leave. Research-active staff returning from a period of 26 weeks or more family-related leave are eligible for one term of research leave to be taken within 12 months of their return. The Department modified individual loads on their return to deliver research time and resilience. PGRs are supported in terms of family and caring needs too, and we have set up a new forum for students with caring responsibilities to gain insight into how this impacts on their studies and their ability to integrate with the academic community.

Diversity

We acknowledge the need for a change in culture around diversity in our discipline. During this REF cycle we have held events marking International Women's Day (IWD – Figure 3) and promoted new diversity initiatives. These addressed intersectional issues faced by female students and staff including those with disabilities and from widening participation backgrounds.



Figure 3: Departmental event, IWD2017

A focus on inclusivity and building a sense of community has also been placed at the heart of our Covid online teaching strategy for 20/21. In 2020 six female staff were nominated as *Durham Women Making a Difference* by students and peers – the highest from any Durham Department. We have also created guidance for staff and students on countering and reporting sexual harassment in the classroom and the field, and held meetings with Durham Students' Union, and Durham's People of Colour Association to inform our approach in developing a sense of belonging for our people of colour.

We have established a working group on decolonising the curriculum that includes staff and students and draws upon cross-Department expertise (led by Draycott/Coelho-G), evidenced by Draycott's *Sapiens* commentary (32752 views and named best paper 2020). We have seen a modest, but growing, number of BAME staff among our PDR community, and an increase in short-term academic visitors and digital collaborations with colleagues in the global south through the GCRF and Newton (staff from National Museum of Jordan) schemes. Our 2019-20 seminar series is balanced in terms of diversity and gender and we had three dedicated speakers for Black History month. We have welcomed BAME representation on our Advisory Board (Battle-Baptiste/Jing) to help us develop a more effective research environment for attracting and nurturing BAME talent in Archaeology. In 2019 we enhanced our approach to widening participation, establishing a Mature Students Representative, and we launched a joint initiative with Anthropology for First Generation students, built around staff with similar trajectories. Our MOOCs offer free learning accessible to individuals with impaired hearing/sight, or literacy and numeracy needs and have reached 22600 learners from 150+ countries, many with limited access to world-class learning. This density of work around EDI challenges led to a specific, named commendation for Archaeology in the independent *Durham Respect Commission Report* in 2020 for its 'cohesive environment'.

Our selection of outputs for REF2021 follows the University's code of practice and is shaped by an Equality Impact Assessment (REF5a/3.6) which monitors by gender, grade etc. Our REF Management Group also reflects unit gender ratios. In this cycle staff were supported according to overall workload and personal circumstances through:

- 1) additional time in our workload model and strategic use of research leave;

- 2) individual research meetings to establish possible REF outputs. All members of staff were involved in initial reading of potential REF submissions, reducing to a smaller reading group in 2018 (5m:4f), and steered by a REF Management Group (3m:2f). The final selection ensures fair representation of all categories of staff and research areas;
- 3) separate impact meetings with members of our REF Management Group;
- 4) Departmental/university funding to support the completion of outputs and impact.

Section 3. Income, infrastructure and facilities

Income

Our total research income over the REF2021 period was GBP15.6m, an increase of 92% on REF2014 (Figure 4); this came from over 160 awards. We do not set individual targets for grant capture, as we understand that grants are not required for some research. We believe that delivery should be appropriate to research area and career-stage, with grants forming part of a diverse research and impact portfolio. Staff are encouraged to develop strong projects to which they are personally committed, and we work with grant applicants to support them through the process through mentoring and internal peer review. Innovations include a dedicated 'account manager' from RIS, while a Research Development Manager within RIS identifies funding opportunities.

