

Institution: Newcastle University
Unit of Assessment: Archaeology (UoA 15)
<p>1. Unit context and structure, research and impact strategy</p> <p><u>1a. Unit context and structure</u></p> <p>The Archaeology UoA at Newcastle is part of the School of History, Classics and Archaeology (HCA) in the Faculty of Humanities and Social Sciences. These three disciplines are not often found together in UK universities, but the combination benefits Archaeology by providing a rich intellectual environment characterised by disciplinary excellence and interdisciplinary exploration. The School's research ranges from material culture to ancient, medieval and modern languages, using methodologies from physical sciences to literary criticism; its researchers work on periods from early prehistory to the present in societies around the globe from South America to East Asia.</p> <p>Research in the School has been organised since 2014 through nine 'Research Themes'. Each is rooted in History, Classics or Archaeology but open to researchers across the School to promote interdisciplinarity. Archaeology leads two of the themes, Material Culture and Landscape. Research in the UoA ranges from the late Palaeolithic to the present with a geographical focus on Britain and northern Europe, the Mediterranean, the Middle East and North America. Whilst the UoA's research is increasingly global in outlook, it retains a strong commitment to archaeology in northern England, reflecting Newcastle University's ethos as a civic university (Institution Level Environment Statement (REF5a, 2.1)).</p> <p>The UoA has benefitted substantially from new investments in staff, facilities and equipment by the School and the University and has more than doubled in size since 2014. Significant improvements in staff diversity and gender balance (up from 11% to 43% female FTEs) result from a strong commitment to equality, diversity and inclusion (EDI; REF5a, 3.4). At the REF2021 census date the research community included 20 Category A staff, 12 Research Associates (RAs), 2 Project Managers, 2 Technicians, 41 PhD students and 47 Visiting Fellows. In recent years the UoA's research portfolio has increased even more dramatically than staff numbers: at £3.75m, research income is 6 times higher than during the previous REF period, whilst new research awards total £7.7m since 2014.</p> <p>The Faculty of Humanities and Social Sciences has invested more than £750k to support the development of research facilities and projects in the UoA since 2014. Key initiatives include the UoA's two hubs for research in Material Culture and Landscape: MATCH: Materiality, Artefacts & Technologies in Culture & History (a Faculty Research Group), and the McCord Centre for Landscape (a University Research Centre).</p> <p>The University's new research strategy (2018) has further embedded support for interdisciplinary research through two key programmes:</p> <ul style="list-style-type: none"> • The UoA has been closely involved in developing Newcastle University Centres of Research Excellence (NUCoREs; REF5a 2.2), particularly the Heritage NUCoRE (co-directed from MATCH by Duckworth, an ECR, from 2019) and the Landscape NUCoRE (co-directed by S.Turner from the McCord Centre, from 2021). • The UoA was beneficiary of two of the first Fellows appointed through the prestigious and highly competitive Newcastle University Academic Track (NUAcT) postdoctoral fellowship programme (Carrer, Rayne). The scheme provides five years' dedicated research time, a linked PhD studentship, training and research expenses; the Fellowships culminate in open-ended academic positions (REF5a 3.2.4). <p>These University initiatives enable experienced researchers and ECRs to collaborate across the Faculties: the UoA's researchers have recently taken part in interdisciplinary projects including <i>Critical Heritages</i> (with Heritage, Media and Politics; funded by EU Horizon 2020, total value €2.5m); <i>CHT2</i> (with Geomatics; JPI-Cultural Heritage, €587k); <i>Biofuels and Respiratory Health</i> (with Environmental Engineering and Physical Geography; Wellcome Trust, £45k); <i>Expanded</i></p>

Unit-level environment template (REF5b)

Interiors (with Fine Art; AHRC, £280k); *Heriland: Cultural Heritage and the Planning of European Landscapes* (with Planning, Architecture, Landscape Architecture; EU H2020 MSCA ITN, €4m); *GCRF Water Security and Sustainable Development Hub* (with Engineering, Landscape Architecture, Education; UKRI, £17m).

Research integrity is supported by the School Research Committee (including the Ethics Officer) and Faculty Research Ethics Committee; professional, legal and ethical standards are reviewed for all projects by the University's Grants and Contracts team. The University Research Data Management team supports FAIR data principles and advises on data archiving. The UoA is committed to open data, and includes a digital archaeology researcher who assists with data archiving (A.Turner). Examples of recently-archived project datasets include AHRC-funded *Expanded Interiors* (using the University's open repository, data.ncl; REF5a 2.3.3) and Historic England's *Wearmouth and Jarrow* (with ADS). A UoA Authorship Policy ensures fair credit and transparency in determining publication authorship, including with PhD students and technicians.

1b. Strategic aims in research, 2014-20

The UoA's long-term aim is to build a leading international centre for archaeological research by creating a diverse community of outstanding researchers who develop cutting-edge theory, methods and technologies in its key thematic areas. The Unit's research structure is designed to support innovation at all levels. New investment and research funding has enabled the UoA to exceed the aspirations outlined in 2014:

REF 2014 aspiration	Action taken, 2014-2020	Results by 2020
Consolidate and develop Category A staff base	University prioritised strategic investment in the UoA	Permanent Category A staff increased from 8 to 16 FTEs
Development of researchers at all levels	Supported career development and promotions; sought funding for postdoctoral fellows	10 Category A staff promotions; funding won for 20 ECR postdoctoral fellowships
Foster a diverse research environment	Promote equal recruitment practices; encourage international candidates	Female Category A staff up from 11% (n=1, 2014) to 40% (n=8, 2020); international from 23% (n=2) to 35% (n=7)
Focus research in two key research themes: Landscape; Material Culture	Research themes set up in 2014 and since developed as interdisciplinary groups	Major grant awards in Landscape and Material Culture with direct value over £7.7m
Achieve impact from research through the research themes	Developed projects with partners and external funders; strategic support for Impact from University	Successes include Hadrian's Wall MOOC, NLHF-funded WallCAP project, Gertrude Bell Archive exhibitions and UNESCO recognition
Increase commitment to innovative archaeological fieldwork	Supported interdisciplinary collaborations; investment in new lab and survey equipment	e.g. completed <i>Maryport Roman Temples, Apalirou Environs</i> ; launched <i>WallCAP</i> , <i>Rome Transformed</i> , <i>TerraSAGE</i>
Establish McCord Centre for Landscape as University Research Centre	Centre launched 2014 with Faculty investment of £100k	New awards >£10m; hosted 35 postdocs; projects involving 25 PIs across Newcastle University
Develop research facilities and infrastructure	University and School supported facilities acquisition	Invested >£2.5m in labs and equipment to support archaeological science

Table 1. REF 2014 aspirations, actions and results.

In order to address challenges in each research theme more comprehensively, the unit added a new goal after REF 2014 – to broaden expertise in archaeological science:

Additional goal	Action taken, 2014-2020	Results by 2020
Develop archaeological science (added 2015)	Secured investment in permanent Category A staff, related facilities and technicians	Archaeological science staff increased from 1 to 6 FTEs, plus 2 technicians; new Earthslides and One Planet labs opened 2019

Table 2. Additional development goal (2015)

1c. Archaeology Research Themes, 2014-20

Within HCA, **Landscape** and **Material Culture** are the two major research themes led by Archaeology.

