Institution: University of Central Lancashire
Unit of Assessment: UoA15 Archaeology
1. Unit context and structure, research and impact strategy

Unit context and structure

Archaeology at the University of Central Lancashire (UCLan) was founded in 2004 and previously submitted to RAE2008 and REF2014. Since its creation it has been a growing and increasingly influential research unit. It has now matured into a unit leading research on a world scale.

Since the last REF our research income has grown by over 700% and we have increased our staffing from 6 to 7. We run multiple large-scale research projects involving international collaborators. These projects are producing both significant research outputs but also engaging multiple non-academic partners thus having far-reaching and long-term impact. This means that since REF2014 the group at University of Central Lancashire has grown and matured, and become increasingly influential both within our own institution and in the sector more widely. Our increased profile both nationally and internationally alongside established and new collaborative links means we are embedded in broad research networks bringing increased visibility and high-quality outputs and impact. For instance, David Robinson's collaborative research project has involved different university partners (California State University Channel Islands and the University of Strathclyde), museums (Santa Barbara Museum of Natural History), non-profit organisations (The Wind Wolves Preserve, California and Los Padres National Forest) and a federally-recognised tribe (the Tejon Indian Tribe).

As a team we are committed to understanding the past lives of people in a variety of different time periods and parts of the world. We do this by investigating archaeological landscapes via a range of techniques including, but not restricted to, **applied field archaeology**. This research approach sits alongside a deep-seated and ongoing commitment involving a range of partners in the **co-production of knowledge**. The team at the census date comprised seven full-time academics with the Unit led by Professor Vicki Cummings. As an indication of both the strength of this research unit and the University's wider commitment to supporting our research, Archaeology now has its own Research Centre. Everyone submitted here is thus in the *UCLan Research Centre for Field Archaeology and Forensic Taphonomy* led by Professor Duncan Sayer. This represents a step-change to a greater identity with much stronger budgetary independence, which indicates the University's long-term commitment to the subject area as well as providing us with research autonomy moving forward. It ties into the University's approach to research which is to support and reward research excellence via the creation of research centres. This has allowed Archaeology to develop a robust presence within the University. As one of only 12 centres in the University it demonstrates the importance of research investment in archaeology at UCLan (see Figure 1). We now have our own dedicated annual research budget via the Centre and Faculty support (set at £31,000 for 2019-20, £35,000 for 2020-21, plus £34,000 for new equipment) enabling archaeology to set out a new agenda and research direction for future years. Importantly the emphasis of this centre is increasingly focussed towards interdisciplinary research with international research significance, key strategies for both our own institution but also the broader discipline moving forward. Another explicit aim of the Centre is to grow and enhance the involvement of non-academic partners in our work which remains one of the cornerstones of our research. Administratively, our researchers sit within the School of Forensic and Applied Sciences which includes colleagues in Forensic Science, Chemistry, Geography and Environmental Science which enables us to facilitate more interdisciplinary research.

Strategic aims for research and impact over the REF period

1. Our overall aim has been to **grow and strengthen our core research areas**. This builds on our primary research aim from REF 2014 which was to 'enable research to thrive and grow'. We can demonstrate that we have achieved this because our permanent staffing has increased in this REF period from six to seven FTE and furthermore staff have been promoted. We now have two

professors (Cummings, Sayer) and three readers (Rick Peterson, Patrick Randolph-Quinney, Robinson) within our research group. To support these colleagues, we have also had three fixed-term appointments within this period. We are no longer a new research unit but an established group with a strong international profile. Our highest priority at the last REF was to **increase our research capacity**, specifically through acquiring external research income to provide research support. We have been very successful in this regard securing a number of RCUK grants (see below). We have secured £735,836 in funding, plus £109,548 income in kind, providing an average income of £105,119 per person. Right at the end of this cycle in 2020 one colleague successfully secured an AHRC grant of £937,000 while in post at the University (Seren Griffiths), showing our increased ability to bid for and acquire large research grants. Moreover, as a group of researchers we have concentrated our efforts on the investigation of archaeological landscapes. Our expertise as archaeologists who investigate the past using **applied field archaeology as the key exploratory tool** is a key aspect of archaeology at UCLan and means that we can open up new lines of research by integrating field and scientific analysis. This has involved the extensive and continued use of large-scale and major field projects to generate substantive new data for example at Oakington Anglo Saxon cemetery (Sayer), Whitewell prehistoric landscape (Peterson), various national and international dolmen sites (Cummings) and the Roman fort of Ribchester (James Morris, Sayer). It has also involved the realisation of tangible methodological and interpretative advances by enhanced interdisciplinary work with our university science colleagues. This has been very useful for example at the large-scale collaborative project in south-central California in the work of Robinson. This in turn enables the production of new data which is critical in leading and changing key debates and transforming the research landscape internationally. This has given us key focus and coherence as a research unit while enabling individual colleagues the freedom to pursue their own research interests. As such we have been able to grow and strengthen our research by **leading research projects** further enhanced by the support of external bodies and partners.

