

Institution: Durham University
Unit of Assessment: 17A Geography, Environmental Studies and Archaeology
<p>a. Overview</p> <p>The Archaeology component of UoA17 comprises 32.9 Category A Staff: 28.9 academic staff and 4 post-doctoral fellows (PDRF). Colleagues are configured into 5 thematic research groups (RGs) which underpin our vision of a leading international research centre: Bioarchaeology (BioA), Religion, Ritual, Belief and Place (RRBP), Prehistory of Eurasia (PE), Landscapes of Complex Society (LCS) and The Archaeology of North-East England (NE). RGs work to support clusters, flexible groupings of staff, PDRAs and PGRs around specific sub-themes and projects. They create new momentum for our partnerships with external institutions, interdisciplinary university institutes and museums through conferences and seminars, and provide the locus of advice and internal peer-review for grant applications, ensuring that our research generates impact of international reach and significance. Research strategy and direction, infrastructural change, ethics and governance, are managed through a Research Committee (RC) chaired by a Director of Research (DoR), and involve the Head of Department, the convenors of all RGs and the Director of Research Postgraduates. Taken together, the success and distinctiveness of this research environment are measured through our outputs, our expanding postgraduate community, our consistent record of grant-winning across a growing diversity of sponsors, our strength of regional engagement through Archaeological Services Durham University, and the extent of our international profile and networks.</p>
<p>b. Research strategy</p> <p>Since 2008 our RGs have evolved significantly following Faculty Review in 2009 and reappraisal by RC in 2011. There have been six key adjustments. 1: Of the five RGs returned in 2008, we have invested in the strongest: BioA and LCS. 2: Areas flagged for development in RAE2008 such as the Near East and South Asia are refocused within a coherent group, LCS. 3: Our History of Archaeology RG closed following the departure of Díaz-Andreu in 2011 and the completion of major publications by Rowley-Conwy and Hingley, while the research strengths of the previous Artefacts and Chronometry groups were embraced by new RGs. 4: Staff research and new appointments have driven the creation of three new RGs: RRBP, PE and NE. These changes, several of which were mapped-out in our research vision for RAE2008, reflect more faithfully our current pattern of publication, PGR recruitment, grant activity and impact. 5: Membership of multiple RGs is now an essential driving force, while research in one area can promote conversations across specialisms (eg. Gowland's work on the relationship between age, gender and health links BioA & RRBP). 6: Finally, impact is now integral to our research, and recognised in the profile of all our RGs:</p> <ul style="list-style-type: none"> • Bioarchaeology (Church, Gowland, Larson, Millard, Montgomery, Richards, C.Roberts, Rowley-Conwy, COFUND Fellow King) unites our interest in ancient human health, diet, mobility and dispersals. Research on tuberculosis and leprosy (C.Roberts, NERC and Leverhulme), and malaria (Gowland) has explored the variable impact of disease on past communities. The take-up of C.Roberts' work on human remains in particular has enhanced our awareness of successful paths to impact in non-academic sectors. Work on domestication and dispersals has extended beyond pigs (Larson, Leverhulme and NERC) to attract new grants for work on dogs, chickens (Larson £1.77 m ERC, AHRC, NERC, 2013-14), and plants, the latter through reassessment of the pollen evidence for pre-Neolithic agriculture in Britain (Rowley-Conwy, Leverhulme). Montgomery has mapped the distribution of Sr isotopes in the UK biosphere, and developed methods for the identification of dietary stress on an annual scale through the isotopic records in human in dentine, while Millard, Richards & C.Roberts use isotope data to map the mobility of past human populations, from early hominins to the Middle Ages. • Landscapes of Complex Society (Baillif, Chapman, Church, Coningham, Gerrard, Hingley, Kennet, Leone, Moore, Petts, Philip, Wilkinson, Wilson, Witcher, PDRF Sewell) is a reshaped RG which focuses on the landscape dimension of complex polities. We have attracted large grants from the AHRC (Wilkinson, Hingley, Chapman), ERC (Wilkinson) and Leverhulme (Philip), several through innovative use of remote sensing. Witcher and Sewell explore the impact of Rome on urban and rural communities in Italy during the Republican period; Moore is revealing the diverse forms taken by major Iron Age centres in western Europe. The group is developing comparative approaches, first to irrigation systems (Leone, Gerrard, Wilkinson, Wilson) with temporal control provided through OSL dating (Baillif) and, secondly, to the role of 'peripheral' regions in social and

economic development and on the nature of 'frontiers' (Gerrard, Hingley, Witcher, Wilkinson). We have completed monographs on landscape projects in Hungary (Upper Tisza, Chapman), along Iran's massive Gurgan Wall, (Wilkinson, AHRC) and Anuradhapura in Sri Lanka (Coningham).