The hub for **Landscape** research is the **McCord Centre for Landscape**, a cross-Faculty University Research Centre with its main base in the Unit (Director: S. Turner). The McCord Centre was established in 2014 to carry out basic and applied research in rural, urban and maritime landscapes. The Centre enables collaborations across Newcastle University including landscape architecture, planning, geomatics, geography, ecology, engineering and mathematics. Around 25 PIs currently collaborate on projects valued at over £10m, with more than 100 collaborations in 25 countries. Among the principal research themes are long-term adaptation to climate change, water and soil management, participatory research, and landscape planning. Key areas of archaeological expertise in landscape include geoarchaeology, field survey, remote sensing, development of dating methods, GIS and landscape characterisation. Research in Europe, America, Asia and Africa has been funded by major grants from UKRI (AHRC, NERC, British Academy), the European Commission (ERC, MSCA, Societal Challenges), the Wellcome Trust and the National Lottery Heritage Fund. The resulting publications present outstanding results in fundamental research as well as the development of method and theory. Key examples include dating the earliest known human occupation of the Americas (Shillito *et al.* 2020), survey of St John Lateran, the world's first cathedral (Haynes *et al.* 2020), recognising the first Alpine cheese production (Carrer *et al.* 2016), and pioneering new dating techniques for landscape archaeology (Kinnaird *et al.* 2017). The McCord Centre has become a notable home for postdoctoral research in Archaeology with prestigious fellowships funded by EU Marie Skłodowska-Curie (9 fellows), British Academy Newton Advanced Fellowships (2), and AHRC (2); the first two NUAcT Fellows were appointed in 2019/20. Across different disciplines there were more than 20 postdoctoral fellows and RAs working with the Centre in 2020, and around 35 in all since 2014.

MATCH (Materiality, Artefacts & Technologies in Culture & History) Faculty Research Group (convenors: Dolfini, Elliott (ECR)) was originally established in 2009 as the Cluster for Interdisciplinary Artefact Analysis. MATCH provides a focal point for interdisciplinary research in material culture (with strong links to the NUCoRE for Heritage), from artefact studies in Arts and Heritage to scientific materials analysis, use-wear and experimental archaeology. Key specialisms within the UoA include ceramics (Duggan, Gerrard, Jackson), glass (Duckworth), stone and bone (Conneller, Tourigny) and microwear analysis (Caricola, Dolfini). Key grants for Material Culture research have been awarded by the AHRC, British Academy (including 2 British Academy Postdoctoral Fellows), European Commission (with 3 EU Marie Skłodowska-Curie fellows), and charities including the Leverhulme Trust and Senhouse Trust. Outstanding publications include the discovery of Magdalenian art in the Channel Islands (Bello *et al.* 2020), the exceptional Mesolithic site at Star Carr (Milner *et al.* 2018), major excavations at the Roman Empire's northernmost cult centre (Haynes and Wilmott 2020) and analysis of ancient technologies across the Sahara (Duckworth *et al.* 2020).

1d. Future Strategy, 2021-28

In the next seven years, the McCord Centre and MATCH will continue to provide the foundation of the UoA's research strategy by fostering collaborations, providing training, and leading interdisciplinary initiatives including a new Landscape NUCoRE (Table 3).

REF 2021 aspirations	Future actions, 2021-2028	Results by 2028
New research theme: Bodies and Identities	Build new collaborations and areas of expertise	Sustainable research theme on bodily identities
Consolidate and expand Category A staff base	Secure University and external investment	Continued growth in permanent Category A staff
Develop a more diverse and inclusive research environment	Proactive support for promotions and development; seek diversity of candidates for postdoctoral fellowships	A stronger, more diverse and more sustainable research community
Wider and more balanced global research activity	Broaden collaborations; extend international staff expertise; build capacity of partners through mentoring and collaboration	Thriving and diverse collaborative research in 2 or more new regions
Further develop postgraduate research community	Widen supervisory expertise, skills training, exchanges; secure new funding options	PhD community bigger and increasingly diverse; PhD research in 2 or more new regions; stronger support for range of career pathways
Material Culture and Landscape lead growth of interdisciplinary NUCoREs for Heritage and Landscape	Foster new collaborations and leadership of interdisciplinary research programmes	Stronger interdisciplinary partnerships; increase in research funding; more diverse research environment
Further develop facilities for landscape and archaeological materials science	Secure investment from University and externally for more advanced microscopy and analytical equipment e.g. SEM and microCT	World-class facilities for science-based archaeology in key research themes
Develop experimental archaeology capacity	Build strategic partnerships with industry and museums, invest in facilities	Experimental work supporting all research themes
Increase range and quality of impacts through further collaborative research and teaching	Ensure realistic pathways embedded in all project plans with GLAM partners (e.g. Great North Museum, National Glass Centre), UK and international collaborators	Wider reach and significance, addressing targeted UN SDGs

Table 3. REF 2021 aspirations; planned actions and results.

The UoA's aims include launching a new research theme on 'Bodies and Identities' (linked to the cross-Faculty Medical Humanities Network (committee role: Shillito). The new Archaeology group will link archaeological science on human and animal bodies (Shillito, Tourigny) with humanities approaches to personhood, kinship, emotion and identity (Conneller, Fowler, Webster), deepening Newcastle's commitment to bioarchaeology and providing a strategic focus for new staff, collaborations, PGRs and facilities development.

Continued investment in archaeological science will support all three future research themes. Since the UoA decided to expand its scientific capacity in 2015, the staff base has grown from one (Dolfini) to six (adding Shillito (2015), Duckworth (2016), Tourigny (2018), Carrer (2019), Rayne (2020)), plus 2 FTE technicians (Van Asperen (2016), Blumberg (2019)). The capacity created has enabled the UoA to win major projects such as *Rome Transformed* (ERC Advanced, including geoarchaeology and digital survey), *Earliest Human Occupation of North America* (NERC, including micromorphology and geochemistry) and *TerraSAgE* (AHRC, with geoarchaeology and computer modelling). Future investment will prioritise developing capacity in bioarchaeology and palaeoenvironments.

Recent ECR and PGR initiatives have established experimental archaeology as a new methodological focus linked to all three research themes. Experimental archaeology began in MATCH with use-wear and has expanded since 2017 when PGR students founded the Experimental Archaeology Newcastle (EXARN) group (mentored by Duckworth, Dolfini and Shillito). The team is now recognised by EXARC, the global network for Archaeological Open-air Museums, Experimental Archaeology, Ancient Technology and Interpretation; EXARN is just one example of how our PGRs play a central role in developing the research environment.

The UoA will maintain its strong commitment to archaeological fieldwork. In Britain excavations since 2014 include *Maryport Roman Temples* (Haynes), *Lufton Roman Villa* (Gerrard), *Round Mounds, Isle of Man* (Fowler) and *Derwentcote Steel Furnace* (Webster); in Europe, fieldwork includes *Al Alhambra* (Spain; Duckworth); *Apalirou Environs Survey* (Naxos, Greece; S.Turner/Jackson) and *Case Bastione* (Sicily; Dolfini). Innovation in field methods including novel techniques for scientific dating and digital survey is a cornerstone of projects in the Mediterranean and northern Europe. Over the next seven years the UoA will broaden its geographical reach, building on foundations provided by Shillito's excavations at Paisley Caves (Oregon, USA) and Jackson's Kilise Tepe project (Turkey). Since 2016 over £500k from Newton, GCRF and other international funders has enabled the UoA to initiate collaborations in Brazil, Morocco, Libya, Sudan, Turkey, Ukraine, Iraq, India, Sri Lanka and China with a view to designing shared research agendas as the basis for future fieldwork. To date this work has supported staff mobility, PGR exchanges and ECR training in each of these countries. In future the UoA will create strong and balanced partnerships for new fieldwork programmes using archaeology as a vector to address UN Sustainable Development Goals linked to culture, heritage and urbanism, climate, water, agriculture and sustainable ecosystems. These agendas will guide the appointment of new researchers and development of the UoA's expertise in regions such as Africa, south and east Asia, leading to further internationalisation through fieldwork and PGR recruitment. This approach is exemplified by NUAcT appointments Rayne (research in northern Africa supporting SDG targets 6.4-6, 6.b) and Carrer (Mediterranean and western Asia, SDG targets 15.1, 15.4).

