

Institution: University College London (UCL)

Unit of Assessment: 15 (Archaeology)

1. Unit context and structure, research and impact strategy

a. Overview.

Since REF 2014 the UCL Institute of Archaeology (**IoA**) has strengthened its outstanding research environment through investment in both facilities and people. We see archaeology as an internationally inclusive endeavour and undertake research in every continent of the world except Antarctica. We have developed our infrastructure to support high quality collaborative research projects, appointed a number of early career staff, and expanded the scope of our expertise. Our institutional level research networks, three organisational sections, extensive collections, and well-equipped laboratories, enable the IoA to engage with world-wide heritage and archaeology practitioners, and to exemplify the UCL mission of integrating education, research, and impact that is global in scope.

Our research includes archaeological fieldwork, laboratory analysis, scholarly synthesis, and the study of heritage stakeholders and audiences, approached from an exceptionally diverse range of theoretical and methodological perspectives. We have an extensive network of external partners in the UK and overseas (Fig. 1); we have 15 active research projects in the Americas, 20 in Africa, 44 in Asia and the Middle East, three in Australasia and the Pacific, 47 in Britain and Ireland, and 27 in mainland Europe. Our published outputs (2014-2020) reflect this scale, with IoA staff having authored or edited 100 books, including journal special issues, 1104 journal articles, and 429 book chapters and proceedings papers (plus a large number of commissioned professional reports and digital resources such as datasets). We aim: to be internationally pre-eminent in the study, and comparative analysis, of world archaeology; to be at the forefront of international research in archaeological sciences; and to develop theory, method and practice in the study and management of cultural heritage in its social, political and economic contexts.

UCL Institute of Archaeology International Collaborations 2013-20

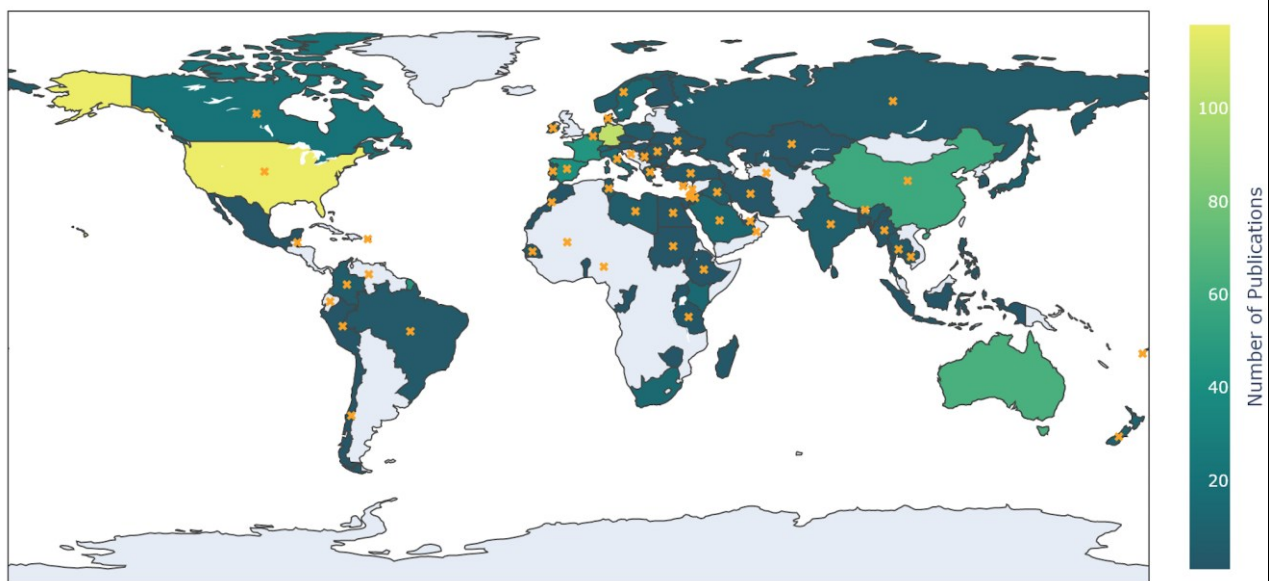


Fig. 1 Global reach of IoA research collaboration. Shading = number of journal articles featuring a co-author from that country during the current REF period; orange crosses = countries where IoA was involved in a collaborative project in 2020.

b. Unit structure.

The IoA forms part of the Faculty of Social & Historical Sciences. Administratively we are organized in three Sections (Archaeological Sciences, Heritage Studies, and World Archaeology), with Section leaders who sit on the Institute's Senior Management Team (SMT). We house four research centres, which coordinate and provide support to research activities as indicated: the Centre for Applied Archaeology (CAA), Centre for Critical Heritage Studies (CCHS), International Centre for Chinese Heritage and Archaeology (ICCHA) and International Centre for Silk Roads Archaeology and Heritage (ICSRAH). In addition, we operate a system of formal research networks (currently thirteen) involving staff and external partners, which underpin research collaborations on focused themes and report annually to our Research Committee.

The Institute building on Gordon Square houses 77 research and teaching staff. It is home to our centres, labs and core collections, and has dedicated teaching/meeting and exhibition spaces. It hosts grant-funded staff projects and their teams, and welcomes visiting and honorary staff who enrich the research environment. The Institute organises numerous seminars, conferences and training events each year (with 6-8 afternoon/evening lectures and weekend meetings in a typical week in term-time). It is a vibrant intellectual space, and a hub in London and the wider UK for research dissemination, training, and professional co-ordination in archaeology.

Archaeology South-East (**ASE**) is our commercial arm and undertakes ~£5M worth of archaeology in London and Southeast England each year. It is wholly owned by UCL and ranks among the largest and longest established archaeological service units in the UK. It has 85 core members of staff and a similar number of fixed-term field archaeologists, with three offices in Essex, East Sussex and London. Its numerous field projects and engagement with stakeholders and developers provide employment opportunities for UCL graduates, student placement and apprenticeship opportunities and potential datasets for research. ASE contributes 5% of its annual turnover to the IoA; its Director (Perring) sits on the IoA SMT, its staff publish monographs and articles in peer-reviewed journals, and it is engaged internationally, for example through its survey of wall paintings in Shanxi Province, China.

In 2011, UCL opened a campus in Doha, Qatar, with an emphasis on heritage, archaeology and conservation and, although administratively separate from the IoA, synergies were strong. In its 2015 Global Engagement Strategy, UCL decided to close its three overseas campuses. However, Rehren, who had been seconded as the Director of UCL Qatar, returned to the IoA. Research in the Middle East and North Africa at a university level is now sustained through our membership of the Middle East Research Centre, under the UCL Institute of Advanced Studies.

Integration within UCL. The Institute collaborates with many other Departments and Centres. We share lab space and facilities with Geography, Genetics, and Forensic Science and have active research collaborations with Digital Humanities, Slade School of Art, and Anthropology. We participate in UCL's rich interdisciplinary networks and programmes; our own CCHS is an inter-faculty initiative linked to the Institute for Advanced Studies, and with Anthropology, Geography and History we are co-founders of the new UCL Anthropocene initiative. Our CCHS small grants

scheme provides seed funding for projects, networking activities and events across the whole of UCL: this constitutes 25 awards, totalling £50k, in the REF period and represents a significant source of funding for PhD and postdoctoral researchers. Our materials analysis laboratories provide facilities for researchers from across the university (e.g. Engineering, Medical Physics, Earth Sciences, Chemistry, Surgery). We have benefited regularly from competitive awards from central and faculty-level strategic funds for our research facilities (£1.19M during the REF period), for publication, for priming new research projects, and for organizing events. Our research activity is facilitated not just by our own 21 professional and technical staff, but also by highly experienced research facilitators in the UCL European office, in UCL Libraries, in UCL Culture (museums and collections), in our Faculty, and the Office of the Vice Provost (Research).

c. Research strategy

Overview: thematic and regional priority areas.

IoA research strengths are focused on nine major research themes, pursued collaboratively on a global scale (Fig. 1). An individual researcher may work within more than one theme and collaborations between staff can result in cross-thematic approaches. We make major contributions to all of these themes and strive to be among the agenda-setters in these areas.