- In recognition of the distinctive heritage and international significance of the region, our **North-East England** RG (Gerrard, Graves, Hingley, Petts, Scarre, Semple, Witcher) was created in 2009. Major initiatives include: Petts' appointment as Lecturer in the Archaeology of NE England; major publications on Hadrian's Wall (Hingley), Newcastle (Graves) and the monastic sites of Wearmouth and Jarrow (Semple); and new fieldwork at the Long Meg stone circle (Scarre) and the Roman and early Christian sites of Binchester and Lindisfarne (Petts). The group influences heritage policy through inputs to Durham World Heritage Site committees, Graves' role as Archaeological Consultant to the Dean and Chapter of Durham Cathedral, and the English Heritage Regional Research Framework, among others. Archaeological Services (AS), the largest commercial unit of its kind in northern England, liaises closely with this RG and retains its commitment to publication in refereed journals and collaborations with Category A staff eg. through the Binchester field project.
- By 2011 we had identified two further areas with high research potential. **Prehistory of Eurasia** (Bailliff, Chapman, Millard, Moore, Pettitt, Philip, B.Roberts, Rowley-Conwy, Scarre, Skeates, White, PDRFs Blanco & López) brings together one of the strongest concentrations of Eurasian prehistorians in the UK to focus on the response of small-scale societies to major episodes of social and economic change. For Palaeolithic archaeology, the appointment of Pettitt to join White with the addition of chronometry researchers Millard and Bailliff and Richards' work in **BioA** on hominin mobility and diet, creates a world-leading cluster at Durham. Major publications on Palaeolithic Britain (White/Pettitt), Neolithic Brittany (Scarre), Prehistoric Malta (Skeates) and the Atlantic Iron Age (Moore) illustrate our chronological and geographical range.
- **Religion, Ritual, Belief and Place** (Cagle, Chapman, Coningham, Gerrard, Graves, Hingley, Leone, Moore, Pettitt, Petts, Scarre, Semple, Skeates, Wilson) addresses the creation and manipulation of gender, religious and cultural behaviour across a range of contexts. Driven by the intersecting research interests of staff who had been ECRs in 2008 (eg. Leone, Petts, Semple), **RRBP** has produced major publications on religion, landscape, monuments and identity (Semple, Petts, Leone, Coningham), and Gerrard's work on the importance of 'place' at Shapwick. The group provides an excellent research context for the nationally significant Corpus of Anglo-Saxon Stone Sculpture, while fieldwork at active religious sites, birthplace of the Buddha at Lumbini in Nepal (Coningham) and Lindisfarne (Petts), offers new paths for public engagement and impact.

Objectives, strategic plans and new initiatives. Our vision is to promote an academic environment which sets new agendas for the discipline, delivers internationally-leading scholarship, seeks out opportunities for interdisciplinary research, informs archaeological policy and practice, creates impact across a range of research areas, and provides excellent opportunities for personal development. To achieve this we will:

- Apply emergent science to rethink major cultural narratives. We have invested in new isotope and aDNA facilities which will support, for example, Larson's research into the nuclear genome (grants in 2013-14 from ERC, AHRC, NERC, total £1.77m). This work not only explores the domestication of dogs, pigs and chickens but also reveals population dispersals and the social and economic impacts of different species on human communities. The combined strength of **BioA** and **PE** will integrate this new data with chronometry, material culture and settlement evidence, and address the substantive social science challenges;
- Undertake meta-analysis, building upon our experience of mining large datasets at a trans-regional scale eg. remote sensing to compare settlement and material culture data (Philip, Wilkinson, **LCS**) or the analysis of long-term trends in the treatment of the dead (C.Roberts, Scarre, **PE /RRBP/BioA**). External collaboration and strategic alignment to funding bodies will be central to these geographically wide-ranging projects;
- Revitalize Durham's research on material culture by supporting new external research collaborations on ceramics (Moore, Philip), lithics (White, Pettitt), metalwork (B.Roberts) and growing cross-period interests in textiles and bodily ornament (Brooks, Skeates, White), with a view to re-establishing a research group in this area of national shortage. We will lever funds from internal and external sources to support new initiatives in this area;
- Cross boundaries, extending the reach of archaeological research to take-up new interdisciplinary challenges, for example on landscape degradation (Church, **LCS**) and on risk and

resilience in the face of natural hazards (Gerrard with the University's Institute of Hazard, Risk and Resilience, **LCS/RRBP**). Our new DTC partnerships will especially be harnessed here;