1e. Strategic aims in research impact

The UoA's strategy to achieve impact from research has focussed on two key areas:

- Increasing public understanding of archaeology and heritage through knowledge exchange and partnership with cultural institutions and industry
- Coproducing policies and tools to underpin landscape management and planning

The UoA's Impact Case Studies show how impacts have developed in each of these areas through the research themes of Landscape and Material Culture. Both the McCord Centre and MATCH lead internally- and externally-funded projects designed to create research impact. The UoA encourages close links with industry through Visiting Fellowships for professional archaeologists, contract research, participation in knowledge transfer activities and training through masterclasses and PGR/staff secondments.

The strategy for research impact is underpinned by investment in partnerships with non-HEI bodies including Historic England, English Heritage, the National Trust, and commercial organisations, as well as key regional partners like the Vindolanda Trust, Senhouse Museum and Tyne and Wear Archives and Museums (TWAM). The UoA nurtures these relationships by co-organising policy workshops (e.g. Natural England (2015), European Commission (2016), High Speed 2 (2018), Government of Flanders (2019)), providing advisors and trustees, and by supporting joint projects including commercial research and collaborative doctoral awards (e.g. with Northumberland National Park Authority, Beamish Museum, Historic England). Such links ensure ongoing co-design of research, co-production of outputs and the adoption of research innovations by the UoA's partners.

A key example of an ongoing partnership is the Great North Museum (GNM), the gateway museum for Hadrian's Wall, which is a collaboration between the University, TWAM, the Society

of Antiquaries of Newcastle and the Natural History Society of Northumbria (REF5a 2.4.2). The University's commitment of £1m p/a helps to sustain strong collections-based research by the UoA and keep public admission to the GNM free.

2. People

2a. Staffing strategy

Archaeology was the smallest UoA submitted to REF2014 by Newcastle and remains relatively small in the context of a Russell Group university. Nevertheless, the UoA's success since REF2014 means its growth was prioritised in successive School Strategic Plans. The UoA is now more than twice its size in 2014. Investment recognised the need to broaden the base of researchers from different backgrounds, particularly in archaeological science, in order to create the strength and diversity required for an outstanding and sustainable research environment.

The UoA's recruitment strategy from 2014-2020 was designed to maintain and consolidate core strengths in the landscape archaeology and material culture of Britain, Europe and the Mediterranean, whilst developing capacity in archaeological science. New permanent appointments were consequently made in both environmental and landscape archaeology (Shillito (2015), Gleeson (2015-17, now at Queen's University Belfast), Tourigny (2018), Carrer (2019), Rayne (2020)) and artefacts and materials science (Duckworth (2016), Collins (2017), Conneller (2018)). The UoA's current thematic, chronological and geographical expertise is represented in Table 4.

Category A eligible staff	Themes			Periods				Regions				
	Landscape	Material Culture	Bodies and identities	Later Prehistoric	Classical	Medieval	Post-med. & Modern	Britain and NW Europe	Western Mediterranean	Africa	E. Mediterranean and W.Asia	North America
Caricola												
Carrer												
Collins												
Conneller												
Dolfini												
Duckworth												
Duggan												
Fairclough												
Fowler												
Gerrard												
Haynes												
Haysom												
Jackson												
Lekakis												
Moore												
Rayne												
Shillito												
Tourigny												
A.Turner												
S.Turner												
Webster												
Wright												

Table 4. Current staff (Category A) expertise at Newcastle.

Whilst Conneller was appointed following a retirement, the others were all appointed to newly-created positions in line with the University's strategy of investment in areas with world-leading potential. The appointment of Wright in September 2020 shows this strategy is continuing, notwithstanding challenges such as Covid-19 (Figure 1).

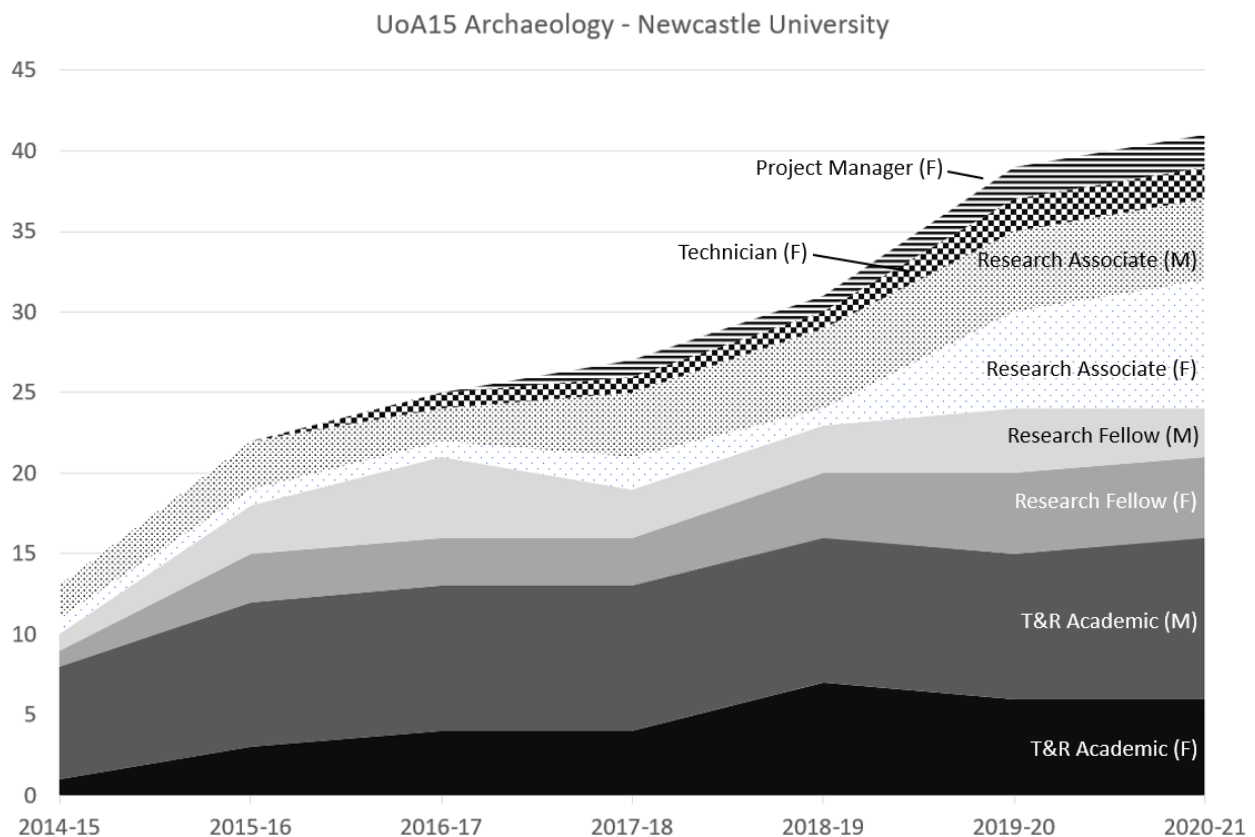


Figure 1. Staff in Archaeology at Newcastle ((F)=female; (M)=male), 2014-20.