Human Evolution includes primate archaeology (**Proffitt**), world-leading research on early stone tools and on early modern human occupation (**Shipton**), the evolution of hunter-gatherer sociality and cognition (**Wengrow, Shipton**), and work on world-renowned sites and assemblages in Pleistocene Europe (**Parfitt, Pope, Roberts, Stevens**), West Asia (**Garrard**) and the Americas (**Arroyo-Kalin**); this research theme is supported by a small lithics laboratory and a recently established archaeological stable isotope laboratory, as well as by collaborations with the Natural History Museum. Two ERC grants have supported research in this area.

Domestication, Niche Construction and Agricultural Transformations includes sub-themes on the domestication of animals and plants (**Fuller, Martin**), human demography and migration (**Shennan, Steele**), and environmental transformations and sustainability (**Fuller, Arroyo-Kalin**). Archaeological science research includes archaeobotany (**Fuller**), zooarchaeology (**Martin**), and geoarchaeology (**Macphail, Arroyo-Kalin, Zhuang**), each with dedicated laboratories and extensive reference collections. The recently established isotope laboratory and upgraded Scanning Electron Microscope have expanded our analytical capacity and helped maintain their world class status (**Stevens**). Active field research projects are being undertaken in China (**Fuller, Zhuang**), Southeast Asia, South Asia (**Fuller**), Western Asia (**Martin, Wright**), Europe (**Sommer**), Western and Eastern Africa (**MacDonald, Reid**), North America (**MacDonald**), Central and South America (**Arroyo-Kalin**), while laboratory research has included methodological developments and large-scale database construction, analysis and synthesis. We have had three ERC grants in this area, as well as recent support from NERC, AHRC and the Leverhulme Trust.

Environmental Change, Sustainability and Cultural Adaptation is a broad theme with which many research projects engage, using our dedicated dendrochronological, geoarchaeological, soil micromorphological, and GIS and spatial computing laboratories. It involves work on coastlines, hydrological systems, salinization, and anthropogenic soils, and addresses past and current concerns about environmental fragility, resilience, risk perception, land-use and the origins of anthropogenic climate change (**Arroyo-Kalin, Bevan, Bridge, Fuller, Graham, Macphail,**

Schadla-Hall). It includes our research defining an “Anthropocene” and its implications for sustainability science, heritage, museums, and the environmental humanities (**Harrison**). We are researching these issues in the UK, the Americas, China, India, the Mediterranean, and the Pacific. Support has come from the AHRC, British Academy, and Leverhulme grants.

Material Culture, Technology and Exchange carries research beyond artefact typology to technology and the practices of production, and uses our Wolfson Archaeological Science Laboratories for materials analysis of lithics (**Quinn, Wright**), metals (**Charlton, Radivojevic, Rehren**), glass (**Freestone, Rehren**), ceramics and other artificial materials (**Freestone, Quinn, Sillar, Sparks, Whitelaw**), as well as imaging of organic remains (environmental, artefactual, and for conservation treatments). There is a developing strength around the interface between materials analysis and conservation science (**Freestone, O’Grady, Peters, Sully**). Work has focused widely from China and Central Asia to West Asia, sub-Saharan Africa, Europe and South America. This thematic cluster has trained large numbers of PhD students, and has hosted 10 Marie Curie-Skłodowska postdoctoral researchers over the past five years (e.g. **Dikomitou-Eliadou, Gandon, Mise, Sanchez-Ramos**), and others funded from other sources. We have particular strengths on Silk Roads (overland and maritime routes connecting East Asia and Southeast Asia with South Asia, Persia, the Arabian Peninsula, East Africa and Southern Europe) and Mediterranean regional archaeologies, in which trade processes were central, as well as more limited research around the Indian Ocean. Our recently established ICSRAH (**Williams**) is linked to this theme.

Human Remains and Forensic Anthropology includes research on human skeletal remains, from the evolution of human dentition (**Hillson**), to the study of health and variation in past populations (**Hassett**), to the forensic application of these methods (**Rando**). This research area has trained large numbers of MSc and PhD students, some of whom go into professional crime scene forensic investigation, while others have researched past human populations and their health. Major funders have included the Wellcome Trust, AHRC and Leverhulme.

Civilization, Inequality and Political Organization are themes that emerge from our comparative approach to past cities, states and empires. Such research considers the rise, the organization and the collapse of complex societies, from the earliest civilizations in Mesopotamia (**Altaweel, Wengrow**), Egypt (**Bussman, Naeser, Quirke, Stevenson**), the Indus, China (**Fuller, Zhuang**), Africa (**MacDonald, Reid**), the Mediterranean (**Bevan, Fenwick, Riva, Whitelaw**) and the Americas (**Graham, Oliver, Sillar**) as well as later states and empires in these regions (**King**), Europe (**Gardner, Perring, Reynolds**) and Southeast Asia (**Shaw**). A major theme is how inequality emerged and how shifts in political organization are reflected in the material record. Our research in this area includes ancient languages (Egyptian) and manuscripts, and extends into the medieval period in Europe and Islamic period in the Mediterranean and Central Asia. This research has received support from ERC, AHRC and Leverhulme grants.

Ritual Practices, Organized Religion and Belief has two major thematic foci. One is concerned with integrated studies of the materiality and history of religions, including Buddhism, Hinduism, Islam, Christianity and syncretism, as well as the religions of classical Greece and Rome and Ancient Egypt and Nubia (**Bussman, Fenwick, Naeser, Quirke, Shaw, Tanner**). A key focus is how belief and faith structure the materiality of past societies: their landscapes, monuments, settlement and other material practices. Secondly, regarding construction and use of ritual and cosmological landscapes, we research many iconic ancient heritage landscapes (e.g. **Hamilton**,

Parker Pearson), including those of Stonehenge, Madagascar, Rapa Nui, the Terracotta Warriors of the Qin Emperor's mausoleum, and early Buddhist monuments of central India.

Critical Heritage and Museum Studies. We are world leaders in developing critical perspectives on the interpretation of cultural heritage, from prehistoric sites and art to standing monuments, industrial sites and the heritage of the Anthropocene (**Butler, Harrison, Moshenska, Moussouri, O'Grady, Peters, Sterling, Stevenson, Sully, Williams**). This strength is reflected in recent grant successes (e.g. AHRC Priority Area Heritage Fellowship, **Harrison**), and extends from the most ancient human past to the present and planning for the future, for example through Harrison's *Heritage Futures* project, which includes engagement in natural (seed banks, DNA banks) as well as cultural collections. This research uses our conservation laboratories, working with objects and standing buildings, and is engaged not just with the science of preservation but also the underlying ethics and philosophy of past and present cultural conservation. We have an active research network on the history of archaeology (**Moshenska**), including archival research into the IoA's own role in disciplinary history. We undertake research into the relationship between heritage, museums and the development of concepts of race and culture (**Harrison, King, Quirke, Stevenson**), and the implications of the disciplinary histories of these concepts in relation to contemporary racial and social inequalities. Our researchers curate exhibitions working with museums and other heritage institutions (e.g. the *Heritage Futures* exhibition at Manchester Museum, Stevenson and Quirke's work with the Petrie Museum, and *Reimaging Museums for Climate Action* currently in development with Glasgow Science Centre for COP26), in particular assisting their engagement with Sustainable Development Goals (**Harrison, Moussouri, Williams**). **Moussouri** undertakes world leading audience and practitioner research in museums and other institutional contexts, which has led to significant policy impacts in the UK and internationally.

Innovation in Archaeological Methods, Theory, Science and Applied Archaeology. All our research themes involve, to varying degrees, fieldwork, laboratory analysis and working with museum collections. We strive to use the latest methods and approaches, building on our scientific strengths. Our strength in computational methods and archaeological data science contributes to all research strands (**Altaweel, Bevan, Lake, Lockyear, Shennan, Steele**). Through ASE, the IoA is on the frontline of documenting, excavating, and preserving UK heritage to the highest international standards (**Perring**). Archaeological theory explicitly informs all other themes but also includes our world leading work on Darwinian approaches to material culture and archaeological traditions (**Shennan**); our work is also influential in the fields of art history and social theory (**Tanner**), sensory archaeology (**Hamilton**), and cultural memory and landscape (**Parker Pearson**).

COVID response. We continue to develop additional support for research adversely affected by Covid-19, including not only remote access to specialised data analysis software in the Wolfson and GIS labs, but also remote operation of the electron microscopes. Additionally, the UCL COVID-19 Career Support Scheme has mitigated some of the lost productivity caused by the pandemic, by alleviating personal pressures such as child-related expenses and providing one-off funding for up to 30 hours administrative support for staff in their work.