- Foster new research agendas to encourage a new generation of scholars. Specifically, we will actively promote an understanding of the material culture of religion, belief and identity, and examine religious transitions, east to west (Coningham, Leone, Petts, Semple, **RRBP**), and the sensory world of religion/pilgrimage (Skeates, Graves, Scarre). We will also support collaboration between RGs and so stimulate new research areas (eg. integrated social and scientific critical advances on themes such as gender, diet, identity and the human body - **BioA, RRBP**);
- Generate a sustainable stream of high quality archaeological fieldwork. We will invest the resources required to bring past and current field projects to publication (eg. in Britain, Jordan, Spain, Syria, and major Archaeological Services' projects). We plan significant new projects at Stanwick in Yorkshire (Moore, **PE**), British cave sites (Pettitt, White, **PE**) to enhance Palaeolithic archaeology, and multi-institutional projects in Spain (Gerrard, **LCS**) and Libya (Leone, **RRBP**);
- Enhance links between RGs and external organizations, not only locally (**NE**) but also in those regions where heritage is directly threatened, to ensure appropriate documentation of the resource and its ethical management and protection (Coningham, **LCS**). This will require further integration with the wider policy objectives of regional and international stakeholders (eg. Witcher, National Parks of Lazio, Abruzzo & Molise; Coningham, UNESCO); renewed efforts to disseminate our research to more varied audiences; and collaborative working with major stakeholders (eg. UNESCO Historic Urban Landscape Initiative).

To achieve this vision, investment continues to be released for our laboratories, growing IT requirements, equipment for the capture and analysis of field data, and for qualified support staff (see below). RCUK and European funding remain strategic priorities for large thematic projects while teamwork with inter/national research partners and heritage agencies is central to more geographically focused work. Above all, we aim to support our researchers individually through their Annual Staff Reviews (ASR), a personal research plan which agrees future outputs, impacts and grant initiatives and aligns these to our strategic priorities. All Category A staff are also supported by mentors with whom they discuss their research. An overview is provided by RG convenors to the DoR, who reflects upon overall progress against targets and thus informs subsequent planning. Research income is evaluated by Research Committee against targets set in the University's annual planning round, while our Impact Group monitors activity in this area.

c. People, including:

i. Staffing strategy and staff development

The Durham unit comprises 11.9 Professors, 4 Readers, 10 Senior Lecturers, 3 Lecturers and 4 PDRFs. Internationally renowned scholars (Richards, C.Roberts, Scarre, Wilkinson) work alongside emerging leaders in their field (Larson, Montgomery, Semple, White) and exciting junior researchers (Petts, B.Roberts). The re-engagement of Richards, following his move to U of British Columbia, recruitment of Montgomery, the conversion of RCUK Fellow Larson to Reader and investment in **BioA** infrastructure places Durham at the forefront of isotopic and ancient DNA research. The **PE** group has been reinforced by a Lectureship in European Prehistory (B.Roberts) while the addition of Pettitt creates a world-leading strength in Palaeolithic archaeology. Dobney and Díaz-Andreu departed for chairs at Aberdeen and Barcelona but staff retention is otherwise strong, talent being recognized internally through 19 promotions since 2008: 8 to SL, 7 to Reader and 4 chairs. Staff recruited 2005-11 played a major role in reshaping both research groups and unit strategy to respond to emerging themes (eg. Petts formation of **NE**; Montgomery and Larson reshaping of **BioA**), and 88% of our ECRs from RAE 2008 have now been promoted. The 8 women on our staff (28% of the total) include 1 Professor, 2 Readers, 4 SL, and 1 Lecturer, recognizing their research performance and leadership abilities eg. Semple (REF Impact Coordinator, Convenor **RRBP** group), Montgomery (Dir. PGRs) and Leone (Deputy HoD). Our future staffing strategy will continue to balance recruitment of research leaders with rising scholars.