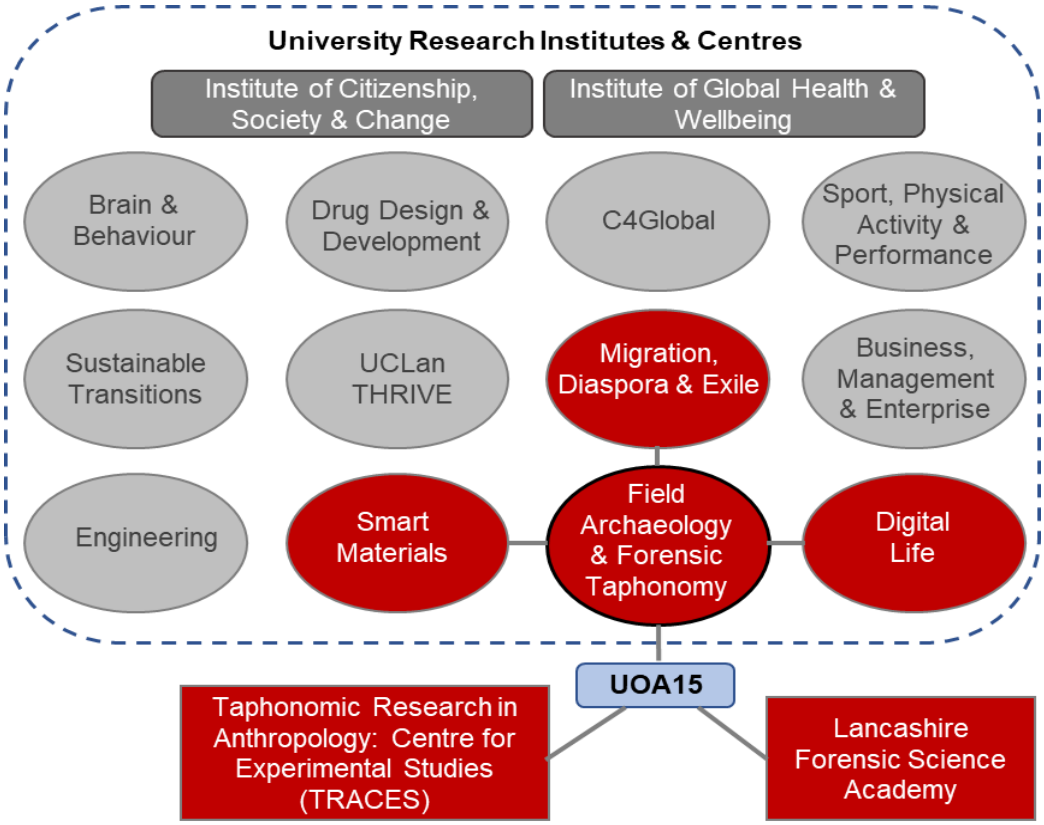

Figure 1. Schematic illustration of UoA15 at University of Central Lancashire in relation to the other institutes and centres, showing the interconnectivity of our research within the wider University research network