A notable highlight in this REF cycle is that 30 projects awarded GBP100k+ are spread across 17 staff (59%, up from 31% in REF2014); over 50% of Cat A staff were PI/CI on RCUK awards. Every RIG has captured significant funding: in **LCS** *Persia and its neighbours: the archaeology of Late Imperial power in Iran* (Philip, GBP667k-led by Edinburgh); in **MV** *Worked in Stone: completing the corpus of Anglo-Saxon stone sculpture* (Semple/Cramp, GBP578k); in **PW** *British tin sources and trade in Bronze Age Europe* (Roberts,B, GBP404k); in **NC** *Iron Age and Roman Identity* (Hingley, GBP303k), *The Great Depression in Northern England* (Petts, GBP255k), *Funerary landscapes and social change in early medieval northwest Europe AD400-900* (Mees/Semple, GBP236k); in **HP** *Risk and resilience during/after earthquakes* (Gerrard, GBP284k). Several projects bridge more than one RIG e.g. *Viking social space* (Milek, GBP311k, **NC/BioA**) and *People and Place: Creating the Kingdom of Northumbria AD300-800* (Semple/Gowland/Millard/Montgomery, GBP275k, **NC/BioA**), others demonstrate external collaboration e.g. *Climate, Landscape, Settlement and Society, Exploring Human-Environment Interaction in the Ancient Near East* (Lawrence, GBP1.6M-Tübingen/Leeds, **LCS**).

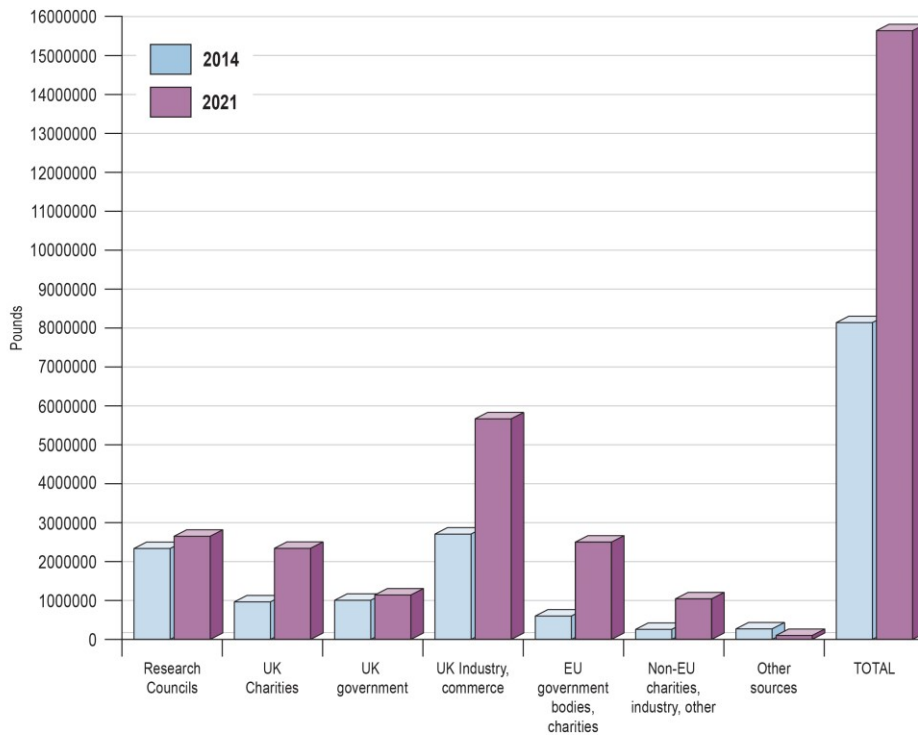


Figure 4: Research spend comparison REF2014 and 2021

Another significant achievement stems from our impact expertise in the **LCS** and **HP** RIGs. By sharing practice, Philip, Leone and Coningham have leveraged over GBP2m to support heritage training and protection. The multi-institutional *EAMENA* project garnered funds from Arcadia (Philip-GBP160k), while both *EAMENA* and *Training in Action* (ICS-Leone) have benefited from the Cultural Protection Fund (GBP970k total). Two AHRC-Newton awards have supported collaborative research projects with Jordanian partners that address United Nations SDGs (Skeates-museum interpretation GBP193k; Philip/Montgomery-multi-isotope environmental mapping GBP200k). Our UNESCO Chair Coningham has accumulated grants in excess of GBP1.23m from sources including UNESCO, GCRF and National Geographic (ICS-Coningham).