2b. Staff development

The academic staff profile is balanced across career stages, with two Professors, eight Senior Lecturers, one Principal Research Associate, four Lecturers and five Research Fellows. A further Lecturer and Senior Lecturer have been appointed jointly with Classics and Ancient History to foster interdisciplinary connections. Apart from Moore (appointed to cover Collins' secondment to the NLHF *WallCAP* project), all Category A staff with 'Teaching and Research' responsibilities hold open-ended contracts. Temporary Lecturers are routinely appointed to 'Teaching and Research' contracts to support their career development (e.g. Ashley Coutu, 2017-19 (now Oxford); Stephanie Piper, 2018-19 (now York); Sophie Moore, 2019-22). Since 2016 the archaeology laboratories have been supported by lab technicians who are themselves experienced researchers with technical skills in lab management, artefact conservation (Blumberg) and environmental archaeology (particularly palaeobiology) (Van Asperen). They contribute to research outputs as co-authors and are trained in new skills through research projects (e.g. Blumberg trained in soil micromorphology by Shillito during AHRC *TerraSAGE*).

All staff researchers participate fully in the Unit's research culture, whatever their career stage and whether on open-ended or fixed term contracts. All benefit from the same research mentoring and have equal access to internal funding schemes, which helps create the freedom and opportunity to succeed envisioned in the University's Vision and Strategy (REF5a, 2). Formal mechanisms for staff development include an annual Personal Development Review (PDR) and probationary reviews during the first two years of employment. These provide space to identify priorities and training needs in relation to individual career goals, including discussion of promotion. Following

a review of processes during preparation of the School's successful 2019 Athena Swan Bronze submission, PDR reviewers now proactively encourage staff who meet promotion criteria to apply, rather than relying on reviewees to put themselves forward. All staff prepare Personal Research Plans in consultation with the School Director of Research, including impact and training goals. The UoA is committed to the Researcher Development Concordat and Technician Commitment, and implements principles including open recruitment practices, flexible working, professional development time and relevant training for technicians, researchers and managers. For example, the UoA routinely provides bridging funding for fixed-term staff facing gaps between projects, and tops up fractional contracts to enable training and project development. This support has benefitted 10 individual RAs during the assessment period.

The UoA's mentoring system provides a more informal process for peer support, with mentors allocated to all new colleagues. Outside formal mentoring, an active culture of support means all members of staff provide and receive one-to-one advice on their research and publishing, and the UoA operates a supportive system of peer review for funding proposals and papers in progress.

The University provides training to support impact and research for staff at all levels through its extensive Open Learning Programme (with modules in all aspects of leadership, digital, health and safety, and EDI), and the NU Academies (supporting skills and engagement with policy makers, business and global challenges). For example, Collins and Carrer have developed their leadership and project management skills through the 5-month PI Development Programme. Most staff have benefitted from research funding workshops and tailored support for UKRI, European and International funding from the Faculty's Research Funding Development team. Induction activities attended by all new starters are tailored separately for professors, lecturers and researchers. The UoA itself provides training in specialist techniques such as digital survey, GIS, databases and archiving, spatial analysis, pXRF and microscopy. RAs are supported to develop their personal research alongside their main project duties through allocation of at least 6 hours per week in line with UKRI professional development guidelines. The success of all these measures is demonstrated by tangible results: the increasing volume of outstanding publications produced by researchers at all career stages; the fact that all Category A staff have been PI or CI for at least one externally-funded project; and the striking increase in research income.

All staff have administrative responsibilities; ECRs are mentored through theirs by experienced colleagues in preparation for more senior roles and to ensure knowledge of policy and process development is widely shared. Consequently, archaeologists have held key management positions on the School Executive Board (in addition to the Head of Archaeology), including Head of School (2014-19; 2020), Deputy Head of School (2014-20), Director of Research (2013-14), and Director of Learning and Teaching (2019-20).

A burgeoning group of Research Fellows and RAs has developed with the maturing research environment, from 5 in 2013 to 20 in 2020 (Figure 2). During the assessment period the UoA has attracted 20 Research Fellows holding prestigious fellowships, including grants from EU FP7/H2020 (12 Marie Skłodowska-Curie fellows), British Academy (4), national research councils (2), and the University's NUAcT programme (2). Another 20 RAs have fulfilled key roles on projects funded by research councils, charities and heritage agencies. Three research-only staff hold open-ended contracts (A. Turner, Carrer, Rayne).

The School's induction and probation policies support all ECRs (defined as 7 years from PhD or 5 years from first academic appointment, whichever is most generous) regardless of contract type or funding source. For example, ECRs' annual Research Support Funds are raised from the standard staff allowance of £900 to £1400 p/a; their applications to some internal funding competitions are treated preferentially, e.g. University Conference Support Fund (which awarded £23k to 3 ECRs for 4 conferences at Newcastle including *CIFA*, 2016; *Developing International Geoarchaeology*, 2017; *IALA Landscape Archaeology Conference*, 2018; *Mapping the Sacred in Byzantium*, 2019). New ECR lecturers have lower teaching workloads during their probation to help minimise the impact of lecturing on their research. Meanwhile research time, mentoring, researcher management, impact activities and research administration are factored into workload

planning for all academic staff. Colleagues are incentivised to submit grant proposals with 0.1% of the value of all applications (successful or not) added to their Research Support Fund. Fostering a collegial working environment and a strong sense of community is at the core of our research strategy, so colleagues in all roles and at all career stages feel supported to achieve their goals: the exceptionally low turn-over rate among Category A staff on open-ended contracts is testament to the success of these policies (with nine new appointments and only one resignation since 2013).

Staff with fixed-term contracts are encouraged to apply for open-ended positions and four have recently made this transition (A.Turner, 2016; Collins, 2017; Van Asperen, 2018; Carrer, 2019). Fixed-term researchers from Newcastle have also been appointed to academic posts around the world, e.g. Cristiano Iaia (Marie Curie Fellow (MCF), 2015-17), now Associate Professor at the University of Turin; John Blong (NERC RA, 2016-20), now tenure-track Assistant Professor at Washington State University; Elif Koparal (British Academy Newton Advanced Fellow, 2016-19), now Associate Professor at Mimar Sinan Fine Arts University, Istanbul; Mihail Mitrea (MCF 2018-20), now research scientist at the Romanian Academy. Support for diverse careers has helped other researchers secure positions in industry (Oscar Aldred, RA 2012-14, Cambridge Archaeological Unit) and government (Sabrina Pietrobono, MCF 2012-14, Ministry of Cultural Heritage, Italy).

All teaching staff take one semester in every seven as sabbatical leave. Staff who complete a term of at least three consecutive years in major administrative roles such as Head of School or Head of Archaeology follow it with a two-semester sabbatical. Over the assessment period staff in the UoA have taken 22 sabbatical semesters. External funding has supported further research leave, e.g. Duckworth's British Academy Postdoctoral Fellowship and Conneller's British Academy Mid-Career Fellowship.