2. A second aim has been to **expand collaborative and interdisciplinary research**. All our staff are experienced research leaders directing a range of excavation projects and we all invite interdisciplinary research collaborations. Our high research profile has attracted a number of international academic partners including The Wellcome Sanger Institute, Max Planck Institute for the Science of Human History, Harvard University, Copenhagen University, University of California, Santa Barbara, Australia National University, Flinders University, Institute for Field Research. Museum collaboration involves the National Museum of Scotland, British Museum, Santa Barbara Museum of Natural History, Ribchester Roman Museum and commercial units and national heritage organisations such as the Museum of London Archaeology, Oxford Archaeology, Historic England and Cadw. This is not an exhaustive list but indicative of the depth and breadth of institutions with which we work. In REF2014 we specifically highlighted potential research cross-overs with chemistry within our institution. These have been realised in a number of interdisciplinary research projects led by archaeology with associated outputs and income for both subjects (see below). In addition to this we have also forged significant research links with computing particularly relating to the creation of Virtual Reality Systems. This has led to both methodological gains but also interpretative advances at archaeological sites. Again, these connections have been realised through external grant capture and publication and has meant that colleagues in other disciplines are able to increase their own research profile through collaborating with archaeology. Our strategy has also enabled us to gain access to data held by others (e.g., commercial archaeological excavation companies) which have fed into our research projects.

3. As part of an entrepreneurial university we are fully committed to **engaging non-academic partners in the co-production of research**. We have a broad commitment to enhancing participatory work with the public and other non-academic users embedding it in all our research activities. Alongside a robust and innovative research project design public engagement is one of the cornerstones of our research and underpinned by the mission statement of the Research Centre. This means that all of our research excavations have public engagement elements built into them alongside bespoke, project-specific impact activities. This means that we have **multiple pathways to impact**, thus offering many ways of benefitting people outside of academia. As promised in our REF2014 submission for this REF period considerable effort in public engagement would be focussed on the Ribchester Project. Indeed, this project has played a pivotal role in one of our Impact Case Studies.

In addition to this we have significantly supported specific projects in order to develop these into Impact Case Studies. They represent our two different approaches to impact, but highlight the unit's strengths. The first, led by an individual (Robinson), was developed prior to this REF cycle and has been fully supported throughout this REF period. Robinson focussed on exploring a hitherto 'blank' archaeological landscape in south-central California, revealing multiple sites. He involved the Tejon, a Native American group who originally occupied this landscape, in exploring their own history and framing their future development. His research programme has been fundamental to this newly-recognised Native Federal tribe by providing knowledge of, and access to, their own sacred spaces in the landscape. This has been both in person, but also via the co-production of virtual reality environments for those unable to visit the sites on the ground. The project has reintroduced skills to the group as well as enabling changes in practices in the management of their cultural resources. The second Impact Case Study was developed by the rest of the team, once again drawing on our collective strength as a group of researchers where primary data collection via field archaeology is the primary investigatory tool. All of the research excavations explored in this Impact Case Study involved participatory work with the public. The key achievements of this impact work have been the co-production of new narratives for North-West England and North Wales involving a range of non-academic collaborators. People in the region have felt empowered to be involved in researching the history of the area in which they live. We have also built capacity in the regions where we have worked, especially targeting areas of deprivation. This ties into our commitment as a widening participation university. In addition, this work has also involved innovation in training and field methods as well as affecting national policy. Together, both Impact Case Studies tie into our underpinning ethos that participatory work with the public and wider societal impact is fundamental to all our research.

Future strategic research aims and goals

1. To **strengthen and expand our leadership of large research projects** we will utilise the support and infrastructure provided by the *UCLan Research Centre for Field Archaeology and Forensic Taphonomy*. As the defining and unique aspect of this unit we will continue to explore our research questions via applied field archaeology, involving national and international projects and collaborative teams. We plan to build on existing collaborations within Britain, Europe, America and Australia. Alongside this we will continue to develop the careers of a range of colleagues including those about to achieve a PhD or Research Assistants. Thus, our support and development of early career researchers will utilise these collaborative opportunities sustainably allowing us to enlarge our networks and influence.

2. Our intensive work as field archaeologists positions us to build greater depths of interdisciplinary research with existing collaborative disciplines, notably chemistry and computing. However, we are now also able to **broaden our interdisciplinary research** to include forensic science. This strategy partly relates to the location of archaeology in this institution within the School of Forensic and Applied Sciences. However, this aim is also strategic because forensic science continues to grow in both profile and research output. Indeed, the institution is a sector leader in forensic science and by co-creating research we can further build the footprint of archaeology through links with a larger and as yet untapped source of research and income generation. UCLan's multi-million-pound investment in Lancashire Forensic Science Academy (a joint venture with Lancashire Constabulary) is of considerable strategic importance. It will be further facilitated by the utilisation of our 13-acre taphonomy research site (TRACES) near Burnley. Here we are able to conduct taphonomy research into a range of post-depositional processes relevant to both archaeology and forensic science.