Archaeology conforms to the University's Equality and Diversity Policy and the institution holds both the Two Ticks Positive about Disabled People award and Athena Swan Bronze status: it is a departmental priority to seek accreditation. We adhere strictly to the HERA methodology with clearly defined career pathways and, following the Concordat guidelines, we have moved staff onto non fixed-term contracts (eg. Petts in 2011) and strive to ensure that research students are effectively supported in making a transition to a research career. All new staff are assigned a mentor, including PDRAs, who enjoy the same training opportunities through our award-winning

ECR support programme (see below), while ECRs are assigned a reduced workload during probation as they build their research profile; Durham is one of only 15 UK universities awarded the European Commission HR Excellence in Research Award. Our workload model affords all staff at least 20% time for research, with additional allocation for doctoral supervision, management of major grants and strategic activity outside Durham (Sect. 5). As a result, all Category A staff had University research leave within the current cycle (44 terms in all; typically 1 term in 7). Hingley was awarded AHRC Research Leave for completion of a major volume on Hadrian's Wall which led into research on frontiers initiated through the University's Institute of Advanced Studies (IAS); Leone's AHRC award supported completion of her monograph *End of the Pagan City in North Africa* which helped extend the geographical focus of the **RRBP** RG beyond Europe. Grant applications and PGR research proposals are reviewed by our departmental Ethics Committee (chair: Skeates), guided by the *Ensuring Sound Conduct in Research* code of practice.

ii. Research students: Recruitment and Supervision: Annual PGR recruitment has doubled during this census period and currently stands at 20 FTE pa. During this cycle we have won 21 RCUK studentships (4 attached to grants), 2 linked to European grants (HERA, ERC) and 5 Durham Doctoral Studentships. Departmental bursaries have supported 10 outstanding candidates to bridge the 'Masters funding-gap' and proceed to doctoral research. Joint supervisions with the universities of Aberdeen, Manchester, Rennes and Manitoba and the successful recruitment of EU and international students, including 9 sponsored by their home-country governments (eg. Egypt, Finland, Iraq, Spain), underline our research networks and reputation. Collaborations with national museums (British M, Victoria & Albert M, Ashmolean) and the Health Protection Agency demonstrate engagement with external stakeholders, while interdisciplinary is evidenced by dual supervisions with Durham Anthropology, Engineering, Geography, Mathematics and Physics.

All Category A staff are involved in the supervision of PGR students. Experienced supervisors update their skills through the University's CPD programme while workshops on the changing context of the doctorate are integral to new staff training. ECRs begin in a secondary role and are expected to complete a successful supervision before leading a supervisory team: supervision across research groups is now quite common. Provision and support, tracked through anonymous on-line reports and a yearly group PGR feedback meeting, show high levels of satisfaction, both for our new monitoring arrangements such as our web-based blog to record mandatory meetings and for the quality of our supervisors. C.Roberts won a Durham University award for *Excellence in Doctoral Supervision* (2009); Gerrard was an invited participant at a European PGR/PDRA training events funded by the French CNRS (2013).

Training: We appraise our PGRs' training needs annually and the quality of the Durham Doctoral Training Programme, which consists of more than 300 events throughout the year, was recognised in October 2009 by the Times Higher Education Award for Outstanding Support for Early Career Researchers. In May 2010 the university received the Gold Global Learning Impact Award of the IMS Global Learning Impact Consortium for our on-line training modules. In-house opportunities to teach, peer-reviewed by staff, are offered to all PGRs who also plan and deliver a successful mock module to UGs who attend voluntarily. 4 PGRs have so far opted to take the HEA-accredited Durham University Learning and Teaching Award. Our membership of both NERC and AHRC Doctoral Training Centres has ensured that we will enhance our capacity in advanced PGR training across the discipline, and provide PGRs with access to new research possibilities, and substantive opportunities for collaboration with external organizations.

Both Masters students and staff attend the weekly postgraduate seminars: that 35% of new PGRs arrive from Durham masters courses confirms the strength of vertical integration. Our Research Dialogues scheme, a new initiative in 2010, encourages PGRs to organise thematic research conferences and workshops which bring leading academics and PGRs from other institutions to Durham, and raises awareness of possibilities for impact. For example, a workshop on *The Useful Corpse* (2010) informed the subsequent Invisible Dead project which examines burial practices in Britain and the Levant through the prehistoric and Roman periods, while *How to Build a Dam and Save Cultural Heritage* and *Where the Wild Things Are* (2012) each attracted over 100 participants from academia, the heritage and commercial sectors. These events not only enhance PGR profiles but also improve their networks and develop career options. Overall, our PGRs are strongly engaged in the discipline: 70% of the 2008-13 doctoral cohort have academic publications arising from their theses, while the appearance of more than 50 jointly-published

Environment template (REF5)

outputs during the census period underscores the strength of staff-PGR collaboration. The attraction of this research environment is confirmed by the presence of 13 visiting PGRs from France, Spain, Italy and Brazil funded by home governments and *Erasmus* programmes.