With the growing need for research to benefit society and demonstrate value through the public and private sectors, our activities will continue to evolve. We aim to maintain our core funding, e.g. from AHRC and Leverhulme, while growing grant capture in interdisciplinary areas (e.g. NERC, GCRF), in particular through strategic collaborations, and as part of consortia both within and outside the university. We are also working with the university development office to renew focus on private funding and partners (e.g. private donation of GBP25k for Binchester post-excavation from Michael Binns) and exploring the research potential of donor legacies (Isobel Fleck for PDRs).

To revitalise our income base for the future, we have made our new facilities sustainable by broadening our engagement with industrial partners. Since 2017 our laboratories have worked with 53 clients generating income of GBP134k which underpins dedicated PDRA manager roles in archaeomaterials (Badreshany), isotopes (Moore,J) and luminescence (Andrieux). These staff provide high-quality support for research projects, enhanced training for PGRs/PDRs, and have much improved the delivery of laboratory services for our commercial and research partners, building an international research and business client base for the first time. As a result, we are now expanding this concept to Conservation and exploring possibilities in aDNA with the aim of providing new and integrated opportunities for our full suite of laboratories.

Infrastructure and facilities

The Dawson Building houses the following facilities: the **Fenwick Human Osteology Laboratory** (Roberts,C/Gowland) is dedicated to the study of human remains with major skeletal collections held in the department which underpin Gowland's ICS. The **Informatics Laboratory** (Lawrence) lies at the heart of **LCS**. Besides state-of-the-art computer facilities for remote sensing and GIS, we have 12Tb of dedicated server space holding important digital datasets including maps, satellite and aerial imagery, and Digital Elevation Models. This supports research (e.g. ERC grant, GBP1.1m, PI Lawrence) and impact generation in **LCS, HP** and **MV**, through e.g. image analysis and photogrammetry (e.g. Leone ICS), and from 2021/22 through *EAMENA* will host a freely accessible archive of historic aerial and satellite imagery that will contribute directly to international research on landscape change and emerging threats to heritage.

The **Luminescence Laboratory** (Bailiff with Andrieux) has full facilities for dating projects, e.g. on ancient irrigation and terracing systems (Bailiff *et al.* 2020 *J of Arid Environments*), but also for fundamental research, including development of instrumentation *via* access to the University's high performance computing network. The **Environmental and Archaeological Science Laboratories** (Church/Milek) are used for geoarchaeology, archaeobotany, zooarchaeology and wet chemistry. We hold archaeobotanical and zooarchaeological reference collections of international standing, underpinning multiple grants and projects (e.g. Leverhulme GBP190k grant, PI Rowley-Conwy leading to prize-winning output Gron *et al.* 2018 *PPS*). Our **Isotope Laboratories** (Millard/Montgomery, with Moore,J) process both animal and environmental samples. Archaeology hosts a Stable Isotope Biogeochemistry Laboratory (SIBL) which is shared with Earth Sciences, and has reciprocal access to their facilities for radiogenic isotopes (Pb, Sr). Investments in this cycle have vastly increased our capacity to develop projects involving large-scale analytical programmes (e.g. multi-isotope map of Jordan, Philip/Montgomery, AHRC GBP200k), and resulted in over 10 grants awarded from a diverse range of UK and international funding bodies as well as over 30 papers published in international peer-reviewed journals.

The **Conservation Laboratory** (Williams) supplies conservation services for research and commercial purposes. The **Durham Archaeomaterials Research Centre** (DARC) (Badreshany) performs instrumental analyses including scanning electron microscopy and SEM-EDS, X-ray fluorescence spectrometry, Fourier Transform infra-red spectroscopy, reflectance spectrophotometry, petrology, microscopy, the digital imaging of archaeological materials and 3D printing, and works closely with Earth Sciences where ICP facilities are available. Our enhanced capabilities in the analysis of archaeomaterials have shaped the **MV RIG** and underpin new research on archaeomaterials (e.g. Badreshany *et al.* 2019 *Levant*). The **DNA Laboratories** (Fernández-D) extract DNA from ancient and modern and forensic tissues, and with appropriate technical support in place, are generating new research data and publications (e.g. innovative insect aDNA paper co-authored by Fernández-D and MSc student Simpson for *JAS* in 2020).