3. Building on our existing strengths in the delivery of participatory work with the public and other non-academic users via our field projects in the next REF period we will expand this both spatially and demographically. Leading on from growing our links with forensic science, there is considerable scope for the **growing impact of incorporating archaeology and taphonomy**. Here we have the chance to show the wider applicability of archaeological techniques beyond the discipline while growing and strengthening our interdisciplinary links. This has already been partially realised via our new appointment (Jennifer Jones) as we grow expertise in biomolecular archaeology. Moreover, we will be able to develop links with colleagues already involved in the international recovery of human remains including the retrieval of DNA. This will involve new stakeholders as well as new pathways to impact. The Centre will be key in enabling this interdisciplinary work through the creation of long-term planning and investment in this area.

2. People

Staffing strategy

Our staffing strategy has been to grow and enhance our areas of expertise while supporting the strategic aims stated above. Since the last REF the departure of Tal Simmons (who moved to Virginia Commonwealth University) enabled us to take a fresh look at our staffing profile and Randolph-Quinney was appointed in 2015 to bring in critical expertise in taphonomy. Likewise, post-REF2014 to strengthen our commitment to enhancing participatory work with the public and other non-academic users we appointed Griffiths at ECR level whose research profile articulated well with our commitment to public participatory work. Upon Griffiths' departure just prior to the census date we wrote our future strategic research aims and goals with one of the most important priorities being to broaden interdisciplinary research. As a result, we brought in Jones as an archaeological scientist who had the skills and experience to facilitate and grow this area.

Existing staff have also been promoted to more senior positions. Within the REF2014 period we were without Professors but had two Readers. The unit now has two Professors (Cummings, Sayer) and three Readers (Peterson, Randolph-Quinney, Robinson) demonstrating that archaeology at UCLan is now a maturing subject area. Moreover, our research expertise is utilised more widely by the University. Cummings is now research lead for the School, and Sayer leads our Research Centre and chairs the University's Business, Arts, Humanities and Social Sciences

Ethics Committee. We have also been able to recruit fixed-term and post-docs staff to support our research for the first time. Griffiths was initially appointed on a fixed-term contract but was subsequently made permanent. Upon her departure the University replaced her immediately but with a permanent role from the outset (Jones). In this REF cycle we also appointed a lecturer for 2 years, Rachel Askew, to cover staff on sabbatical. Supported by an AHRC grant we appointed Eleni Kotoula as a Research Assistant for a year. Kotoula has gone onto become the Lead Digital Research Facilitator at the University of Edinburgh. We have also had a research assistant working in archaeology on a 0.2 contract for three years (Viki le Quelenec). The achievements of these staff demonstrate the quality of our researchers as research leaders as well as the commitment of the University to supporting the subject area. Moreover, the investment in short-term contracts has given valuable support to more senior members of the team to enhance and develop their research, their careers and to grow the department.

In relation to equality and diversity, of our permanent staff members the proportion of women is 29%. At a senior level one of our two professors is female although there are currently no Black, Asian or ethnic minority academic staff members within this UoA. There has been strong support in relation to career progression for female staff members via the appraisal system and the provision of training opportunities. Our female Professor (Cummings) is both the UoA lead and School research lead, showing women leading within this Institution. UCLan achieved the Athena Swan Bronze award in March 2020.

Research staff management

The University operates a workload model system to ensure that colleagues have dedicated research time. New members of staff have lighter teaching and administrative loads, again implemented via the workload model. This means they have the opportunity to develop or expand a research profile at the start of their career. Formal appraisals are held once a year, with an interim appraisal at the six-month point and a biannual research one-to-one with the School Lead for Research. We have also implemented an informal research appraisal where the UoA co-ordinator meets with all staff twice a year to discuss their research and make short, medium and long-term plans. This was implemented at the start of this REF cycle and has been instrumental in guiding and forming this REF submission. Strong research leadership at subject level, School level and University level has been critical for the growth and success of the unit. Progress on REF is discussed at monthly team meetings in a transparent and inclusive manner. University sabbaticals have supported staff and a number of colleagues have benefitted in this REF cycle: Cummings (2015), Peterson (2017) and Sayer (2018). Other colleagues have had light workloads in one semester to provide them with quality time for research (Morris). Early Career Researchers are part of a mentoring programme with university training and development support to give their careers strong and well-directed trajectories.