Research strategy 2021-2029.

Our priorities for the next period include: the realisation of our full strength in comparativism, particularly through strengthening our presence in Asia; to further develop our research facilities to enable further cross-disciplinary collaborations; to expand our activity in the field of heritage studies; and to address proactively the under-representation of BAME staff and students, and the gender imbalance at Professorial level.

Our ambitions in the field of Heritage are led by CCHS (directors: **Moussouri, Harrison**). CCHS operates as an inter-faculty research centre led by the IoA in partnership with the University of Gothenburg. It aims to lead the way in defining a new field of critical heritage studies which identifies and interprets evolving, multi-scalar forms of heritage and identity, and addresses issues of heritage justice. The School for the Creative and Cultural Industries at the new UCL East campus in Stratford, East London, will draw together research, learning, public engagement and enterprise to generate new skills and practices. It includes a conservation studio, exhibition space, and object learning studio and will have access to partnerships with the V&A and the Smithsonian Institution. There is planned recruitment of four new research-active staff in Archaeology which, with the new conservation and collections space, enables us further develop our vision in heritage.

We intend to strengthen our research in Asia through the activities of our research centres. ICCHA (director: **Fuller**), is an association between Peking University and the IoA, facilitating collaboration and exchange with researchers in China, providing a venue for conferences, regular seminars and supporting funding applications. Long-term projects include Imperial Logistics (**Bevan, Hamilton, Quinn, Rehren**) and the Early Rice Project (**Fuller**). ICSRAH (director: **Williams**) was recently established as a collaboration with Northwest University, Xian. It aims to undertake comparative research to explore the East-West movement of ideas across Asia, and the Southern and Maritime Silk Roads. The CAA (director: **Perring**) is also active in the region through the Shanxi Digitisation Project.

Following significant investment in both infrastructure and staff, we are looking to consolidate our facilities and build laboratory-based collaborations in archaeological materials science, environmental science and computing. We see further opportunities in developing inter-departmental and inter-institutional partnerships, especially relating to isotopic, biomolecular and forensic sciences and genetics. **Shennan** and Thomas (UCL Genetics) have obtained an ERC Synergy grant of ~€10M for the project "*From correlations to explanations: towards a new European prehistory (COREX)*", which will run for six years from May 2021. It is a collaboration with archaeologists from the University of Gothenburg and geneticists from the University of Copenhagen.

We have established new EDI structures to address BAME representation, and see the recruitment of four new IoA lecturers at UCL East as a key opportunity; we will work with UCL's Fair Recruitment Specialists to ensure that the positions are fully open to under-represented groups.

d. Impact strategy

Archaeology can attract an immediately positive response from the public and offers many approaches to engagement. We take advantage of these in our interactions with our audiences,

but our responsibility as a discipline is both broader and deeper. We need to ensure that heritage is properly understood, appropriately preserved and used to achieve socially positive outcomes and this requires a variety of pathways to impact. A diversity of approaches ensures that our research work has impact both in the UK and internationally, from policy development, advice and guidance, knowledge exchange through training heritage professionals, to engaging the public in active research programmes.

We have sought to increase our presence in the field of **cultural heritage policy** through our work with the Heritage Futures project, our AHRC Heritage Priority Area Leadership Fellowship and its associated Follow-on-Funding project (see impact case study [ICS] 'Heritage Futures'). We share our research in cultural heritage management, museum studies and the use of new digital media with cultural heritage professionals and policy makers internationally, via workshops, meetings and publications, including consultancy work (for example, ASE's 'Education Cultural & Creative Knowledge Alliance for Tomorrow's Entrepreneurs' [EDUCCKATE] project, and ICS 'Heritage Futures'). This enables us to support innovation and best practice in museum conservation and heritage, exhibition design and display (ICS 'BigPicnic'), and to improve the conservation and interpretation of archaeological sites open to the public. We publish guidance on best practice in impact-producing activity, including textbooks on public archaeology (Moshenska, ed., *Key Concepts in Public Archaeology*) and on museum learning (Moussouri, co-author, *Museum Learning*). In addition, we have engaged more widely and intensively with a broader set of online audiences by expanding our use of social media, including Twitter (@UCLarchaeology), Instagram (@uclarchaeology), and podcasts (<https://soundcloud.com/user-382553721>).

We provide specialist CPD scientific training for UK and overseas archaeologists and have authored market-leading archaeological textbooks and lab and field manuals (former and current IoA staff have authored seven of the Cambridge Manuals in Archaeology). The EDUCCKATE project sustained and enhanced our impact among **cultural heritage professionals and museum educators** by training 21 members of the academic staff of European universities who incorporated lessons learned from the project into taught degrees in the cultural and creative industries.

We apply our work on the theory and practice of community and development archaeology to benefit **local communities** in many areas of the world in which we conduct fieldwork, enhancing tourist experiences and increasing visitor numbers, raising awareness of cultural heritage, and informing local planning decisions. For example, we have developed our involvement in regional heritage policy and community engagement in the Middle East and East Asia through our work on the archaeology and heritage of the Silk Roads (ICS 'Silk Roads'). The advice and practice we provide in ASE's commercial activities are research-based and aligned with current standards. We aim to improve the integration of ASE and IoA research activities to sustain and consolidate good practice.

We are very conscious of our catchment in London and its environs and support amateur fieldwork in and around the city (e.g. **Moshenska's** Hendon project and **Lockyear's** work in Hertfordshire). We are committed to involving diaspora communities in the management and interpretation of transported elements of their cultural heritage (e.g. **Sully's** Hinemihi project), and we work with London schools whose pupils we introduce to archaeology in open days and community outreach projects (we led in instigating a now highly successful and well-established annual UK University Archaeology Day). To promote inclusion, we provide teachers and museum educators with

resources aimed at specific age and subject groups: for example, 'Building Bridges', the latest project from **Moussouri's** long lasting Science Museum collaboration engaged with underrepresented audiences (mainly from BAME and urban working class backgrounds) looking at issues of science capital and identity. More broadly, we have used our extensive existing programmes of community archaeology to expand local networks of amateur 'citizen scientists', including among those monitoring the archaeological impacts of coastal erosion (ICS 'CITIZAN') and helping to digitize museum collections (ICS 'Micropasts').

We disseminate primary research results in traditional broadcast and new digital media, and interpretation of larger processes of social, economic and environmental change on TV, radio and the internet (e.g. **Parker Pearson's** media work on Stonehenge); contribute to a range of national and international museum exhibitions; and disseminate our research in our Open Access journals and on our websites.

e. Research Ethics and Open Access

Research ethics in staff and students' work is covered by UCL and IoA policies on work with human subjects, on the illicit trade in antiquities, and on responsible and efficient practice in fieldwork and conservation (including the treatment of human remains). Research involving human subjects must be approved by UCL's Research Ethics Committee, and for more specialized matters, the IoA Ethics Committee. Staff and students are protected by, and subject to, UCL's policies on intellectual property rights (including copyright) and on Open Access archiving on UCL Discovery. Our researchers must also comply with UCL's 'Code of Conduct for Research', which stipulates (for example) fair expectations for co-authorship.

We strongly support the move to Open Access and took early advantage of the new open access series offered by UCL Press; our staff and honoraries have published 10 free-to-download volumes in this series since 2015. Ubiquity Press, an open-access publisher and UCL enterprise start-up co-founded by Institute PhD student Brian Hole, is a spin-off which maintains strong Institute ties. Its portfolio includes *Present Pasts*, a journal which during much of the REF period was produced by members of the Institute's Heritage Studies Section; *Journal of Conservation and Museum Studies* (editor-in-chief **O'Grady**); *Bulletin of the History of Archaeology* (editor-in-chief **Moshenska**); *Silk Roads Archaeology and Heritage* (**Williams**) and our in-house journal *Archaeology International* (**Stevenson**; recently moved to UCL Press). UCL Press also publishes *Papers from the Institute of Archaeology*, a peer-reviewed open access journal edited and produced by our postgraduate students. Meanwhile during the REF period we have uploaded 1,123 items to UCL Discovery, our institutional repository, with 205,455 downloads. Our research projects also generate open-archived datasets and software (e.g. the EUREVOL datasets on UCL Discovery, 18,884 downloads by users from 55 countries, and the rcarbon software package on GitHub). ASE out-of-print publications are freely available on-line, and ASE is strongly committed to maximising open access to its grey literature reports (see section 4c).