Strong institutional support of Archaeology is the cornerstone of this investment. We realised our REF2014 plans completing our GBP600k investment in a stable isotope sample preparation lab awarded ahead of this REF cycle. Working through the university's **Research Equipment Group** (REF5a/4.3), we have built on this with coordinated bids with Geography and Earth Sciences around common priorities and improved access to key equipment by sharing resources (e.g. stable isotopes-Archaeology; radiogenic isotopes-Earth Sciences). We identify laboratory and equipment needs on a rolling basis and have secured University investment of GBP3m since REF2014. Recent major acquisitions include:

- 1) GBP750k Zeiss - Scanning electron microscope package (with Zeiss Sigma 300 VP with automated mineralogy platform and Zeiss Evo 10 extended pressure; with Earth Sciences and Geography, operated by Badreshany) is reshaping our materials research, allowing us to image and analyse materials physically and chemically on a far greater scale, and in a less

- destructive manner than previously possible;
- 2) GBP350k - new stable isotope sample measurement laboratory. The SIBL is equipped with a ThermoScientific MAT 253 and ThermoScientific Delta V Advantage gas-source mass spectrometers for the measurement of stable isotope ratios in geological, biological, archaeological and environmental samples;
 - 3) GBP594k - portable non-destructive XRF and XRD facilities for chemical fingerprinting of artefacts and sediments (shared with Geography);
 - 4) GBP170k - new single-grain reader for luminescence dating of sediments involving complex depositional processes (e.g. irrigation features);
 - 5) GBP153k - to complete our new human aDNA laboratory;
 - 6) GBP139k - for CT and digital X-ray imaging systems for the study of objects (for example from Auckland Castle) and human bone;
 - 7) GBP71k - upgrading IT facilities in our Informatics laboratory (facilitating grant success and research output in landscape research);
 - 8) GBP37k - equipment for geoarchaeological research in the Environmental Laboratories, including upgraded microscopy for advanced sedimentological and archaeobotanical analysis.

Our field research is supported by a full array of the latest equipment, with purchases to the value of GBP764k since REF2014. These include four new vehicles, Bartington MS2 meter, gradiometers, Leica GPS kits, Sensys cart, drones, and a quadbike with rover GPS. This equipment supports increased revenue flow from industry through ASDU, while providing all PDRs and PGRs with cost-free access to, and training on, field equipment. DGPS kit and UAVs have supported field research by Cat A staff in UK, Central & South Asia, China, Lebanon and Ukraine, while ASDU staff are themselves embedded as trainers and users in the unit's research and impact work e.g. geophysics work for the community training project *Belief in the North* (Petts). We also make collaborative use of research infrastructure elsewhere in the UK and overseas (e.g. Church-Tephrochronology Facility in Edinburgh; Montgomery-British Geological Survey, Keyworth; Fernández-D-Max Planck, Germany; Lawrence-supercomputer at Leeds Institute for Climate and Atmospheric Science).

The university library is an invaluable resource (REF5a/4.3). As examples, the Scottish Soldiers Project (Graves) made use of the Ushaw College, Durham Cathedral archive/rare book collections and the Special Collections at Palace Green Library; the Auckland Castle Project (Gerrard/Graves) has used medieval manuscripts, tithe and estate maps from the same collection as well as the holdings of Castle Museum, part of the Durham WHS. Several thousand archive maps of the Middle East (mostly pre-1960) from Palace Green were digitized 2015-16, to assist with the interpretation of historic satellite and air-photography and will be released as part of the *EAMENA* image archive (Philip/Lawrence). The Oriental Museum boasts more than 32,000 artworks and archaeological artefacts from Egypt and Asia – invaluable for our developing research relationship with the Palace Museum (Beijing) through PDRA Zhang's work on Chinese ceramics.

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

Durham Archaeology is an outward-facing department that contributes to the research base, economy and society in the UK, Europe and the world in multiple ways.