To build and develop their research profiles, the School offers funding to support staff presenting their research at conferences both nationally and internationally. All colleagues, including ECRs, have benefitted by attending international conferences where they can develop their networks and seek opportunities for collaboration. There are dedicated internal funding streams for Early Career Researchers and for colleagues seeking to start new research projects. This is offered at School level, Faculty level and within the University more widely. Again, all staff submitted here have benefitted from this funding stream. All staff have a dedicated Academic Lead with whom they work closely to ensure wellbeing and support for personal circumstances. The University promotes flexible working to enable colleagues to work from home if needed. The School research lead along with other key researchers have had unconscious bias training, and two members of the archaeology team have been critically important in the development and operation of the University's approach to research ethics.

The selection of outputs considered for submission to the REF go through a specific process. One-to-one conversations with colleagues discuss the potential grading of outputs. Staff put forward publications for consideration by the internal REF subject panel which consists of key research leaders. Initially it is this internal REF panel who review outputs and agree an internal rating. Publications are then sent for external peer-review for further calibration. To ensure fairness and transparency in the REF process a centrally-run review process agrees a final internal grading for

all research outputs. All colleagues that have submitted potential REF outputs are given one-to-one feedback.

Support and training of PGRs

We have had a vibrant and dynamic cohort of PGR students in archaeology over the REF period. All our PGRs have attended and spoken at conferences and one PGR Rob Leedham, organised the Neolithic and Early Bronze Age Research Student Symposium in 2017. PGRs actively engage with community groups as part of our outreach and public engagement ethos which serves to boost their career skills and to give them confidence both in public speaking and in their research. The group is small enough to share the same office space but this creates cohesiveness, knowledge sharing and a strong community. Depending on their experience PGRs also undertake paid seminar duties which, once again enhances their professional competencies. This has its benefits when they also take these skills onto digs where they supervise teams of undergraduates and volunteers. Supervisory teams comprise supervisors with multiple completions working alongside less-experienced staff who can then gain greater practice and knowledge. We have benefitted from two AHRC-funded studentships as part of a collaborative Doctoral Training project run in collaboration with Oxford Archaeology North (OAN). These two doctoral students have conducted research on material excavated via a commercial archaeology project run by OAN. Staff from OAN are on UCLan student supervisory panels and benefit by becoming co-creators of new research knowledge as well as developing their own research and supervisory skills. Both of these studentships ran in this REF cycle but will obtain their PhDs next REF cycle. The institution funded two PhD scholarships as part of the strategy to grow our research and ECR capacity. In total we have 6.75 successful completions this REF cycle but with as many again achieving their doctorates this year just outside the census period.

A robust system supports our PGR students. The process is overseen by the Graduate Research School who run a week-long, centralised training sessions for all new PGR students which provide essential induction elements, networking and sessions on project managing the thesis. Within the School we have Research Degree Tutors (RDTs) who oversee PGR within the School and have subject-specific knowledge. Subject-specific development is imparted on a one-to-one basis for specific training and instruction on techniques, tools, instruments and methods. PGRs may also attend any modules or lectures and events for masters' students. Annually, the department organises a day-long careers event where PGRs and invited research graduates attend for the experience and also to impart knowledge as guest speakers alongside other professionals from non-university career destinations. Thesis progress is supportively managed to ensure a programme of original work, publication possibilities and timely completion. Alongside regular meetings with the Director of Studies, students must also meet with the RDT to check on their progress. There are also assessed milestones, including annual progressions, and a transfer report from MPhil to PhD which includes a viva. The University has an annual postgraduate conference and runs events such as the Three Minute Thesis which the unit wholeheartedly supports as another means to enhance confidence in public speaking and outreach proficiency.

3. Income, infrastructure and facilities

Income

Considerable emphasis was placed on securing a diverse range of external research funding in this REF cycle as we looked to complement RCUK funding with other sources of income to support our ambitions. We encouraged senior staff to lead on applications and for less experienced colleagues to be named on joint applications. This allowed these colleagues to gain valuable experience of the process of submitting grants before leading on them themselves. As a result of this strategy, we secured several significant grants including an AHRC grant of £190,916 awarded to Robinson for his work in California, an AHRC collaborative Doctoral Award of £137,296 awarded to Peterson for the project *Settling Down on the Solway Plain* and £98,320 awarded to Cummings by the British Academy for a Mid-Career Fellowship. We have also secured research funding from collaborations with the Australia National University and the Institute for Field Research totalling £116,729. Smaller pots of funding from the British Academy, AHRC, Royal Archaeological Institute,

Historic England, Cadw, Orkney Island Council and ORCA have also been obtained. In total our research grant capture in this REF period is £735,836. We have also benefitted from £109,548 income in kind notably from the Diamond Light Source facility to analyse Anglo-Saxon brooches.