2. People

a. Staffing strategy and staff development

In terms of research activity, by the end of the REF period the IoA had 51 staff on academic (research and teaching) contracts, 15 research fellows (some on project grants and not Category

A-eligible), 118 PGRs, 15 professional services staff and six technical officers. In addition, there are two Category A-eligible staff on research fellowship contracts with ASE. Of the 51 on academic contracts (48.9 FTE), eight are Lecturers, 26 are Associate Professors/Readers, and 17 are full Professors.

Staff research. A workload scoring system quantifies teaching and administrative duties to ensure that Category A staff have protected research time. New members of academic staff have a designated mentor, and initially low teaching and administrative loads. They attend comprehensive UCL courses for new lecturers (leading to fellowship of the HEA) and are favoured in the allocation of Institute research and conference funds. Post-probation, formal staff appraisals take place every year; they include agreeing research objectives and identifying needs for research leave. The Institute encourages academic staff with well-defined research plans to apply for sabbatical leave on a one in seven (term or year) basis. In addition to the qualification period, research active academics returning from maternity, adoption, extended carer's, or long-term sickness leave are automatically entitled to one term of Returners Sabbatical Leave without teaching commitments. During the REF period 27 staff had sabbaticals of one term or more, and four staff obtained external funding that gave them full teaching relief for a year or more.

Each full-time permanent member of lecturing staff receives an annual Faculty research allocation of £1000. This can be used for research-related expenditure, conference participation or impact-related activities. Staff are strongly encouraged to develop their research through grant applications, supported by UCL's research facilitators. Workshops on grant application are held regularly, and details of schemes as well as examples of successful applications circulated. The Chair of Research Committee and the relevant Section Head critically review all grant applications before submission. Additionally, IoA internal funding since 2014 has supported 31 staff and 50 PGR projects, and 25 staff and 40 PGR conference presentations. This complements PGR funding available from UCL Doctoral School.

Staff development: training, progression/promotion. The Directorship of the IoA transferred from **Shennan** to **Hamilton** (now in a second term), who sits on the UCL Provost's Leadership Forum. The Institute strongly supports the aim of members of staff to achieve promotion. This is discussed in staff appraisals; each year the Institute's promotions committee looks at the complete list of academic staff, not simply those who have put themselves forward, identifying those with a strong current case and those who need to do further work to be put forward. The Director then meets with the relevant staff to discuss how they can achieve their goals. Since 2014 there have been 19 promotions to Senior Lecturer/Reader/Associate Professor and eight to full Professor.

Recruitment, 2014-20. Our staffing strategy has been to consolidate and renew. We have taken the opportunity of four Professorial departures to refresh our earlier-career staff cohort and have simultaneously improved gender balance. **Broodbank** left for Cambridge, and our Mediterranean interests were extended by the appointment of **Fenwick**, who brings new expertise in Islamic and North African archaeology (and has recently become Director of the Society for Libyan Studies). **Basu** was replaced by **King** in Heritage Studies, and our growing activity in this field was further strengthened by the appointment of **Stevenson** as a new Senior Lecturer in Museum Studies. **Stevenson** also contributes to our coverage of Egyptian archaeology, following the retirement of **Jeffreys**. **Martinon-Torres** was replaced as a strategic expansion by two new lecturers in archaeomaterials: **Charlton** with strong interests in analytical instrumentation and iron metallurgy, who manages the Wolfson Laboratories, and **Radivojevic** who has research interests in bronze

metallurgy and Central Asian and Southeast European archaeology. **De la Torre** was replaced by another expert on early stone technology, **Shipton**.

Bussmann was replaced as Lecturer in Egyptian Archaeology by **Naeser**. **Rando** was appointed Lecturer in Bioarchaeology and Forensic Anthropology, in recognition of the growth in that field at IoA; another strategic appointment, **Stevens**, brought expertise in biomolecular archaeology as our new Lecturer in Isotopic Archaeology. The retirements after long service of **Griffiths**, **Merkel** and **Tubb** enabled us to take these strategic initiatives; we also greatly regretted the death in service of **Laidlaw**. We were joined among our senior professional staff by **Bone** as IoA Department Manager, replacing **Brown**. Finally, **Rehren** rejoined us from his secondment to UCL Qatar, then accepted a post in the Cyprus Institute; however, he remains a valued IoA staff colleague at 0.2 FTE.

b. Support for PGR students

Postgraduate research students (PGRs) are our future, valued as a vital element of the IoA's research community. In the seven completed academic years 2013/14-2019/20 147 PhDs were awarded, an average of 21 per year. Meanwhile new registrations remained stable at just over 25 per year, about half with grant funding. MPhil/PhD applicants are normally required to have a Master's degree at distinction level and selection is rigorous. Many are recruited from the Institute's own taught Master's programme (the largest in the country, with 18 degrees and up to 250 students, about half from overseas, each year). The Graduate Research Student Sub-Committee reviews projects and supervision arrangements for all starting PGRs and receives progress reports annually. Research students have a primary and at least one secondary supervisor, with additional supervisors as appropriate. Supervisors are required to undertake UCL training; primary supervisors must have been a member of staff for three years and have previous experience.

All research students are offered bench or desk space in dedicated research rooms with computing facilities. Structures are in place to support full-time students in completing within four years (or the part-time equivalent). In addition to monthly supervisions, monitoring of student progress is done through UCL's on-line Research Student Log. Students submit six-monthly reports (plus an extra one at month three) for discussion and approval by the supervisory team. Each student has a first-year review, including a written submission and presentation, and second year students apply to upgrade from MPhil to PhD. This requires a 15,000 word paper and a 30-minute presentation, followed by questions. A panel chaired by the Graduate Tutor decides whether the upgrade is successful or more work is needed. In the latter case, detailed feedback is given. A third-year interview, and a fourth-year one if necessary, follow the upgrade to track progress and identify support needs.

The Institute provides extensive training for PGRs, with a dedicated first-year induction course. In addition, UCL's Doctoral School runs a Skills Development Programme providing training to support research and to enhance skills and employability. Students have access to academic writing assistance and are encouraged to attend IoA Master's courses, or others such as language courses available within UCL. They are given the opportunity to gain teaching experience as PGTAs on undergraduate courses; the Institute organizes compulsory training for all prospective PGTAs, taught by members of UCL's Arena Centre for Research-Based Education.

Use of our laboratory facilities by PGRs is encouraged and they do not have to find funding to support in-house analysis. The Institute also funds essential access to equipment in other departments (e.g. Chemistry). For advanced equipment students must attend the appropriate Masters-level training course, and there is mandatory on-line generic as well as in-person lab-specific Health and Safety training.

Students who need to carry out fieldwork which their funding body does not cover, and those without grants, are able to apply for assistance to the Institute's Grants Committee. In the REF2021 period, it awarded c.£40k to support student research, mainly fieldwork. Students may also apply for funding to attend conferences and meetings.

Activities initiated by PGRs are strongly encouraged and funded where possible, and they are encouraged to play active roles in our internal networks and on relevant committees. PGRs have organized seminar series, one-off thematic conferences, and an annual Graduate Student conference. They run an annual peer-reviewed open access journal, *Papers from the Institute of Archaeology*. This provides authors with experience in publishing articles early in their careers; extra emphasis is placed on peer feedback and editorial assistance. Students are also encouraged to publish in other Institute open access publications and research blogs.

All UCL PhD theses are required to include a 500-word impact statement, and the preparation of these is raising awareness of impact among students and in discussion with their supervision teams. In 2018 we established with *BAR Publishing* a PhD series, designed to offer the Institute's PhD students the opportunity to publish theses in a more or less unaltered state. To date five have been published in this way.

Of those who completed PhDs in the REF period, 19 went on to lecturing posts, 10 to teaching fellowships, 40 to post-doctoral research positions, 17 to the museum sector, 13 to other archaeology/heritage related employment and 9 are freelance specialists/conservators in archaeology-related fields.

c. Supporting and promoting equality and diversity.