1. Research collaborations, networks and partnerships

Our scholarly engagement has significant international visibility, placing us in the global Top 4 (World University Rankings by subject, 2020). During this REF cycle the unit featured 3 Fellows of the British Academy (Cramp/Roberts,C/Wilkinson). Staff institutional affiliations include Church (Adjunct Professor-City University New York) and Kennet (Honorary Professor-Palace Museum, Beijing). Our Category A staff serve on over 40 UK and international advisory boards e.g. Universities Archaeology UK (chair Gerrard 2019-22); British Academy H7 (Roberts,C delivering workshops and attending roundtables on the impacts of Covid-19 to inform SAGE/GO Science); Chair, Awards Committee, American Schools of Oriental Research (PDRF

Welton 2019-); NERC Radiocarbon Facility Steering Committee (Scarre 2011-15); Chair, Antiquity Trust (Coningham 2016-). We sit on international appointing panels, are routinely consulted about promotions at other institutions (e.g. RobertsCx14; Rowley-Conwy x6) and are represented on major international funding panels (e.g. Skeates-Co-Chair, European Science Foundation, Humanities/Social Sciences Panel; Coningham-Expert Evaluator Marie Skłodowska-Curie Actions Innovative Training Networks).

Our staff have received honorary awards (e.g. Scarre, Docteur Honoris Causa, Université de Rennes and Distinguished Service Award, Shanghai Archaeology Forum) and we provide extensive support for Archaeology through journal editorship: *EJA* (Skeates 2010-19); *Levant* (Philip 2008-2020); *Medieval Archaeology* (Semple 2013-2019); *Radiation Measurements* (Bailliff 2009-), and as guest editors (e.g. Pettitt and Semple for *World Archaeology*). At *Antiquity*, Witcher (2018-) has secured 6 years funding for public engagement and outreach through social media and links with *British Archaeology* (print run c.12k). Many serve on editorial boards e.g. *Textile History* (Brooks), *Journal of Islamic Archaeology* (Kennet), *Colloquium Anatolicum* (Draycott), and we edit monograph series (Gerrard-Society for Medieval Archaeology monographs). Research quality has been recognised through prizes: *Current Archaeology* best book 2018 (White), British Archaeological Award best book 2018 (Graves), PROSE award for best book in Classics 2019 (Hingley). Our Category A staff have published 650+ outputs in this cycle (46 books/edited volumes, 262 chapters, 343 journal papers/special issues), with co-authors from 50+ countries. The Scottish Soldiers Project was shortlisted for the THE best research project of the year 2018 and the Culture Awards 2019, winning Living North 2019 Performance of the Year (with DU Museums). Foundational works for the discipline include *The Routledge Handbook of Sensory Archaeology* (Skeates) and *The Backbone of Europe* (Roberts,C).

In the REF period, we have organised major conferences e.g. Theoretical Roman Archaeology 2017 (Hingley/Witcher), Seminar for Arabian Studies 2018 (Kennet), and Society for Medieval Archaeology annual conferences in 2016 and 2018 (Gerrard/Forlin; Semple/Mees/Orsini), Bronze Age Forum 2019 (Roberts,B) and the BABAO conference 2014 (Roberts,C/Gowland/Millard/Montgomery) in addition to collaborative conference sessions and workshops (e.g. Pettitt co-founder Kyoto Workshop on Evolutionary Anthropology 2017-). Pettitt, Roberts C, Rowley-Conwy and Semple have given 17 keynote addresses between them. Themed issues and edited collections arising from these co-ordinating roles include the *Proceedings of the Seminar for Arabian Studies* (Kennet), *Journal of Archaeological Research* (Roberts,B), and *World Archaeology* (Semple).

Our RIGs act as hubs for international visitors. Since REF2014 we have hosted 3 research fellows (Crossland (Colombia), Oxenham (ANU), Guichard (Bibracte EPPC), and 7 visiting researchers, e.g. we co-produce research with visiting academics from Middle East countries supported by GCRF and the Nahrein network. In addition, our worldwide reputation is evidenced by Visiting PDRs (e.g. Gonzalez-Spanish mobility grant 2016-18; Golosetti-Ferdinand Braudel Fellowship 2014) and 42 visiting doctoral research students in this cycle (increase of 200%+ from REF2014). State-funded with peer-reviewed applications, these students come from around the world: Australia, Canada, China, Pakistan, Russia, Spain and Turkey for stays of up to 6 months.