2c. Research students

Sixty-six PhD students studied in the UoA during the review period, with 18 PhD degrees awarded. The key source of support for PhD researchers was the AHRC Northern Bridge Doctoral Training Partnership (NBDTP), which includes seven universities in NE England and Northern Ireland working with a range of partner organisations. The UoA's applicants to NBDTP have consistently been amongst the most successful in the consortium with 19 awards. In all, 66% of Archaeology PhD students registered at Newcastle have won competitive scholarships from sources including AHRC, NERC, European Commission, Commonwealth Commission and charities.

Many PhDs are interdisciplinary, jointly supervised across subjects in the School, across Faculties, and with external partners. For example, the development of archaeological science has enabled access to new funding sources such as NERC IAPETUS², a multidisciplinary DTP for natural environment, including a PhD on climate change and Hadrian's Wall jointly supervised with the Newcastle Earth Observation Laboratory and English Heritage. There has been significant growth in co-supervisions with partner institutions in the UK, Europe and the USA (up from 2 (10%) in 2013/14 to 13 (30%) in 2019/20) and marked diversification amongst students (e.g. international students up from 6 (30%) to 24 (62%)). Over the review period PhD supervisions (all categories) in the UoA grew from 20 to 41 (Figure 2).

PGR students are key members of the UoA's research community and its research themes. Involvement in research activities provides training opportunities which can contribute up to 70 hours of their required annual research training requirement. PGRs have consequently taken central roles in organising international conferences (e.g. DIG2017 and LAC2018, where PhD students were on the steering committees) and fieldwork (e.g. the *Apalirou Environs Project*, where PhD students led ceramic analysis and building survey). PGRs are also encouraged to develop initiatives with financial support from the University. Examples include EXARN, which hosted the first Annual Experimental Archaeology Student Symposium at Newcastle; a PhD-student led 3D survey of Sant'Apollinare in Classe (Italy, a UNESCO World Heritage Site) with funding and technical support from the McCord Centre; and the School's interdisciplinary Postgraduate Forum seminar series.

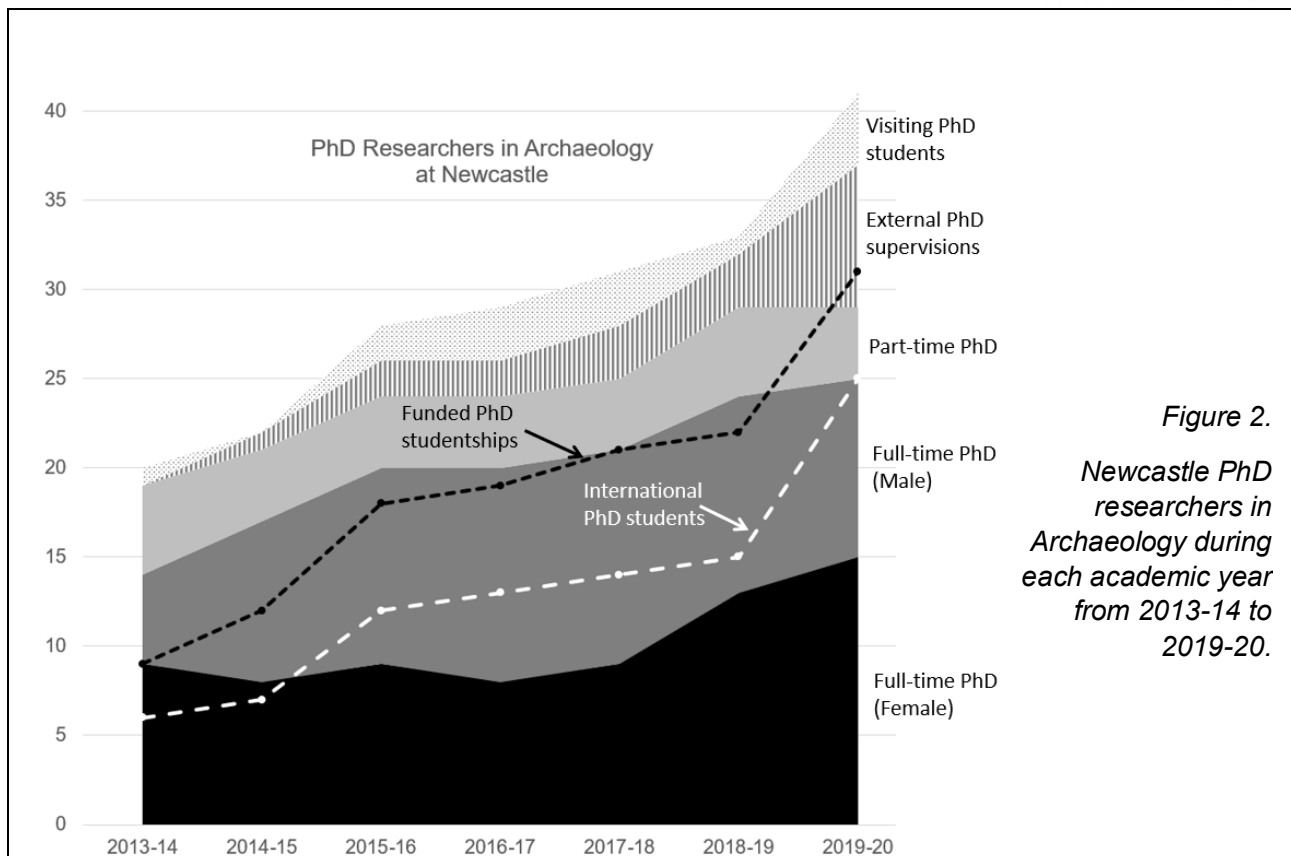


Figure 2.
Newcastle PhD researchers in Archaeology during each academic year from 2013-14 to 2019-20.

The School is committed to providing an accessible environment with a range of support for all PGR students. Applications are made in writing through an online portal; if applicants indicate needs relating to a protected characteristic, the Graduate School can arrange discussions with Student Wellbeing and/or a visit to discuss support. Each PGR application is reviewed by the Graduate School, School PGR Director, Archaeology PGR coordinator, and at least two potential supervisors.

PhD researchers are required to have at least one formal meeting with their supervisor each month, which is recorded in the online 'e-portfolio' system. Students use this system to keep minutes of meetings, record training activities and assist with goal-setting. PhDs have the opportunity to teach after completing the Newcastle Teaching Award; many lead seminar groups and provide at least one lecture for modules related to their research. Faculty and School PGR programmes provide over 700 hours of flexible training to choose from each year, delivering theoretical and practical skills relevant to a wide range of humanities and social science research. PhD students working on lab-based projects participate in monthly Lab Committee meetings, which provide a semi-formal setting for practising research presentations and soliciting feedback on draft papers and grant applications, as well as gaining valuable insight into the management of the laboratories. The School's PG Student Voice Committee provides a forum for PGRs to shape the agenda for their facilities and training needs.

The UoA is committed to supporting a range of career pathways with workshops for stage 3 UGs, PGs and postdocs which include regular networking events with local employers and "Want to be an archaeology academic?" workshops. Recent PhD graduates now work around the world in research or professional practice, including postdoctoral fellowships at the universities of Göttingen (2018), Princeton (2018), Leicester (2014), Newcastle (2018); lectureships at KCL (2016), Leicester (2016), Newcastle (2019), Peradeniya (2015); and professional roles at Archaeological Research Services Ltd (2014); English Heritage (2017); Hameln Museum (2018); Wood plc (2020) and the UK Civil Service (2018).