The IoA is committed to equality, diversity and inclusion. The IoA Women's Forum and a new IoA Equality, Diversity and Inclusion Forum created in 2016 meet regularly to identify issues and monitor progress on key student and staff EDI issues (including but not restricted to gender, race, ethnicity, disability and sexual identity). The Women's Forum is co-ordinating our application for an Athena Swan Bronze Award due to be submitted in May 2021. IoA also contributes to the SHS EDI Strategic Board, as well as Faculty strategic initiatives on Difference, Diversity & Inequalities and Liveable Working Lives. In 2020, we established a formal staff-student EDI Committee as part of the management structure of the IoA, to complement the Forums and to be responsible for delivering the IoA's EDI strategy which aims to diversify the student and staff body and to ensure an inclusive departmental culture which allows all staff and students to achieve their potential.

The IoA's strategic priority is to increase our staff profile, particularly the proportion of BAME staff, who are currently under-represented in all roles, and to address the under-representation of female academic staff, particularly at professorial level. The IoA has 51 staff (37% female) on academic contracts (research and teaching). Since 2014, we have increased the proportion of female academics from 25% to 37% (seven of the nine new lecturers appointed are female, when

only of one of the eight departures had been of females). Improved mentoring and support for promotion has directly increased the proportion of female staff at Associate Professor/ Reader level from 25% to 46% (12 female staff; 14 male staff). The IoA now has its first female Director (**Hamilton**). However, female staff are still under-represented at professorial level, such that in 2019/20 only 2 of 17 (12%) Professors were female, significantly below UCL's average of 29% female Professorial staff. We aim to increase female representation at Professorial level through mentoring, continued support in the promotions process, and access to leadership development opportunities. Since 2015, the proportion of BAME staff has increased from 5% to 11%: our strategic aim to increase BAME recruitment among staff is being addressed by advertising posts in targeted networks, by reviewing the wording of job adverts, and by making use of UCL's Fair Recruitment Specialists.

The IoA is committed to creating an inclusive departmental culture. The Women's Forum has led on initiatives, including new mentoring policies, fair distribution of workloads and organizing academic career workshops for Research Fellows (RFs), those on teaching contracts and PGRs. The two Forums collaborate on many initiatives aimed at enhancing the visibility of minority and female professional role models in archaeology, including a Decolonizing the Curriculum initiative, displaying photographs in the IoA of prominent women archaeologists, and annual events to celebrate International Women's Day; LGBT+ History Month; Black History Month, and Disability Month. Trowelblazers!, an associated initiative to promote awareness of pioneering women archaeologists, held a more outward-facing one-day Wikipedia edit-a-thon at IoA in 2019.

Mental and physical well-being, training and support are actively promoted within IoA. In 2018, we introduced a Fieldwork Code of Conduct to prevent sexual harassment and bullying. The UCL Provost commended ASE for its work in 2019 in developing a bullying and harassment training course, 'Where Do You Draw The Line?'; the sessions have been recognised nationally by the Chartered Institute for Archaeologists. All IoA staff were required to take this course in 2019. Two professional staff are Inclusion Leads, two academic staff are Mental Health First Aiders, two professional staff are UCL Wellbeing champions, and we also benefit from a qualified therapy dog (Indy), who has a large social media following.

We used UCL EDI impact assessments of our draft output selection to ensure that our submission reflects the composition of the workforce. Our outputs review panel consisted of 15 academic staff, including most IoA professors, and four non-professorial staff (of whom three were women, enhancing gender balance). Anyone with decision-making responsibilities for the REF at UoA level was required to attend a REF-specific equalities training event delivered by the UCL EDI team. Our submission includes proportionally slightly more staff from non-UK/EU/EEA nationalities (25%) than the institution-wide average, but proportionally slightly fewer women (40%) in line with our staff profile, and we will continue to work to redress the latter imbalance in the next REF cycle through recruitment. Staff selection for this REF consisted in identifying independent researcher status from among our postdoctoral staff, which was done by rigorous review of project funding applications and by consulting with the fellows themselves; overall, the likelihood of women being selected was roughly equal with that of men. The two BAME staff selected for submission in this way (out of four in the postdoctoral and academic staff pools) also contributed disproportionately highly to the output pool.

Promoting research integrity is an important component of our EDI work, inasmuch as it addresses positional responsibilities in professional researcher relationships, and also supports positive and

ethical relationships between researchers and their subjects. The UCL Statement on research integrity promotes honesty in all aspects of research; rigour, in line with prevailing disciplinary norms and standards; transparency and open communication; and care and respect for all participants in and subjects of research, including humans, animals, the environment and cultural objects. We address these priorities in our researcher training initiatives, especially via mentoring, and in the supportive culture of our Sections, in the work of our IoA Ethics Officer and Research Ethics Committee, which reviews ethical aspects of research proposals and escalates them to College level where needed, and by embedding the UCL Research Integrity Training Framework in our new researcher induction programmes.

3. Income, infrastructure and facilities

a. Income

Grants from previous period carried over, and new income. In our REF2014 submission we noted that income from grants already won would guarantee the Institute £8M in the current REF period. In addition, staff won a total of c.£16M of new external research grant income during this REF period, including: £2.89M from the Arcadia Fund to **Williams** for work on 'Archaeological Sites, Monuments and Landscapes in Central Asia'; £1.62M from the AHRC to **Harrison** for the 'Assembling Alternative Futures for Heritage' project, and a further £1.04M from the same source to **Harrison** for his Heritage Priority Area Leadership Fellowship; £1.2M to **Fenwick** for her ERC Starting project EVERYDAYISLAM; £1.25M to **Stevens** for her ERC Consolidator project UP-NORTH, transferred from Cambridge; £638k to **Fuller** from the NERC for his project 'The impact of intensification and deintensification of Asian rice production'; and £536k to **Wengrow** and **Hassett** for their project 'Radical death and early state formation in the Ancient Near East'. Including these, the Institute received new grants to a total of £4.36M from the AHRC, £4.48M from the ERC and other European Union sources, £3.07M from the Arcadia Fund, £1.79M from the Leverhulme Trust, £1.35M from the British Academy, and £1.92M from a wide range of other sources. This included 10 Marie Curie-Skłodowska Fellowships and five British Academy Postdoctoral, Newton, and Mid-Career Fellowships. The IoA has also received generous support from UCL infrastructure funds for maintaining and updating our scientific laboratories (£1.19m), and from other internal UCL funds for individual research projects (£51.4k).

ASE income, UCL East set-up costs, and UCL-Q investment by Qatar. ASE has earned an average of £5.2M annually during the current REF period in commercial funding, and additional external grant-funded ASE projects have included £831k from the Arcadia Fund for 'Survey and Digital Documentation of Endangered Temple Wall Paintings in Shanxi Province, China' (PI: **Perring**). ASE contributes 5% of its annual turnover to the IoA, equivalent to c.£260k per annum. The set-up costs of our new facilities and space at the UCL East campus will amount to a very substantial internal investment by UCL. Meanwhile, the Qatar Foundation, UCL contract partner, met all upfront costs for UCL Qatar; by the end of the contract in 2020, a total investment of c.£90M.

b. Infrastructure and facilities pertaining to research

The Institute has outstanding facilities for an unparalleled range of archaeological research, including libraries, laboratories, equipment, collections and support personnel, the benefit of which is reflected in staff publications and PhD research. To sustain this infrastructure we have invested

in new labs, maintained or upgraded our existing provision, and we have ensured that staff – including new teams funded by large project grants – have appropriate provision through efficient use of office space in the Institute building. The Institute’s Facilities Committee continues its five-year strategic programme for the updating of its equipment and laboratories. Major pieces of equipment have resulted from successful bids for UCL Faculty and College funding.

Laboratories. Our labs and lab facilities are overseen by an academic manager (**Charlton**), a Senior Technical Officer, a Safety Officer, and a Facilities Committee. Our Safety Working Group reports to the Facilities Committee. The exceptional scale of our facilities is shown in Table 1: they have a footprint of 773 m², about one fifth of an acre.