Infrastructure

The UCLan *Research Centre for Field Archaeology and Forensic Taphonomy* provides financial investment and peer review for the support of our research. The University has also provided funding throughout the REF cycle to assist with the development of impact. This includes supporting an open access policy with a number of our publications, not submitted as part of this exercise, being funded to gold-level access. One of our monographs has been published as open access as part of the University's commitment to go above and beyond open-access baseline requirements. The School's Research Committee ensures a robust culture of research integrity and provides funding to support new research projects.

Research Services is the central unit supporting all our research activities. It is comprised of the Grants and Funding Unit, to support the application stage including Full Economic Costing and the development of proposals; the Research Governance Unit which manages and oversees ethics processes; the Scholarly Communications Unit assisting in the management of data, open access, and CloK research output repository. The University also has a well-resourced public-engagement team which delivers the highly successful Lancashire Science Festival, attracting around 12,000 visitors each year where Archaeology always provides a strong showing.

Facilities

We have an excellent and diverse range of labs and research collections which enable and facilitate our research needs. This includes our dedicated archaeology imaging lab with a bespoke computer visualization suite and Faxitron digital X-ray, a Leica CLS100x digital microscope, a NextEngine Ultra HD desktop 3d scanner, a Faro Focus laser scanner, two Oculus Rift virtual reality headsets and dedicated high specification desktop and laptop PCs. The imaging suite computers also host specialist software. We have a dedicated research lab for the use of PGRs and staff which was refurbished at a cost of £38,598. This works alongside our undergraduate research laboratory which houses an extensive collection of archaeological reference material. The reference collection also includes animal skeletal remains, stone tools and replica ceramics. In addition, there is a dedicated physical anthropology laboratory with a large reference collection of human skeletal remains. Archiving and post-excavation support for our field research is provided by a secure finds storeroom and an external store for tools and environmental archaeology processing equipment. We also own a 13-acre taphonomic research site (TRACES) near Burnley where we conduct taphonomy research into a range of post-depositional processes relevant to both archaeology and forensic science. This facility has a large indoor storage area and work space, ideal for experimental set-up, along with an extensive range of experimental equipment and machinery to help us in the field, such as a tractor, trailer and excavator.

There is a full suite of geophysical and topographic survey equipment available for the team to use. This includes two Bartington Grad 601-2 fluxgate gradiometers, Geoscan RM15D and RM-65 resistivity meters with a multiplexer, a Bartington magnetic susceptibility meter, and a Groundvue 3 Trivue Ground Penetrating Radar antenna. Archaeology has three dedicated total stations: a Leica GS12/TS12 GPS system and two Leica Builder 409s. We also have access in the summer months to a large stock of Leica total stations held centrally by Learning and Information Services (LIS) within the University. In a similar manner we are able to augment our own dedicated collection of laptops, tablets and digital cameras through long-term loans from central LIS stocks. This has the advantage that equipment is centrally maintained and managed. As part of the Faculty of Science and Technology we can access a range of analytical equipment to enable the scientific analyses of archaeological material. This includes pXRF, ICP-MS and Raman spectroscopy. These have enabled interdisciplinary research, particularly involving chemistry which has been utilised by our research students. Environmental archaeology teaching can use a soils lab with two wet sieving tanks and the University's 330 m^2 analytical suite in the JB Firth building.