Infrastructure: Ft PGRs have permanent desk-space in the Dawson Building where all students have access to IT, wi-fi, laboratory facilities, and fieldwork equipment; suitable library provision is a pre-requisite for PGR admission. Financial support is provided for research visits and conferences through the Birley and Cramp Funds; the Haycock studentship is aimed at those researching the East Mediterranean. Our PGRs have made successful applications for financial help to the British Schools and Institutes overseas, and national period societies, among others.

Completions: We have maintained submission/completion rates within University/HEFCE targets: 55 PhDs (33 UK, 22 Intl) were awarded during the census period. Equivalent to 51.65 FTE, this represents a 90% annual increase in awards over RAE2008 (5.4 to 10.3 FTE pa). Students on competitive awards (12 AHRC and 3 NERC studentships, 3 Durham Doctoral Awards and 1 each supported by the Leverhulme Trust, French and Canadian sources), achieved a 100% submission rate. Of the 85% of the doctoral cohort from the current census period that we are able to track, 29% have gone on to fill academic posts in the UK (eg. Aberdeen, Oxford, York) and overseas (eg. Alexandria, American University Cairo, Sultan Qaboos [Oman]), 21% are in PDRA roles, 25% are in Heritage, Museums/Libraries (eg. Historic Scotland, British Museum, Fitzwilliam), 8% Arts/Education/HE Admin (eg. Higher Education Academy), and 8% Professional Archaeology (eg. Suffolk County Council). 10% are in non-academic professions, indicating that while our doctoral students are in demand within academia, they are well equipped for wider employment.

d. Income, infrastructure and facilities

Our total research income over the census period was £8.14m, an annual average of £1.63m, representing a 38% increase over RAE2008 (£1.18m). Grant winning is now embedded across the department so that, during the census period, 90% of academic staff have been PI on a grant, 56% have won individual grants exceeding £50k, and 31% grants over £100k: several colleagues (Chapman, Kennet, Semple, Skeates) have won their first major grants as PIs.

Our key strategies for generating research income are to:

- Develop a greater understanding of the needs of major funders, such as RCUK and heritage agencies, through university liaison groups and participation in policy discussions;
- Continue to diversify our funding base (eg. Skeates with British Academy, Fondazione Banco di Sardegna, and The Prehistoric Society, for ritual dimensions of prehistoric caves in Sardinia; Kennet with British Inst. of Persian Studies, for re-analysis of the Williamson Collection of Sasanian and Islamic pottery);
- Address key research questions by combining our cutting-edge techniques (eg. in genetics, isotopes, remote sensing) with major research datasets (eg. elite Anglo-Saxon cemetery at Bamburgh, Fragile Crescent trans-regional settlement comparison);
- Participate in networks as a first step in collaborative grant bids (eg. Semple with HERA network on Early Medieval assembly sites across Europe);
- Continue to allocate research time through our workload model for those managing major grants;
- Build upon international research networks to capitalize upon major research opportunities (eg. Moore with French, German and US colleagues at the Bibracte oppidum in Burgundy; Witcher with US colleagues in Abruzzo, Italy);
- Use RGs to share knowledge of effective research project design and seek to transfer techniques, datasets, or research infrastructure (eg. isotopic and aDNA research, expertise in remote sensing and handling big datasets) from existing to new projects and so extend research into new areas.

Our research peaks are supported by RCUK income to the value of £2.2m. Domestication and dispersals are addressed through Larson's substantial NERC grants, which build upon his RCUK Fellowship. The diverse origins of the human population of the Early Medieval centre of Bamburgh are explored by C.Roberts (AHRC), while work on the evolution of TB is supported by NERC. Major landscape projects at Hadrian's Wall, in the Channel Islands, and in Syria, Iran and Sri Lanka all received AHRC support. More recent RCUK grants include: *Ukrainian mega-sites* (Chapman AHRC, £635k, 2012) and *Colonization of the North Atlantic* (Larson, NERC, £515k, 2013). £400k of funds from the Leverhulme Trust supported research on pig domestication (Larson), health and diet in Nubia (C.Roberts), and satellite mapping of settlement in Syria (Philip). A new comparative project on changing attitudes to the treatment of the human dead over time