Laboratory/suite	Function/instrumentation	Area m ²
Wolfson materials analysis	Electron microscopy, microprobe, LA-ICP-MS, XRD, FTIR, pXRF, optical microscopy, lithics, metallographic, petrographic sample prep	160
Biomolecular archaeology	Sampling & preparation of biomaterials for isotopic analysis; ancient DNA extraction; Maldi ToF mass spectrometry;	65
Environmental archaeology	archaeobotany, archaeozoology, forensics, soils, sediments, cold storage area	237
Conservation	conservation workstations, benching, microscopes, extraction and consolidation equipment	143
AGIS labs	Archaeological geographical information systems - specialist computer workstations	47
Digital Heritage	Imaging, VR, photogrammetry etc	91
Miscellaneous	technician offices, balances, storage etc	30
External wet area	large cutting equipment; potters wheel etc	
Total area, m²		773

Table 1. Lab space and function within the IoA building.

The Wolfson Archaeological Science Laboratories are one of the best-equipped university-based archaeological science laboratories in Europe and, since 2014 we have drawn on central UCL funding to achieve significant refurbishment and upgrade. In addition to our strength in artefact analysis and materials, we have continued to expand our capabilities in bioarchaeology.

We have updated our electron microscopy laboratory by the purchase of a new Zeiss variable pressure SEM with EDS and the procurement of new X-ray analysers for our existing Hitachi SEM, and update to the software and computer system for our JEOL electron microprobe (2018-19: £281k). These changes have allowed both a major improvement in data quality and throughput, and operation free of liquid nitrogen (previously a significant health and safety issue). A new Laser Ablation-ICPMS for the analysis of trace elements in ceramics, glass, stone and slag inclusions in iron (2020: £295k), a portable Raman spectrometer (£45k) and a new x-ray cabinet (£75k) were

added to our other in-house facilities which include three portable X-ray spectrometers, an X-ray diffractometer for the analysis of stone, ceramic and pigments, and an FTIR spectrometer for pigments and organic media. An office was converted into a dedicated optical microscopy lab for metallography and petrography with research grade microscopes, and we have extensive sample preparation facilities, and a sedimentology lab. This general analytical infrastructure was enhanced by other new equipment including a large encased abrasive cut-off saw and electrical supply (£32k), a micro-hardness tester (£14.4k), benchtop exhaust ventilators for the sedimentology and preparation labs (£5k) and a UV resin curing unit (£1k). We now have state-of-the-art in-house facilities for investigation of archaeological materials, while our staff access radiogenic isotope analysis (Sr, Pb, Nd and Hf) through collaborations with universities in London and abroad. In collaboration with the appropriate specialists we access synchrotron techniques at Harwell Campus (Diamond and ISIS).

In-house we maintained our Biomolecular Archaeology Research Laboratories with facilities for the extraction of carbon and nitrogen for isotopic analysis. We acquired a Maldi TOF mass spectrometer (£144k) to enable species analysis from bone collagen, which offers the possibility of collaborations with the British Museum and the UCL Crick Institute, as well as a -80°C freezer (£14k) to support the laboratory. Our aDNA Lab, a collaboration with Genetics and Forensic Science, has meanwhile been used: to develop forensic testing tools; to study aDNA in crop species from the UCL Petrie Museum and elsewhere; and as an extension lab for other aDNA projects in collaboration with the University of Cambridge.

The IoA makes an equal financial contribution with UCL's Departments of Geography and Chemistry towards the Bloomsbury Environmental Isotope Facility, which has established a new laboratory in the UCL Kathleen Lonsdale building. For this joint use, we leveraged Faculty funding to acquire an IsoLink interface to improve our $^{13}\text{C}/^{12}\text{C}$ measurement capability (£55k). In 2020 we again received significant funding from Faculty, enabling us to acquire a Thermo Fisher DELTA V Advantage Mass Spectrometer including universal triple collector, HD collector and computer package with ISODAT software suite and ConFlo IV Universal Interface for all Continuous Flow peripherals, for our shared use (£145k). We also acquired with Faculty funds startup equipment for a new Experimental Taphonomy facility (£9k).

Other Institute laboratories. In 2019 we refitted our photography lab as a new Digital Heritage Imaging and VR Lab, equipped with new virtual and mixed/augmented reality equipment (Oculus Rift and Microsoft HoloLens headsets plus VR-ready PCs and iPads), and with multispectral cameras, drones, and software for photogrammetry applications (total: £50k). This lab also has the full range of conventional photographic facilities. Our Conservation Research Laboratories offer a range of specialist equipment, including air abrasive units, X-radiography, traditional and digital microscopy and an oxygen gas analyser, and conservation research also makes extensive use of the Wolfson laboratories. Research in zooarchaeology and human remains is supported by excellent reference collections housed in our Osteological Laboratory. We have converted an office into an ancillary Zooarchaeology Lab. The Palaeoecology Laboratory contains its own microscopy units and an outstanding archaeobotanical reference collection. The Lithics Laboratory has metrical, photographic and optical instrumentation, and houses Palaeolithic collections from Europe and Africa. The Archaeological Geographic Information Systems (AGIS) Lab offers specialised facilities unavailable on the general UCL network, to support staff and student research; an upgrade of the AGIS laboratory (2017, c.£25k) included 12 new HP EliteDesk 800 G3 PCs with 27" QHD monitors, i7-7700K CPUs and nVidia GTX 1080 graphics. Access is

also available to specialised equipment in other parts of UCL, e.g. 3D laser scanning in Geomatic Engineering.

Fieldwork equipment. The Institute has extensive fieldwork equipment, including a minibus, digital cameras, resistivity and magnetic susceptibility meters, a fluxgate gradiometer, total station, differential GPS, drones, and surveying software. In addition we have access to ASE equipment, including 4x4 vehicles, total stations, differential GPS, and geophysics equipment.

Collections. The Institute has outstanding archaeological collections, researched by staff and students and a basis for applied research in Heritage Studies. Continued investment has made them more accessible to both scholars and the public, in physical and digital form. The Keeper of Institute Collections (**Sparks**) is supervising their cataloguing to make them accessible for teaching and research, and a Collections Manager is responsible for their use in teaching. The UCL Petrie Museum of Egyptian Archaeology co-works with the IoA to develop access for teaching and research (including online) to its collection of around 80,000 objects, recognized by the UK government as 'of outstanding importance'. In conjunction with the IoA, it has continued to develop innovative research and impact projects, including the 'Papyrus for the People' project, which won the Society for Museum Archaeology's Annual Award for Excellence in 2019.

Library collections. The Institute of Archaeology library has one of the finest archaeological collections in the world. It supports staff and research students with research material covering all aspects of archaeology, conservation, museum studies and cultural heritage worldwide, and provides access to researchers from elsewhere in the UK, Europe and the rest of the world. UCL has spent c.£193k on Archaeology Library acquisitions from Aug 2014 to the present. The IoA Library also holds the Yates collection of classical archaeology of Greece and Rome and the Edwards Egyptology collection. It houses c. 70,000 books and 800 journals on the open shelves with c. 40,000-50,000 items in store. UCL Library subscribes to a wide-range of electronic resources (e-journals, databases), with UCL Discovery providing our own open access repository. Overall, UCL Library Services in one recent year (2018/19) spent £8.8 million on e-resources, including access to 75,000 electronic journals. UCL is also fortunately situated in Bloomsbury with ready access to the British Library and a wide range of specialist libraries and collections.

Support staff

The Institute currently has 16.3 FTE core-funded administrative and technical staff with a further 3.0 FTE technical and administrative support provided for individual projects enabled by direct cost funding from their grants. Of the 19.3 FTE staff, 6.0 FTE administrative staff directly support research (**Bone, Bremont, Carroll, Dullaghan, Pang, Rynsaard, Sandford Smith, Williams**). Laboratory facilities are supported by 4.9 FTE technical staff who directly support research (**Benzonelli, Bond, Fremondeau, Grego, Gregory**). One 0.3 FTE member of staff supports publications (**Cutting**). Photography, AV and digital imaging are currently supported by 0.5 FTE technical staff (**Walton**) with additional Faculty-level support for IT.

c. Infrastructure and facilities pertaining to research impact

A number of central teams in UCL provide advice, support and resources to facilitate impact. They are focused on specialist areas such as Public Policy, Culture, Innovation, Enterprise and Consultancy and are directly accessible to individual researchers. The Research Impact Curation Service maintains a searchable database of UCL case studies as examples of good practice.