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

Collaborations

We are growing and strengthening our external collaborations. In relation to excavations and field projects we have a long-term collaboration with Australia National University (ANU), the Institute for Field Research (IFR) and the Ribchester Roman Museum. The latter collaboration involves the co-creation of knowledge via the excavation of Ribchester Roman Fort but also expands into wider connections including innovative pedagogic activity with ANU students, local schools and community groups. Work on Middle Stone Age landscapes has been run in collaboration with University of the Witwatersrand and the University of Liverpool alongside strong connections with the Smithsonian. Excavations at Whitewell and the Ribble Valley have been run in collaboration with Forest of Bowland Area of Outstanding Natural Beauty and Vanderbilt University. A project in Orkney was run in association with the University of Manchester, the University of the Highlands and Islands and the National Museum of Scotland. Finally, the Bryn Celli Ddu project had long-term links with Manchester Metropolitan University as well as Cadw and these connections are explored in more detail in one of our Impact Case Studies. Wider research collaborations in this REF cycle involve the Welcome Sanger Institute, Max Planck Institute for the Science of Human History, University of Huddersfield, University of Cardiff and Harvard University. Harvard are investigating the ancient DNA which were part of our excavations and sampling. Further collaborations have also involved the UK's national synchrotron Diamond Light Source which has enabled us to study artefacts in detail. We also have long-standing connections with California State University, the Channel Islands and the University of Strathclyde as part of Robinson's research network. Critical to his research and one of our Impact Case Studies are our collaborations with the Wind Wolves Preserve. This is also detailed in one of the Impact Case Studies.

We have established firm research links with Oxford Archaeology North (OAN) receiving AHRC funding in the support of two collaborative doctorates. The research students were investigating new material excavated via a commercial archaeology project run by OAN. As detailed above, staff at OAN are on the student supervisory panels co-creating new research and developing their own skills as professional researchers. Mentoring and supporting these OAN colleagues equates to more impact and increased potential for future collaborative projects. In 2020 OAN involved UCLan staff and students in an ongoing commercial excavation just outside Preston. This was organised in this census period but took place in the following month and we will be building on this in the next REF period.

Robinson was President of the Anthropology and Archaeology section of the British Science Association and Randolph-Quinney holds a Senior Research Fellowship at the University of Johannesburg. We have multiple formal PGR collaborations and co-operations in place, and in other instances there are informal arrangements that help to spread experience and networking opportunities. These collaborations have involved the California State University Bakersfield, California State University Northridge, University of California, Santa Barbara, University of Cambridge, University of Cardiff and University of the Witwatersrand.

Internally we have strong and established collaborations with chemistry and computing. Junior colleagues in these areas have been brought on board by our more senior researchers and this has led to high quality research on the chemical analysis of metalwork, rock art, organic materials, flint and the trace element analysis of soils, usually tied to our research excavations. These collaborations will form parts of the excavation reports on these sites and will form future publications. Our links with computing relate help in the development of Virtual Reality Systems and visualisation, specifically in relation to Robinson's ongoing research. The impact from this collegiality has formed a key strand Robinson Impact Case Study.

Economic and social base

Our Impact Case Studies demonstrate that we excel at involving a wide range of people and non-academic partners in the co-production of knowledge, reflecting our ethos and strategy. This chart indicates multiple pathways to impact across all our excavation projects including site visits and public participation in our research excavations. It illustrates that people are increasingly engaging

with our research in this REF period. Moreover, we have realised more active kinds of engagement as the projects progressed, with people becoming actively engaged in the process of research. This aspect of our research is further explored in particular in one of the Impact Case Studies.

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Public participation in research and training	4	42	46	60	76	74
Attendance at site visits and events	35	330	3963	7309	9392	10211
Attendance at public lectures	91	98	120	170	260	331
On-line interactions	3867	4921	2674	3017	3420	2667
School & youth group learning on site		135	250	834	863	67
Museum exhibition attendance					500	3000

Please note that work was planned for 2019-20 but was unable to take place because of the COVID-19 pandemic.

In addition to this we have had a stand at the Lancashire Science Festival every year in this REF cycle. This has included stands on our collaborative research with OAN, the excavations at Ribchester (the Ribchester Revisited Project) and the Building the Great Dolmens project.