2d. Equality and Diversity

The UoA recognised that gender balance was poor at the REF2014 census (1f, 9m). Over the current assessment period this has improved significantly (8f, 12m). The UoA will continue to work actively to improve gender and other aspects of diversity as part of our staffing strategy, ensuring that there is a gender balance (and career stage balance) on shortlisting and interview panels for all posts. All job specifications now use inclusive language and all panel members have undertaken unconscious bias and active bystander training.

While 33% of Category A eligible staff originate outside the UK (Canada, Greece, Ireland, Italy, USA) and 68% of Research Fellows and RAs have international backgrounds (mainly from Europe and the USA), their ethnic backgrounds lack diversity. The EDI Committee – which includes PGR and researcher members – will continue to implement an EDI Action Plan (following 2019 submission for Athena Swan Bronze) to ensure barriers to career advancement are overcome for colleagues and students from all backgrounds. The Action Plan has recognised the need to create effective pathways to promotion for staff with protected characteristics (e.g. enhanced mentoring for women seeking promotion; creation of pathways into leadership positions to ensure proportionate representation).

The University's strong commitment to EDI means funding is available for schemes such as parental leave cover, with a Returners' Support Programme to assist staff returning to work following caring responsibilities, e.g. to reduce face-to-face workload for nursing mothers returning from maternity leave. The School EDI Committee's initiatives are supported by a University EDI fund. The University has robust leadership supporting EDI including a Dean, Faculty Directors and Inclusion Advisory/Project Officers, who help ensure EDI matters are prioritised in all the School's work including strategic planning, recruitment, induction and training, and all levels of teaching.

There is a strong commitment to empowering staff to maintain a proper work-life balance, through e.g. flexible retirement policy (no fixed retirement age) and flexible working. The main weekly research seminar series (linked to the research themes) is scheduled earlier in the afternoon to enable attendance by those with caring responsibilities. The timing and format of weekly team meetings is also designed to enable all staff to contribute fully, since many decisions at UoA level are made by consensus. The Covid-19 pandemic in 2020 accelerated plans to implement videoconferencing for business meetings and research seminars so that all are now digitally accessible: this contributes to environmental sustainability and improves accessibility for participants with caring responsibilities or other mobility constraints.

3. Income, infrastructure and facilities**3a. Income**

UoA research income has increased during the review period from c. £200k p/a in 2013/14 to c. £1m p/a in 2019/20. At £3.75m, the total income is 6 times more than reported in REF2014, reflecting effective mentoring and researcher development activities. Meanwhile new research awards during the review period totalled c. £7.7m, an increase of around 550% compared to 2008-14. This remarkable growth is a result of major investments in the research community, in personal and professional development, mentoring at all levels and new research facilities (Figure 3).

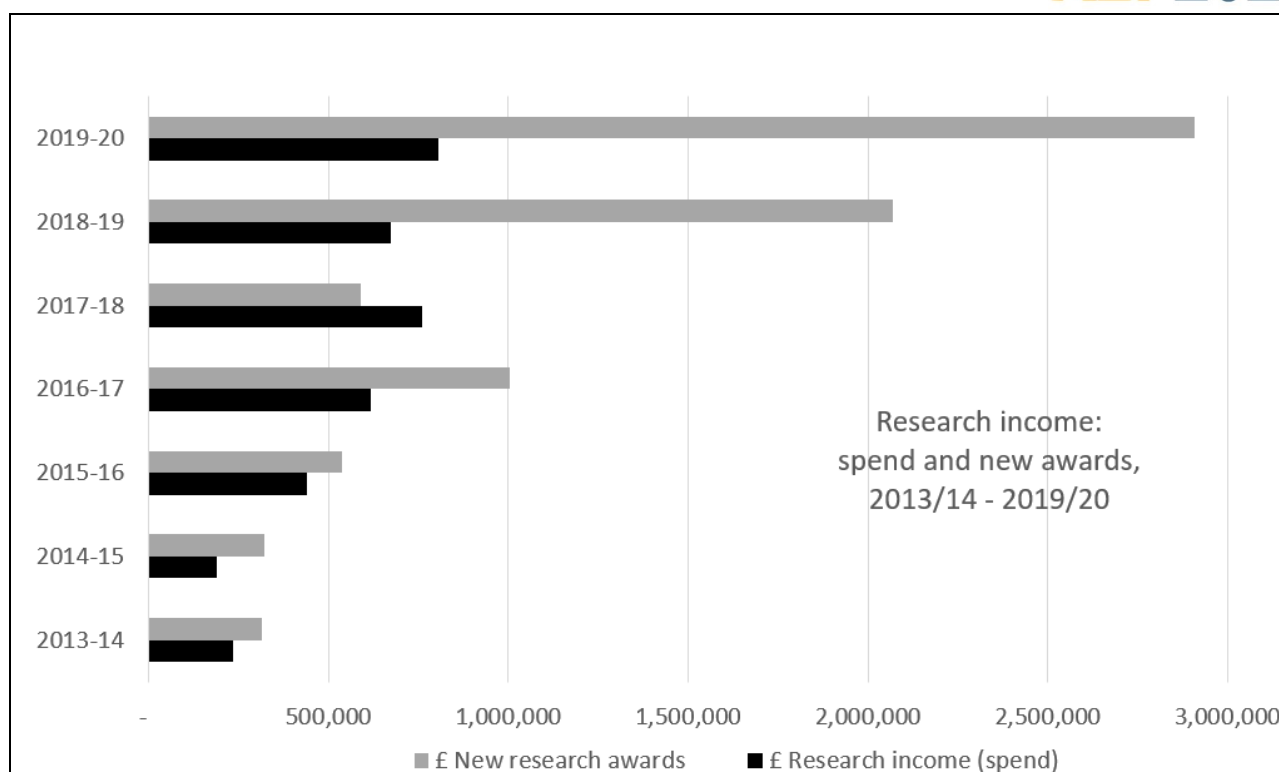


Figure 3. Research income: spend and new awards.

As the UoA has invested in its members' research careers and developed new fields of expertise (including archaeological science and related facilities), staff have won grants from an increasingly wide range of funders. During the review period the UoA was awarded £2.1m from UK research councils with projects including *Earliest Human Occupation of North America* (NERC, £550k, PI Shillito, 2016) and *TerraSage: Terraces as Sustainable Agricultural Environments* (AHRC, £750k, S.Turner/Shillito, 2019) demonstrating a strong trajectory of growth through the review period. The UoA's members have won funding from a growing range of sources including major funders like the European Commission (*Rome Transformed*, ERC Advanced, €2.4m, Haynes; *Heriland*, MSCA ITN, €875k, S.Turner), Wellcome Trust (*Biofuels and respiratory health*, £43k, Shillito), Leverhulme Trust (*Unmasking Masks*, £108k, Conneller), British Academy (*Mesolithic Histories*, £100k, Conneller; *Tintagel* (£173k, Duggan)), and National Lottery Heritage Fund (*Hadrian's Wall Community Archaeology Project*, £2m, S.Turner/Collins) but also awards from industry and smaller UK and international charities (*Round Mounds: Isle of Man*, Manx Heritage, £95k, Fowler; *Maryport*, Senhouse Trust, £200k, Haynes). Such grants help build relationships with the professional sector and consolidate regional partnerships; the strategy of diversification is helping to protect the UoA from risks associated with challenges like Brexit and Covid-19 by providing new funding sources for research.