2.Transforming knowledge for research users and other audiences

i. Using research advances to meet new challenges

Recent investment and staffing have melded existing and new research and commercial operations. ASDU have worked with 500+ commercial partners realising GBP5.7m of infrastructural development over this REF cycle. They have translated their research and commercial work into 20 community-driven projects (10 HLF-funded), providing volunteers with 3600 days of training in field and lab-based procedures.

New methodological advances have also realised significant impact beyond archaeology, e.g. working with UK Health Protection Agencies and communities in Belarus on emergency planning, Bailiff has translated his OSL work on radiation measurement to a programme of international radiation monitoring. Montgomery/Gowland have co-developed a new technique that can determine biological sex from peptides (proteins) preserved in human tooth enamel. This will have major implications for commercial archaeology, forensic science and police work worldwide.

ii. Informing cultural-heritage management and protection practice and policy

Investment and collaboration, catalysed particularly by our **LCS** and **HP** RIGs, has significantly deepened the influence of our research on heritage management and policy. Our beneficiaries include UNESCO and ICOMOS in India, Myanmar, Nepal, Sri Lanka, Libya and Tunisia (ICS-Leone-*Training in Action: North Africa*; ICS-Coningham-*Accessible, Resilient Heritage S Asia*), as well as Interpol and the EURPOL Counter Terrorism unit (ICS-Leone-HeDAP collections system). Our research is enabling the recording and protection of heritage by state agencies in Kuwait, Oman and Ras al-Khaimah (Kennet) and through the creation of digital Historic Environment Records for the national agencies in Lebanon and Iraq (Philip/Lawrence). We are using our research to effect ethical and responsible management and ownership of natural and human-altered landscapes, sites and collections (e.g. changing land-owner practices in Britain and Europe-Moore, T for *REFIT*).

We create and contribute to site management plans (e.g. Durham WHS-Millard **NC**), regional research frameworks (e.g. North East England-Petts **NC**), national research frameworks (e.g. Historic Environment Scotland-Milek/Church **NC**) and policies for specific heritage assets (e.g. Historic England and Natural England policies towards Palaeolithic resources of the Trent and Thames-White **PW**). We also work with partners such as the National Trust where Skeates' work has led to new guidance on the presentation of archaeology (*WOW Project*). Gerrard, as Chair of UAUK, gathers data on national research infrastructures then represents and coordinates university responses and lobbying e.g. advisory panel for Historic England's *21st-century Challenges for Archaeology*, including the synthesis of findings of planning-led investigations to create new understandings.

iii. Global capacity building in terms of knowledge and skills

Our research on human identity and identification, via international partnerships and online training, is now influencing the work of crime and body recovery agencies in 80+ countries (ICS-Gowland-*Bodies of Evidence*-ICRC MOOC). Our international research networks, combined with growing investment in landscape archaeology, geoinformatics and remote sensing, have also enabled us to build capacity in terms of skills and knowledge for heritage protection worldwide (Figure 5). In 2020, this realised a new *Durham Centre for Cultural Heritage Protection (DCCHP)* that capitalises on multiple grants and projects across three continents, providing a platform for sharing data, archives, techniques and expertise with more than 20 partners in 13 countries, now enhanced by Gomes-C's work with descendent communities on recording heritage related to slavery in Brazil and West Africa. Working with partners, we have developed extensive programmes of training with beneficiary communities and agencies to upskill heritage professionals, embed skills in communities and develop the economic benefit of heritage in under-developed or conflict/disaster impacted regions of the world (ICSs-Coningham/Leone, Philip).



Figure 5: Heritage professionals engaged in training with Durham EAMENA team, Lebanon

In Jordan, a programme of knowledge exchange in collaboration with the Department of Antiquities and Yarmouk U is enhancing local capacity in isotopic research methods, facilitating the creation of the first biosphere map for a MENA country (Philip/Montgomery), while collaboration with Jordan Archaeological Museum is guiding local staff in heritage presentation and education skills (Skeates/PDR Badran). Our developing relationship with the Palace Museum in Beijing, China, is opening up new opportunities for sharing expertise in curatorial and heritage practices (Kennet/PDR Zhang/Brooks/Skeates).