(Invisible Dead) has won our first major grant from the John Templeton Foundation (Scarre, £210k). Improved knowledge of EU funding schemes has resulted in two major ERC grants (Persia and its Neighbours, Wilkinson, £667k; UNDEAD, Larson, £1.07m), a collaborative HERA network grant (Semple, £115k), and 3 Marie-Curie Fellowships (Chapman, Scarre, Witcher, £510k): the latter confirm the growing attraction of Durham to emerging European researchers. Our research quality has also enhanced our role in international partnerships, allowing us to access funds from the US National Science Foundation (Church, Larson), and the Social Science & Humanities Research Council of Canada (Philip, £146k). Participation in these programmes has deepened our understanding of the requirements of large multi-institutional collaborations. Continuity of support for the Corpus of Anglo-Saxon Sculpture beyond its AHRC funding has been secured through the British Academy, and the Pilgrim, Headley and Sainsbury Family Trusts (£308k).

An important route to impact is to align our research with the requirements of UK and overseas heritage organizations. This has led to major grants from Historic Scotland for environmental research and post-excavation analysis in the western Isles (Church, £189k), for Caple's excavations at Nevern Castle in Wales (CADW, £52k), and projects on rural and religious landscapes undertaken in collaboration with English Heritage (Gerrard, Shapwick; Semple, Wearmouth & Jarrow; c. £100k). Grant-winning research projects in Ras al-Khaimah (Kennet, £160k) and the Faroes (Church, £33k) have been designed in cooperation with their national agencies, while Coningham's high-impact work in Nepal, developed with, and funded *via*, UNESCO and other world heritage organizations (£107k), is expected to lead to further grants. The generation of primary data through fieldwork has been taken forward through the British Academy Research Development Awards (Skeates, Mediterranean caves; Wilkinson, Carchemish; £118k), though more modest grants sustained over several years may also lead to substantial grant applications and major monographs. Income from British Academy Small Grants (£130K), National Geographic (£69k), BASIS overseas Institutes (£51k), and some 14 other funding bodies has enabled (1) research for specific projects (eg. Gowland on malaria in the Anglo-Saxon period), (2) pilot work ahead of larger applications (eg. Chapman's fieldwork in the Ukraine; Philip's ceramic sampling programme in Syria) (3) evaluative fieldwork and prospection. University seed-corn funding (£5K in 2011) provided vital support for proof-of-concept work that underpinned successful grant applications by Larson to ERC and AHRC.

Infrastructure and facilities. The University Library was extended in 2011, giving a 42% increase in floor area (£11.5 m). Expenditure on Archaeology holdings increased by 63% in 2008-12 to £83.4k pa and supports first class coverage in all our main research areas. Special collections at the Cathedral and University Museums are significant in attracting research students (eg. to analyse historic maps and estate records): the Durham Research Online repository offers access to 670 staff publications.

We have gained substantial University investment since 2008. **BioA** has received £270K of enhanced facilities and equipment, including a Geometric Morphometrics Laboratory (with Anthropology) with a 3D digitizer, facilitating fine-scale analysis of animal remains essential for studies of pig and dog domestication. In 2013-14 we will enhance our ability to generate nuclear DNA sequences from archaeological material by investing £600k to establish unique purpose-built laboratories for the analysis of archaeological stable isotopes and ancient DNA. This will foster closer ties between scientific and field archaeology, thus extending grant potential across the board, and provide state-of-the-art research space for PhD and MSc projects and new opportunities for cross-disciplinary collaboration. The work of **LCS** in remote sensing, image analysis and GIS was facilitated by a new Informatics Laboratory (£56k joint with Anthropology) hosting high performance workstations linked to a dedicated server and specialist software, essential to landscape research in Syria (Philip), Iran (Wilkinson) and Ukraine (Chapman). We plan to upgrade this facility in 2013-14. Boosting our capacity for field data collection and analysis (GPS systems, total stations and laser scanners: £767k with Geography) has vastly improved the speed of in-field recording and 3D data capture, analysis and visualisation. This equipment has proved essential to projects in the Ukraine (Chapman), Nepal (Coningham) and Kuwait (Kennet). Growing technical sophistication means that Archaeological Services' skilled personnel play a significant role in delivering field projects, and in enhancing the data-capture and analysis skills of PGRs.