Within the IoA, we host a number of facilities that enable our research-related public engagement and interaction with external stakeholders. The Institute itself has meeting and seminar rooms and a large lecture theatre, enabling us to host training days, workshops, summer schools, and seminars throughout the year. Our special collections are a specific focus for outreach, housed in the Institute itself and also in the Petrie Museum. We make active use of social and traditional media, including Twitter, Facebook and Instagram, as well as appearances and consultancy for radio and television and print journalism. We also host and support a variety of initiatives in citizen science. Our in-house publishing activities include open access journals, with one (*Archaeology International*) aimed at a general as well as specialist readership. Our collaborative relationships with external partners are consolidated through our 13 thematically-defined Research Networks and through our Honorary associates. ASE also holds regular on-site and headquarters events and open days to disseminate the results of its commercially-funded and other work.

IoA facilities enable us to interact on campus with a range of stakeholders. For example, we convene a Heritage Policy Group, with the explicit aim of thinking critically about current archaeology/heritage policy issues in the UK and beyond, and involving dialogues with **cultural heritage professionals and policy makers** (see ICS 'Heritage Futures'). **Audiences in London and its environs** participate in our regular hosted meetings of regional special interest groups, e.g. the regular ICCCHA 'China Nights' and our annual workshops such as 'Maya on the Thames'. In addition we host meetings for external organisations which attract a broad audience, including the Anglo-Israel Archaeological Society, the British Museum Medieval Seminar Series, the Accordia Lectures on Italian Archaeology, the Central Asian Seminar Group, the Society of Libyan Studies, and TrowelBlazers, as well as occasional meetings for a range of other organisations. Their organisation frequently involves our early career researchers and PhD students, bringing them together with the wider audiences for their research. **UK and overseas archaeologists** have benefited from our workshops and short courses, such as the annual Soil Micromorphology and Ceramic Petrology summer schools. Our offices at the Institute also enable us to host major impact-generating projects such as the Arcadia Fund project on 'Archaeological Sites, Monuments and Landscapes in Central Asia', closely associated with ICSRAH, and benefiting **heritage policy-makers and museums-sector partners in in the Middle East and East Asia** (see ICS 'Silk Roads'). Our network of Honorary associates enables us to develop interactively, learn from, and disseminate new models of best practice, for example in **museums interpretation and education** (ICS 'Big Picnic') and in supporting **amateur archaeology and citizen science** (ICS 'CITIZAN' & 'Micropasts').

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

a. Research collaborations, networks and partnerships

Institutes and Centres (incl. DTCs). International research centres based at the IoA include the CCHS (in partnership with the University of Gothenburg), the new ICSRAH (in partnership with NorthWest University, Xi'an) and the ICCCHA (in partnership with Peking University). These organize conferences and exchanges, support funded collaborations, and provide focal points for graduate research study. We also participate in London and regional inter-university collaborations through Doctoral Training Centres such as the AHRC London Arts and Humanities Partnership and the EPSRC Centre for Doctoral Training in Science and Engineering in Arts, Heritage and Archaeology. Internationally, we participate in the CHEurope Marie Curie-Skłodowska Innovative

Training Network, and we are currently establishing a doctoral training and exchange programme with the Archaeology Centre of the University of Toronto.

Multi-institutional grant-funded research projects. We have a number of key overseas academic partners, with whom we apply for funding for collaborative projects. An example of this is work with Peking University supported by the IoA-based ICCHA. **Fuller's** NERC-funded research as PI on the prehistory of rice agriculture was facilitated by the work of project partner Ling in Peking University, who established collaborations and archaeobotanical sampling programs in Zhejiang, Jiangsu, Yunnan and Guangdong. Our links with Peking University also enabled **Zhuang's** Newton Fellowship project on the geoarchaeology of late Neolithic Chinese floodplain agriculture. ICCHA has meanwhile provided a framework to support our British Academy-funded work on the Terracotta Army (**Martinon-Torres, Bevan**, et al.), through a collaboration with the Museum of Emperor Qin Shihuang's Mausoleum. ICCHA has also supported **Tanner's** Major Leverhulme Research Fellowship project on the Axial Age and the institution of art in ancient Greece and China, as well as **Butler's** work as PI on ethnic heritage in the contemporary craft economy in China (involving collaborations with the National Ethnology Museum in Beijing, Yunan Minzu University in Kunming, V&A Shenzhen, and factories manufacturing high-end and low-end museum products in Jingdezhen and Yiwu). Thus, the creation of an IoA-based Centre (ICCHA), and the strategic establishment thereby of a key collaboration link in Beijing, has enabled a very diverse range of grant-funded archaeological projects. Similar accounts could be given of the effectiveness of CCHS.

Fieldwork partnerships. All our fieldwork projects involve collaboration with local partners and regional authorities, and the vast majority also involve partners from other academic institutions with complementary expertise and facilities. We consider it vital to support these essential grassroots collaborations. An example is the work of **Fenwick** on the archaeology of North Africa, focusing on the early Islamic period. Her work as PI at Volubilis, Morocco, is funded by joint awards shared with colleagues in the Institut National des Sciences de l'Archéologie et du Patrimoine (Morocco) while further investigation of the wider western Sahara is funded by a grant to Mattingly in Leicester with Fenwick as Co-I. Meanwhile she is also involved as PI in collaborative work in the Medjerda Valley (Tunisia), funded in collaboration with colleagues from the Tunisian Institut National du Patrimoine, the Deutsches Archäologisches Institut in Berlin, the University of York, and the Cyprus Institute. Specialist analyses for each project also bring in colleagues from a wider network of collaboration. This kind of pattern is typical of our long-term overseas fieldwork; other examples would include **Graham** and **Williams**.

Partnerships with research leaders elsewhere in the archaeology and heritage sectors. We maintain excellent collaborative relationships with many national and regional non-university research hubs in the UK archaeology and heritage sectors. In London, these include the British Museum, the Science Museum and the Natural History Museum. We undertook a one-year joint project with the British Museum (2017-18) to strengthen that relationship. This involved articulating our existing collaborations to enhance their visibility and impact, and defining future strategic initiatives in knowledge exchange, training, public policy, and research. The project organized workshops and conferences and inventoried numerous current collaborations, including existing grant-funded field and lab work, and collaborative doctoral awards (e.g. ICS 'Micropasts', a close collaboration with the British Museum). Initiatives included more activity in joint discussion forums, facilities-sharing, joint grant applications, and staff exchanges and student placements to facilitate the Museum's collections documentation, interpretation and management. Outside London, we

have partnerships with many regional museums as well as collaborative doctoral awards with e.g. the Natural History Museum Oxford, the Tate, the British Museum, English Heritage, the Mary Rose Trust. Collaborations with other major national and international heritage institutions include the Arts Council, National Trust, Historic England, and major international bodies such as ICOMOS, UNESCO, IUCN through Heritage Futures.

Another indication of the range of our collaborations is our record of long-term academic visitors, of whom we received 48 during the REF2021 period for visits of one month or more (average stay: six months; 17 from Europe and 31 from other overseas countries), as well as hundreds of visits of shorter duration.

IoA Research Networks. Networks bring together UCL and external researchers in areas with high levels of common activity or interest, and their achievements are reviewed annually. For example, the IoA History of Archaeology Research Network mobilises the critical evaluation, examination and presentation of archival material and object collections. It is co-ordinated by **Thornton**, a former IoA postdoc and now Honorary Fellow, and has 26 IoA members (including lecturing and collections management staff, postgrads, and Emeritus colleagues) and 15 external members (all professionals in the museums and university sectors). It meets regularly for seminars, and its core team includes **Moshenska**, co-Editor in Chief of the *Bulletin for the History of Archaeology* (an international peer-reviewed journal now hosted online by the IoA). This composition enables synergies which support and enhance the research activity of each individual member. Other formal research networks cover topics as diverse as Ceramic Technology; the Archaeology of Human Evolution; and Islamic Archaeology.

The role of Honorary IoA Associates. We currently have 17 Emeritus staff and c. 125 Honorary associates. The Honorary status enables us to recognize key partnerships, and also where appropriate to support the career progression of recent postdoctoral colleagues by giving them an affiliation as they seek their next professional appointment. Honoraries include key individuals developing new research collaborations with our staff. For example, honorary Visiting Professor **Scull**, an independent archaeological and heritage consultant (and former IoA lecturer), who works closely with **Reynolds**, successfully applied for a three-year Leverhulme grant (£264k) for a project on 'Lordship and Landscape in East Anglia CE 400-800', administered by UCL. Honorary Senior Lecturer **Milne**, former member of IoA staff (retired 2017), has kept close ties with the IoA in the development of the CITiZAN citizen science coastal monitoring programme, initiated 2015 (see ICS 'CITiZAN').

b. Contributions to the discipline or research base

Our staff make a major contribution to supporting the discipline through editorial activities, conference organization, service on national and international bodies, and peer review and external examining. The numerous invitations to take part in these activities are a reflection of the high regard in which Institute staff are held. These activities are encouraged by the Institute and acknowledged in our workload system.