We have benefitted from a high level of media coverage and interest. One of our key public engagement projects is the Ribchester dig featured on BBC's *Digging for Britain* twice in 2015 and 2016 as well as BBC *North-West Tonight* and on BBC Radio Lancashire annually. Randolph-Quinney is part of an international team of researchers who discovered the most ancient evidence for cancer and bony tumors yet described in the human fossil record from two cave sites in South Africa. This was covered by *National Geographic Magazine* amongst others. New discoveries on Orkney garnered considerable media interest and included an article in the *New York Times*. The project at Bryn Celli Ddu has received varied and sustained media coverage including BBC Wales, ITV Wales, S4C, *Mysterious Britain*, Radio Wales and Radio Cymru. The dig at Whitewell featured on *River Walks* on BBC1. Our research has also featured in debates relating to modern challenges and controversy. *The Conversation* has included articles on Randolph-Quinney's research on cancer, Morris's article on the planning application process at the Rose Theatre and Sayer's article on ancient DNA and Anglo-Saxon identity. The latter in particular fuelled vigorous debate in society more widely as issues of identity have arisen in the light of Brexit resulting in a storm of comments.

Contribution to the research base

Archaeology staff have presented keynote presentations both nationally and internationally. These keynote addresses include Bauhaus-Universität Weimar, Australian National University, University of Amsterdam, British Science Festival in Hull and the Society for Medieval Archaeology Annual Conference in Durham. In addition, the archaeology team have been invited to present their research internationally at a variety of locations including Tübingen University, Hamburg University, Kiel University, Stockholm University, Rutgers University, University College Cork, University of Rabat, University of Toulouse and Michigan State University. Nationally staff have spoken at the universities of Cambridge, Oxford, York, Leicester, Nottingham, UCL, Manchester, Chester and Cardiff as well as the Natural History Museum and the Royal Archaeological Society. Sayer held a visiting professorship at Australia National University in 2017. We have also been invited to speak at the following conferences: EAA, SAA, Society for California Archaeology, American Rock Art Association, Royal Anthropological Institute Festival Conference and the Hay Literature Festival.

We have also organised a number of high-profile conferences within the University, inviting international delegates to contribute. Of particular note was the Taphos-Nomos conference in 2018 which attracted several hundred delegates and hosted papers on archaeology, palaeontology and forensic science. Another high-profile event was the Ritual, Religion and Magic, Death, Dying and Disposal conference held in 2017. We also hosted the Being Medieval, the Society for Medieval

Archaeology annual conference and the Archaeology, Encountering the Corpse, ESRC funded workshop, both in 2015.

Peer review and editorial boards

Archaeology staff are on the editorial advisory boards for Cambridge Archaeological Journal, The Proceedings of the Royal Irish Academy, Quaternary Palaeoecology, Proceedings of the Society of Antiquaries of Scotland and the European Journal of Ecology. This illustrates how our expertise has a broader influence on the direction of Archaeological research. In addition, the Social Archaeology and Material Worlds book series with Manchester University Press has been developed, edited by Sayer alongside other colleagues. We have been involved in reviewing other grant applications, specifically: AHRC Standard Grants, British Academy Visiting Fellows, Natural Environment Research Council, National Science Centre Poland, OPUS Funding Scheme, French National Research Agency (ANR), Netherlands Organization for Scientific Research, National University of Ireland, Engineering and Physical Sciences Research Council, Prehistoric Society and the National Science Foundation, South Africa (NRF).

As a team we have refereed papers for: *World Archaeology*, *Antiquity*, *American Antiquity*, *Cambridge Archaeology Journal*, *Journal of Archaeological Science*, *Archaeological Journal*, *Environmental Archaeology*, *PLoS ONE*, *International Journal of Osteoarchaeology*, *The Antiquaries Journal*, *International Journal of Palaeopathology*, *Proceedings of the Prehistoric Society*, *Proceedings of the Society of Antiquaries of Scotland*, *AP: Online Journal in Public Archaeology*, *Early Medieval Europe*, *European Journal of Archaeology*, *Journal of Social Archaeology*, *Journal of the Royal Anthropological Society*, *Quaternary International*, *Radiocarbon*, *Internet Archaeology*, *Journal of Archaeological Method and Theory*, *Journal of California Archaeology*, *Journal of Anthropological Archaeology*, *Journal of Material Culture*, *Norwegian Archaeological Review*, *Archaeological Research in Asia*, *American Journal of Physical Anthropology*; *Quaternary International*; *Journal of Human Evolution*; *Journal of Anatomy*; *Journal of Forensic Sciences*; *Forensic Science International*; *Science and Justice*; *Medicine*, *Science and the Law*; *HOMO* and *Medical Humanities*. In addition to this we have been asked to review book proposals by Routledge, Oxford University Press and University for Colorado Press. This demonstrates that our research is recognised internationally and that we are sought as reviewers of new research work.