Plans to reshape capacity in material culture studies were taken forward by investment in an Artefacts Analysis facility (£87k) with a Scanning Electron Microscope to add to existing capacity. This has enabled us to undertake new programmes of analysis, eg. wall plaster pigments and

window glass from the AHRC-funded backlog project at Glastonbury Abbey (Capple, Graves). 2013-14 will see research on the Yarm Early Medieval helmet (Capple) and the technology and provenance of ceramics from Syria (Philip). These new facilities have radically changed the nature of technical support required, and a restructuring process (2009-11), supported by University's HR managers, led to the departure of 3.5 FTE technical staff, and the appointment in 2011 of 2 FTE technical support staff qualified to doctoral-level to support research in **BioA** and materials analysis. A need for technical support in response to the growing importance of IT-intensive research has been identified, and will be addressed in the next cycle.

e. Collaboration and contribution to the discipline or research base

Professional service. We shape agendas and priorities by providing leadership advice and peer-reviewing for learned societies, award bodies, inter/national agencies, and professional associations, facilitated by a workload model that takes account of such activity. Nationally, Coningham serves on the British Academy's Sponsored Institutes and Society's Committee, Skeates and Hingley have served on the AHRC Peer Review College and C.Roberts and Rowley-Conwy on the NERC College. Philip and Leone shape UK research in the Middle East as Trustees of the Council for British Research in the Levant and the Society for Libyan Studies respectively. Scarre is as a Trustee of the Council for British Archaeology and Chapman Vice President of the Prehistoric Society (2008-12). Service on the Scientific Advisory Panel of the Natural History Museum and the BABAO Ethics and Practice Working Group has allowed C.Roberts to help define policy on the treatment of human remains in the UK. White is working with English Heritage to disseminate the significance of work funded by the Aggregates Levy to both academia and the commercial quarrying sector. We bring an awareness of current research to the advisory boards for The National Trust (Skeates) and English Heritage (Hingley, Pettitt) and help shape their policies and priorities, and internationally through the Executive Board of the European Association of Archaeologists (Skeates) and on the advisory board of National Geographic (Scarre). We influence international research priorities by serving as grant assessors for overseas funders eg. NSF (C.Roberts) and the Qatar National Fund (Gerrard). Wilkinson joined other leading scholars at a 'horizon-scanning' event, New Directions in Archaeology, at the School of Advanced Studies at Harvard (2011). Another significant measure of our formative influence in the discipline is our external examination of 82 UK and 34 international doctorates during the census period.

Editorial. We view editorial activity as a vital contribution to disciplinary sustainability, with more major journals edited in Durham than any other UK HEI. *Antiquity* (Scarre), *European Journal of Archaeology* (Skeates), *Levant* (Philip) and *Textile History* (Brooks) attract contributors and subscribers globally. Semple and C.Roberts are the deputy editors of *Medieval Archaeology* and *International Journal of Paleopathology* respectively while Kennet edits the annual *Proceedings of the Seminar for Arabian Studies*. Staff serve on over 20 editorial boards including *World Archaeology* (Rowley-Conwy), *PLOS1* (Larson), *J World Prehistory* (Pettitt). Gerrard edits the monograph series of the *Society for Medieval Archaeology* producing 9 monographs since 2008.

Collaborative Research. We are at the heart of innovative, large scale inter/national collaborations. In **BioA**, Church's work on environmental change and population dispersals on Iceland and the Faroes has underpinned collaborations with City University of New York, Stirling and Edinburgh that have won grants from US National Science Foundation to address Comparative Island Ecodynamics in the North Atlantic. C.Roberts pursues work on pathogens that remain major social and economic concerns through the aDNA project on tuberculosis with colleagues in Manchester and Arizona State U, while Gowland explores health in Roman London in collaboration with the Museum of London. Montgomery and Richards collaboration in the Beaker People Project has revolutionized our knowledge of mobility in prehistoric Britain. Major collaborations around **LCS** include Wilkinson's Models of Mesopotamian Landscapes project which involved partnership with linguists (Liverpool, Chicago) and modellers (Argonne National Laboratory) to address issues of scale, resources and sustainability at the transition of urban life in the Middle East. Within **PE**, White was lead archaeologist on the Royal Society funded International-Geological Correlation Project which sought to correlate river terrace sequences across Europe, providing a fundamental datum for future research on the Palaeolithic, while for **RRBP** Semple's role as co-PI (with Oslo, Vienna and Dublin) on a European Research Area Network on the Archaeology of Assembly and Governance places Durham at the heart of pan-European research on early medieval assembly sites; her recent work at Wearmouth and Jarrow