Among our staff have been the editors-in-chief or managing editors of leading journals including *Archaeological and Anthropological Sciences* (**Fuller, Shennan**), *Azania* (**MacDonald**), *J. Egyptian Archaeology* (**Naser**), *Public Archaeology* (**Schadla-Hall**), *Journal of Contemporary Archaeology* (**Harrison**), *Journal of Archaeological Science* (**Rehren**), *Conservation and*

Management of Archaeological Sites (**Williams**). Staff have served as associate editors or on the editorial advisory boards of over 100 specialist journals and book series during the current REF period. The IoA publishes print books in two well-established series, the General series (editor emeritus professor **Whitehouse**) and the Critical Cultural Heritage series (editor **Butler**), published by Left Coast Press until December 2015, then by Taylor & Francis from August 2016. In the REF period we published 11 books in the General Series and five in the Cultural Heritage Series. ASE has its own peer-reviewed Spoilheap series launched in 2009 as a joint venture with Surrey County Council, intended to provide a publication outlet for the results of archaeological investigations across south-east England; in this REF period it published 12 site monographs and four Occasional Papers.

IoA staff were on the organising committees of 142 conferences and meetings, and organised or chaired another 75 sessions or workshops at international conferences, during this REF period. Highlights of over 40 conferences hosted at UCL include UK Archaeological Sciences 2017 (three days, 190 participants), TAG 2019 (three days, 500 participants), and the 2020 Association of Critical Heritage Studies 5th Biennial Conference (five days, 1100 participants). In addition, staff have given more than 800 conference presentations (including over 100 invited lectures, plenaries, and keynotes), seminars and workshop talks at meetings and in research institutions around the world.

Our staff served during the REF period on the Boards or Committees of a wide range of national and international learned and advisory bodies [c. 60], including: the British Institute for the Study of Iraq (**Altaweel**); British School at Athens (**Freestone, Riva, Whitelaw**) and at Rome (**Riva**); Society for Libyan Studies (**Fenwick, Macdonald**); Council for British Research in the Levant (**Garrard, Martin**); Royal Numismatic Society (**Lockyear**); British Institute in Eastern Africa (**MacDonald**); Palestine Exploration Fund (**Martin**); Prehistoric Society (**Parker Pearson**); Society for Archaeological Sciences (**Rehren**); British Academy Archaeology Section (**Shennan**); Anglo-Peruvian Society (**Sillar**); Anglo-Israel Archaeological Society (**Sparks**); ICAHM (**Williams**); Institute of Field Research (**Williams**); NERC Peer Review College (**Fuller**) and AHRC Peer Review College (**Bevan, Harrison, Lake**).

Our staff includes **national advisors on heritage** in relation to heritage research strategy (e.g. to UK Research & Innovation especially in relation to the Global Challenges Research Fund [**Harrison**]) and natural and cultural heritage conservation/management policy and practice (National Trust [**Sully, Harrison**], Historic England [**Harrison**], Natural England [**Harrison**]). We have **hosted the AHRC Heritage Priority Area Leadership Fellow** since 2017, driving AHRC Heritage research strategy and collaborating with Independent Research Organisations (IROs) as well as leading on their heritage related contributions to the United Nations Climate Change Conference (COP26) (**Harrison**). We also advise the European Commission's Joint Programming Initiative on Cultural Heritage and Global Change (**Harrison**). Our staff act as **international advisors** for: the International Council on Monuments and Sites (ICOMOS) (e.g. on conservation strategies [**Williams**]; and in relation to their strategy on climate change adaptation and mitigation for the heritage sector [**Harrison**]); UNESCO (e.g. on Silk Roads heritage [**Williams**] and future heritage [**Harrison**]); the International Centre for the Study of the Preservation and Restoration of Culture (ICCROM) (**Sully**); the International Union for Conservation of Nature (IUCN) (**Harrison**); the International Council of Museums (**Peters**); the World Monuments Fund (**Williams**); and the Getty Conservation Institute (**O'Grady, Riva**).

IoA staff are individually advisors to more than a dozen national government organizations including: Easter Island (Mau' Henua Indigenous People's Community); National Museums of Kenya; National Corporation for Antiquities and Museums Sudan; Sulemaniyah Museum and Antiquities department. We are represented on the Trustee Boards of major museums, e.g. National Museum of Egyptian Civilization (Cairo; **Quirke**); National Museum of the Royal Navy (**Schadla-Hall**). Various staff contribute to/are committee members of UK national organisations (e.g. Chartered Institute for Archaeologists, University Archaeology UK, British International Research Institutes).

c. Commercial activity and its contributions to research

During this REF period we have further integrated ASE into the IoA's research activities. ASE's Director (**Perring**) is now a member of the IoA SMT and also of the Standing Committee of the IoA Research Committee. ASE undertakes research publications and has staff undertaking major research projects (**Pope, Perring**).

As part of its strategic plan, ASE is developing digital architectures of data management and publication to overcome the long-standing limitations of commercial archaeological practice. ASE research is disseminated through a combination of digital and print outputs: the main output is the fully-refereed SpoilHeap imprint which includes a monograph and an occasional paper series (overall, 16 items in this REF period). To date, all out-of-print volumes have been made available for free download. During 2021, it is intended that all volumes printed before 2020 will be made freely available for download via UCL Discovery. Much of ASE's regionally-based research is reported through county-based journals, with more significant national and international research submitted to national, international, and period specific journals. Over 50 contributions have appeared from 2014-2020. ASE staff are also regular contributors to *Archaeology International*. Further avenues for dissemination have included popular print and digital media such as *British Archaeology* and *Current Archaeology* as well as regional, national and international news platforms.

Dissemination of ASE research is amplified by digital media, such as the podcast series *Archaeology South-East Digs Deeper* (<https://www.ucl.ac.uk/archaeology-south-east/podcast>) and the 3D modelling platform (<https://sketchfab.com/ArchaeologySouth-East>). ASE has produced 3050 grey literature reports (mainly for planning-led purposes) during the REF period. In accordance with our commitment to open access, these are being uploaded to the ADS website and become freely available. About 850 of these are on the web at the time of writing, the main delay being due to the approval needed from county HERs. More recent reports are meanwhile made available to researchers upon request. Digital specialist data and archive material is regularly provided to students, PhD candidates, academic researchers and national heritage bodies (such as Historic England) for both regional and national syntheses.

ASE is additionally preparing its digital documentation of archaeological sites, historic buildings, and primary archives for open-source publication. The Arcadia Fund-supported Shanxi Digital Documentation project is being used to pioneer ASE use of photogrammetric recording of historic buildings (<https://shanxi-project.org/sites/>) The data and metadata from these building-surveys is stored in Arches, an open source heritage data platform. In a parallel exercise, ASE is assembling all field archaeological data into a customised interrelational database, ASEBase (<http://www.archaeoscope.org/asebase/index.php>). This holds, catalogues and cross-references

all ASE site records, survey data, finds catalogues, etc. (including GIS and Harris Matrix outputs, linked directly to the underlying context and survey data). The database and related applications are being developed for future use as a research resource supporting open-access dissemination of all primary data. The goal is to allow researchers to navigate between works of synthesis (open-access published reports), underpinning works of post-excavation analysis (detailed assessments contained within grey literature and catalogues), and primary field records (collected digitally through access via a web interface to the relevant parts of the ASEBase).

Looking Forward

In the REF2021 period we have consolidated our outstanding research environment by investment in people and infrastructure. We have expanded our specialisms and improved our gender balance. We have taken initiatives which will allow further improvements over the next cycle, for example involvement at UCL East, our new EDI structures and the updating of our analytical facilities. We see many opportunities ahead and anticipate a decade which is exciting and rewarding, where we will generate research which is both broader and deeper, and accessible to more people, at home and abroad.