We also use these skills to enhance the reach and significance of our expansive portfolio of co-production with community groups in the UK (*Accessing Aidan*-HLF-funded project, Roberts,C), and regional/national agencies (Northumberland National Park, Petts/ Gefrin Trust, Gerrard/Petts/Semple). We have established platforms for community training (NE-Archaeology Partnerships) and our HLF grant *Belief in the North* is enabling a co-produced programme for community training in archaeology of 600+ participants across northern England (Petts).

iv. Changing public engagement with the past

We write major popular books on archaeology and textbooks with a fundamental influence on the discipline, e.g. *Human Past* (Scarre-2018, 4th edn), *Archaeology: an introduction* (Moore,T's updated 2014, 5th edn). In this cycle, we have collaborated with media outlets and platforms to reach new audiences internationally. With DU Marketing and Communications, we create strategic narratives around our major research themes and achievements for TV and film companies (e.g. *Digging for Britain* (Pettsx2), *Digging for Britain's Past* (Gerrard/Graves), *Who Do You Think You Are?* (Gerrard; reaching 1m+ US households), material for permanent exhibitions (e.g. Roberts,C-film on leprosy at the new Wellcome Galleries for the Science Museum 2019), and podcasts (e.g.Montgomery *What'sHerName Women's History*). We have delivered over 700 public lectures/seminars and workshops at heritage venues and locations worldwide, while Gerrard's research back-dating by several centuries the first evidence for Chinese porcelain in Europe, featured in the 2019 'Gaokao', China's college entrance exam, sat by around 10 million students annually.

Our staff advise and collaborate with museums nationally and internationally to inform their displays and educational materials. We have a major commitment to training staff at Beijing Palace museum (Kennet/Skeates), Moore, T acted as consultant and contributor to the GBP1.5m redevelopment of the Prehistory Gallery, Corinium Museum, Coningham (ICS) developed a major exhibition on Buddhist archaeology in Taiwan and Brooks took the curatorial lead on the exhibition of the world-renowned Feller Collection of embroideries at the Ashmolean (Brooks-*Eye of the Needle* 2014 **MV**); subsequently the owners donated a collection of 61 items to the nation (value GBP500k). Our Scottish Soldiers exhibition with DU Palace Green (2018) engaged with 30,237 visitors from 30 countries, with 80,000 downloads of *Dan Snow's History Hit* podcast (with Gerrard) and 2612 attending 49 related talks and events including music, a living history weekend attended by 1898 visitors, self-guided history walks and web app. Our approach to commemoration was commended by Scottish Parliament (Motion S5M-11779) and we developed touring exhibitions for the UK and US National Parks Service (Gerrard/Millard/Roberts, C). The story was also developed into a co-produced theatre production with Cap-A-Pie (Newcastle), playing to 11 venues across Scotland and NE England, a MOOC, and a co-produced community arts project (with The Word Garden) with workshops with local schools and history groups which inspired creative writing, drama, a short film and visual arts (ASDU Annis/Graves).

3. PGR and PDR training beyond Durham

We have served as external examiners for 164 PhD students, including 62 overseas in 20 countries. In addition, we contribute:

- 1) by initiating collaborative PhD Studentships e.g. x2 sponsored by Public Health England in radiation dosimetry (Baillif); IAPETUS CASE studentships in collaboration with the University of Stirling, University of Aberdeen and Historic Environment Scotland (Milek);
- 2) through co-tutelles with international partners, e.g. Rennes (Pioffet), Caen (Rego), and Luxembourg (Streb), including exchange workshops with Caen;
- 3) by opening Durham's laboratories to students from other institutions, e.g. Montgomery-isotopes lab for Leiden students; Badreshany-materials analysis facilities for PhD students from other institutions funded by Northern Bridge Doctoral Training Partnership.
- 4) by leading international ECR workshops e.g. Milek (22 trainees on *Arctic and Sub-Arctic Coastal Regions*; British Council).