Monastic Sites involved Newcastle U and English Heritage among other partners. We work with research and heritage agencies worldwide to shape agendas and ensure that policy decisions are informed by research questions, eg. Kennet with Government of Ras al-Khaimah, Church with Faroese Research Council and Coningham with UNESCO at Lumbini. Through visits and exchanges, we maintain the effective collaborations with local agencies that are essential to creating large-scale research projects capable of winning RCUK grants (Wilkinson, Syrian Directorate of Antiquities; Chapman, Inst of Arch, Kiev).

Advancing the discipline. We have published over 70 authored/edited books and c. 620 articles/chapters within the census period. 40% of co-authored papers included international collaborators, while Rowley-Conwy's work on pig domestication was recently translated into both Chinese and Russian. Collaborations emerging towards the end of the census period will extend our commitment to research that crosses chronological and geographical boundaries. Philip is collaborating with the French CNRS to combine the numerous survey datasets from Syria both to address research questions, and create a national site inventory for the post-conflict situation. Wilson works through the British Academy International Partnerships scheme to undertake cross-institutional training in field techniques and data management with U of Mansour in Northern Egypt. From 2014 a new project on chicken domestication will see Larson join a consortium of UK universities including Bournemouth and York. B.Roberts works with partners from Serbia, Germany and UK to research the Rise of Metallurgy in Eurasia (AHRC 2012-15), extending his expertise on west European metalwork to address global-scale questions, while Pettitt's dating of Upper Palaeolithic cave art in Spain (with Cantabria and Southampton) is revolutionising our understanding of Palaeolithic art and may determine whether Neanderthals were responsible for some of the earliest examples; a NERC grant (2014) will improve the chronological framework for cave art through dating of stalactites stratified above and beneath art at 40+ caves in France, Italy and Spain. Cross-disciplinary research ideas arising within Durham have also served as the basis of external partnerships. Our involvement in the IAS 'Water' theme in 2009-10, underpinned the successful collaboration, Niche Construction to Imperial power (AHRC-Netherlands RC), which supported new field and image-based research on hydraulic irrigation in arid landscapes in the Middle East. Work on the dating of these systems (Bailliff) served to attract Fyssen Fellow Charbonnier to Durham to research the development of *qanat* systems in Arabia. Gerrard and colleagues in the Institute of Hazard, Risk & Resilience challenge the view that risk management is unique to modern society through their analysis of the later Middle Ages, while an AHRC network grant, The Aesthetics and Ethics of Archaeology, has furthered connections between Archaeology (Skeates), the heritage community, and academic philosophers created through the Centre for the Study of Ethics of Cultural Heritage (Coningham), and builds upon debates on ethical dimensions of cultural property in an unstable world.

Intergenerational renewal is evidenced by the presence of 17 research-grant funded PDRAs, and 13 externally funded PDRFs during the census period, for whom Durham's research-intensive environment has proved attractive. The latter have included a COFUND Fellow (King) and SSHRC Canada Fellow (Von Hunnius) in **BioA** while **LCS** attracted a Marie-Curie Fellow working on Roman settlement (Sewell) and two French researchers (Charbonnier, Rey) funded by the Fondation Fyssen to work on ancient near eastern landscapes. **PE** attracted two Marie-Curie Fellows (Blanco, López) and PDRFs funded by Spanish government/regional awards, and a Fernand Braudel Scholarship from France.

Invitations, prizes etc. Wilkinson was awarded the John Coles Medal by the Prehistoric Society (2009) and was Braidwood Scholar, U of Chicago (2013). Colleagues are regularly invited to present to international bodies eg. Inst of Irish Archaeologists (C.Roberts 2010), Finnish Archaeological Society (Rowley-Conwy 2011), and deliver keynote talks at major events eg. Archaeology of Value UCLA (Chapman 2009), Int. Congress of Christian Archaeology, Spain (Leone 2008). Inst. of Advanced Studies thematic fellowships have enabled the establishment of new international connections, eg. with geochronology researcher Prof. Zhou (Beijing) who, with Millard, is now reviewing the dating of early hominins in China. We hosted major conferences, eg. the Theoretical Archaeology Group (610 participants), and the Sachsensymposium (120), all with significant numbers of overseas delegates. Influential research meetings on the horizon include the UK Archaeological Science conference (2015).