3b. Infrastructure

Research and Impact activities are supported by the School Research Committee, which includes subject Heads, research and impact coordinators. Research Committee works with the School EDI Committee to implement an action plan to promote EDI. All School decision-making bodies have balanced memberships in terms of gender and career stage. Within the UoA, weekly staff meetings chaired by the Head of Archaeology facilitate discussion of research strategy, with a monthly meeting dedicated exclusively to research matters.

Three Faculty Impact Officers work with the UoA's Impact Coordinator to advise on embedding impact activities into new projects. The Impact Coordinator (Waite) has dedicated 0.3 FTE to enabling impact since 2015, including work with key partners TWAM and the GNM. The

University's media team supports digital communications through training and collaboration with researchers at all levels, enabling projects such as the Futurelearn *Hadrian's Wall MOOC* which has reached >64,000 learners since 2014. With the Faculty Institutes & Partnerships Manager, the UoA develops projects with strategic partners including Historic England, TWAM, Northumberland National Park Authority and the National Trust (supported by £169k from university, HEIF and ESRC impact accelerator funds in the period under review). The resulting projects have ranged from educational work using ancient Greek artefacts in Newcastle primary schools (2015-19), through creation of digital tools to support collections access and participatory planning (2018-20), to landscape management projects with government agencies/NGOs in Belgium (2019), Greece (2017-18), Turkey (2016-19) and the UK (2016-17).

3c. Facilities

The UoA's home is in the Armstrong Building, a 19th-century college which was refurbished at a cost of £20m between 2013-19. It houses student facilities, offices for teaching staff, computer labs equipped with GIS and specialist software, and open-plan offices accommodating all PhD researchers. A further research suite in the adjacent Old Library Building provides project teams with open-plan office space, meeting rooms and videoconferencing facilities.

The UoA has made substantial investments in upgrading facilities linked to its research themes of Landscape and Material Culture, including resources for remote sensing and survey equipment, microscopes and geoaerchaeology. The UoA has two archaeological science laboratory suites which provide facilities for material culture research (Wolfson Archaeology Laboratory) and geoaerchaeology (Earthslides Laboratory). The Wolfson Lab houses facilities for experimental materials analysis, reference collections for environmental and artefact research, and a dedicated research microscope room. Key equipment acquired since 2014 includes a bespoke Leica DM2700 MH RL microscope with MC170 HD Camera and SW Kit, designed specifically for use-wear analysis of large metal objects; and a bespoke Leica DM1750 M/P for petrographic analysis of ceramics, stone and environmental materials. The Earthslides Lab has a full range of equipment for producing and analysing large-format thin sections of soils, sediments and ceramics, and a clean room for microfossil extraction. A portable XRF Bruker Tracer III-SD analyser enables elemental characterisation of soils and artefacts.

The McCord Centre also maintains facilities for archaeological survey and remote sensing, including a full suite of geophysics and terrestrial and airborne laser scanning instruments. Meanwhile the UoA is a partner in the University's new One Planet complex (opened 2019 after investment of £2m) which provides fully-equipped teaching and research labs for earth and environmental sciences including the SaGE Mass Spectrometry facility for biomarker analysis (e.g. Agilent 6890-5975 GC-MS). Archaeologists have access to additional state-of-the-art facilities for materials and sediment characterisation through access agreements with Engineering and Pharmacy (e.g. Perkin-Elmer spotlight 400 FTIR microscope).

From 2014, Faculty and School policies have directed all overheads (from Full Economic Cost) and other surpluses earned from research and consultancy back to the UoA for investment in staff, facilities and projects without top-slicing. Alongside additional investment in the UoA's facilities by the University, this has facilitated the creation of new laboratories and acquisition of equipment valued at over £500,000 (Table 5). Investment continued in 2021 with £136,000 for advanced microscopes from UKRI World Class Laboratories Fund and £738,000 from AHRC Capability for Collections Fund.

Laboratory	Equipment	Date	Value
McCord Centre	FARO X330 terrestrial laser scanner	2014	£60,000
Wolfson Archaeology Lab	Polarising microscopes	2015	£24,000
Wolfson Archaeology Lab	High temperature chamber furnace	2017	£12,000
Wolfson Archaeology Lab	Stereo and metallographic microscopes	2017	£25,000
McCord Centre	Gradiometry and ERT instruments	2017	£54,300
McCord Centre	UAVs, RouteScene LidarPod	2018	£112,000
Earthslides Lab	Lab refit, Brot micromorphology equipment	2019	£190,000
Earthslides/Wolfson Labs	Keyence digital & Leica motorised microscopes	2021	£136,000
Earthslides/Wolfson Labs	Bruker SkyScan MicroCT; Artec scanners; Leica DM6M LIBS & fluorescence microscopes	2021	£738,800

Table 5. Facilities for Archaeology acquired since 2014.

The University's unique archives and museums include archaeological and ethnographic collections from around the world, including British and Mediterranean archaeology used extensively in the UoA's Material Culture research. Alongside research and seminar space, the GNM houses a specialist library of 50,000 volumes which integrates the UoA's Cowen Library and the historic collections of the Society of Antiquaries of Newcastle upon Tyne. The UoA also has a close relationship with the University Library's Special Collections department owing to co-curation of the Gertrude Bell Archive. Research since 2014 on the Bell collection and newly-acquired archives including the Assyrian archive of Victorian polymath Austen Henry Layard (2016) and the Shefton Archive (Greek archaeology, 2017) has been supported by the British Academy (£80k, 2017-18) and private donors (2019). The UoA's research underpinned inclusion of the Bell Archive on the UNESCO International Memory of the World Register (2017), one of only two UK university archives recognised in this way.

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

The interconnected challenges faced by the UoA's partners inform and inspire much of its research, which helps ensure many projects are designed with users and beneficiaries in mind. Partnerships with institutions outside higher education include strong relationships in the heritage sector (e.g. through MoUs and funded projects with Historic England, the National Trust, Northumberland National Park Authority). The University's partnership with TWAM, epitomised in the GNM collaboration, is a key example (see Impact Case Study (ICS) 15-1 Haynes et al.). The UoA's research informs both permanent and temporary exhibitions at the GNM which were visited by >400k people each year since 2014, including over 30,000 children annually on organised educational visits. Examples include *The Extraordinary Gertrude Bell* exhibition (2016) which was co-curated by Jackson based on his research on the Gertrude Bell Archive, with loans from the British Museum, Imperial War Museum and Royal Geographical Society. The exhibition had over 26,000 visitors at the GNM before permanent installation at Kirkleatham Museum (Teesside). Of 717 visitors surveyed (June-September 2016), 94% felt the exhibition "increased their understanding of the role of archaeologists in the formation of the modern Middle East".

The UoA regularly partners with commercial archaeologists (e.g. Archaeological Research Services Ltd for HLF-funded *Rescued from the Sea* (2013-16); The Archaeological Practice Ltd with AHRC *TerraSAGE* (2020-22)). Industry links provide reciprocal benefits through PhD and postdoctoral researchers who have completed over 25 secondments with industry partners in the UK and Europe, leading to significant and innovative results (e.g. Duggan's ceramic analysis for Cornwall Archaeological Unit/English Heritage for *Tintagel Castle*, 2017-20). Meanwhile a policy

of recruiting researchers from the profession has deepened exchange with industry and the public sector, e.g. Fairclough in 2013 (following a distinguished career with Historic England), Sophie Hueglin in 2014 (previously excavation director for the City of Basel), and Lekakis in 2015 (formerly at the Greek Ministry of Culture, and founder of heritage NGO Monumenta). Projects they have led such as *CHeriScape* (funded by JPI-Cultural Heritage) and *Co-Creating Heritage* (AHRC Follow-on Fund for Impact) have contributed to the development of international policy and practice (see ICS 15-2 Turner and Fairclough).

Many Visiting Fellows (VFs) come from industry. They become involved in major projects such as *Rome Transformed* (ERC, VFs David Heslop and Iwan Peverett of New Visions Heritage Ltd) and lead international participatory research (e.g. VFs Colm O'Brien and Max Adams' *Inishowen Project*). This strategy promotes the co-production of research outputs from commercial projects (e.g. Gerrard's three co-authored monographs with Pre-Construct Archaeology Ltd since 2014). Of 47 VFs, 33 work in the profession (16 UK, 15 international). VFs' roles include fostering new international research programmes, for example Humphrey Welfare's leadership of 'Wall-to-Wall', an initiative funded by the UK and Chinese governments since 2018 to link the Great Wall of China with Hadrian's Wall through researchers at the Chinese Academy of Cultural Heritage, Historic England and Newcastle University. Close engagement with government and industry provides pathways for research innovations to impact policy and practice (see ICS 15-2 Turner and Fairclough); successful examples include collaboration with Historic England for digital survey of unique Roman quarry-face inscriptions from Hadrian's Wall (winner of *Current Archaeology's* 'Rescue Project of the Year', 2020); and Fusion-HS2's decision to commission innovative earthwork dating as part of HS2 Phase 1 (following Kinnaird *et al.* 2017).

In recent years the UoA has also significantly deepened its collaborative relationships globally, as shown by key outputs, incoming and outgoing research visits, and collaborative projects (Table 6). For example, PhD students and postdocs have come to Newcastle for short stays (1-12 months) from Brazil, China, Italy, Spain, Turkey and the USA. Staff from the UoA have contributed to building research capacity as Visiting Professors in partner institutions, for example S. Turner and Fairclough at UFMG, Belo Horizonte (2018) and S. Turner at Pavia University (2019-21).

	Africa	North America	South America	Western Asia	South Asia	East Asia	Europe	UK	Total
Academia	2	21	3	12	5	3	44	26	116
Industry / government	3	2	1	2	3	1	27	30	69
<i>Total</i>	5	23	4	14	8	4	71	56	185

*Table 6. Research collaborations since 2014
(number of institutions in each region/category)*

The UoA has won significant funding for projects focussed on policy development, participatory citizen science and co-productive research. Continuing work with partners along Hadrian's Wall is a flagship for this strategy (see ICS 15-1 Haynes *et al.*). The £2m *WallCAP* project was designed in consultation with regional stakeholders including NLHF, Historic England, English Heritage, the National Trust, Northumberland National Park Authority, Northumberland County Council, Cumbria County Council and Hadrian's Wall museums (TWAM, the Vindolanda Trust, and the Senhouse Trust). *WallCAP* will involve c.300 volunteers participating in research and heritage protection until 2022, with Collins seconded (0.8 FTE) from 2017 to 2021 to manage the project.

The UoA is also committed to promoting public engagement with archaeology through new and traditional media: the University provides specific training and mentoring through the 'Open Learning' staff development programme. New digital tools for participatory heritage have been pioneered through *WallCAP* and other projects including *Co-creating Heritage* (AHRC Follow-on for Impact; £80k; S. Turner) and *Heritage Hack* (AHRC Creative Economy Engagement Fellowship; £25k; Lekakis) and deployed with partners including Izmir City Council (Turkey) and Monumenta (Greece). Digital media like the Hadrian's Wall *FutureLearn MOOC* show how local

research can have major impacts on national and global audiences, with more than 64,500 registered learners in 170 countries (see ICS 15-1 Haynes et al.). Duckworth's 'ArchaeoDuck' reaches a younger demographic, with 3,500 Twitter followers, 1,000 on TikTok and >1,500 subscribers on YouTube; ArchaeoDuck's video 'Carbon Dating Explained' has >24k views. A recent experiment by PhD student Victoria Lucas featured on the YouTube channel of 'Lindybeige' (>900k subscribers) gained >1,000 comments and 9,600 individual 'likes'; in the words of one viewer 'This presentation was so good I want to run away to England to study experimental archaeology'. Members of the UoA also engage public audiences regularly through TV and radio. Examples include Lekakis' 'Hidden Landscapes of Naxos', an output from AHRC *Co-creating Heritage* which was shown twice on Greek national TV (ERT1&2, April 2019, 170k viewers) and Duckworth's role as co-presenter on 'The Great British Dig: History in Your Back Garden' (Channel 4, April 2020, 500k viewers); the success of both projects led their national broadcasters to commission subsequent series. Jackson's research on the Gertrude Bell Archive not only underpinned the documentary film *Letters from Baghdad*, shown in 120 cinemas in the USA and UK, and broadcast nationwide on PBS (USA), ARTE (France and Germany) and BBC4 (UK), but also impacted new audiences' knowledge of Middle Eastern history through pathways including online comics hyperlinked to the Gertrude Bell Archive (62,190 page views from 124 countries (2015-20); funded by ESRC).

The UoA will continue its international landscape policy work (outlined in ICS 15-2 Turner and Fairclough) through McCord Centre projects including *TerraSAgE*, Carrer's *Pastoral Landscapes and Sustainability* (2019-23) and Rayne's *Resilience in a Fragile Environment* (2020-24). These projects seek to inform sustainable landscape futures through knowledge of past impacts from agriculture, pastoralism and water management. They are representative of the UoA's ambition to make archaeology a lever for progress towards UN SDGs, including targets 1.5 Build resilience to climate shocks, 2.4 Resilient agriculture, 6.5 Water resources management, 11.4 Protect cultural & natural heritage, and 15.1 Conservation & sustainable use of ecosystems.

UoA staff also contribute through service on assessment panels (e.g. four UKRI peer-review college members; reviews for international funders in 15 countries), journals, charities and project boards. Haynes is Chair of the Clayton Trust for Roman Antiquities (2018-) and other trustee/directorships include Vindolanda Trust, Corbridge Excavation Fund, European Association of Archaeologists, Historical Metallurgy Society, Landscape Research Group, CBA North, Royal Archaeological Institute and Society of Antiquaries of Newcastle. Staff belong to Editorial Advisory Boards of 14 journals, and five edit journals: Shillito (Editor, *The Archaeological Journal*; Associate Editor, *Geoarchaeology*); Fairclough and S.Turner (Co-Editors, *Landscapes*); Fowler (Associate Editor, *Journal of the Royal Anthropological Institute*); Tourigny (Assistant Editor, *Post-Medieval Archaeology*).

The UoA's commitment to robust and balanced partnerships from local to global levels will ensure its research is relevant to a growing range of challenges. Strategic development targeted on the key themes will enable ongoing investment in world-leading expertise and facilities. Continuing strong support from the University means research in Archaeology is set to thrive at Newcastle over the coming decade.