Careers in Heritage Science: Opportunities and Constraints

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EXECUTIVE SUMMARY

This report outlines the findings of research, commissioned by the National Heritage Science Forum (NHSF), into who applies for UK postgraduate courses that are either focused on or include an element of heritage science, what their motivations and aspirations are, and whether postgraduates consider themselves to be heritage scientists. The report looks at the career pathways of heritage science graduates. It also outlines training providers' and employers' perspectives on heritage science, and their experiences of recruiting for roles and opportunities. Research into the challenges and opportunities encountered by heritage science students and alumni, and the views of training providers and employers on the external context in which heritage operates, builds a picture of the opportunities and constraints for those embarking on a career in heritage science.

Key findings of the report are as follows.

Students/alumni

Who applies for postgraduate roles?

Heritage science postgraduate students and alumni are largely female, white and from a relatively privileged socio-economic background. They are also international, with students from outside the UK making up around half of the country's heritage science graduates.

Heritage science students and alumni are from a range of academic and professional backgrounds, both arts- and science-based.

How do students/alumni identify with heritage science and a career in heritage science?

The term 'heritage science' has been in use since 2006. It is an umbrella term that brings together the diverse and multidisciplinary heritage science community that spans the arts, humanities and sciences; academic, heritage and commercial organisations. It can therefore apply to a range of career paths and associated professional identities. Of the students and alumni interviewed here, two-thirds would describe themselves as heritage scientists, although some used this in combination with other terms. This reflects the growing identity of heritage science as a cohesive sector.

Participants were most comfortable associating heritage science with a research role. However, they were less likely to describe a job as 'heritage science' if it only utilised aspects of it (e.g. collections care). Those who belonged to a long-standing profession such as archaeology or conservation were more likely to describe themselves by their job title, rather than as heritage scientists.

Motivations and aspirations of heritage science students/graduates:

Applicants have high expectations of postgraduate opportunities, from improving skills, knowledge and experience, to building a network of industry contacts. Barriers to undertaking postgraduate study are largely financial, and funded courses are considered a better prospect by students.

Concerns among students and alumni reflect wider issues in the heritage sector, such as low pay and a lack of opportunities outside of London. However, most heritage science postgraduates still aspire to a career in the sector.

Career paths of heritage scientists:

Heritage scientists tend to pursue lengthy studies at postgraduate level, completing an average of three postgraduate qualifications. This has led to concerns that the sector is too focused on training, to the detriment of developing secure and appropriately paid roles.

Beyond taught programmes, universities are by far the largest employer of heritage science graduates, followed by museums, heritage organisations, and consultancies and private companies. Heritage scientists often work outside of heritage science before securing their first heritage science role, and those from a heritage background often volunteer in the sector first.

Sector retention is heavily affected by job security; despite strong enthusiasm within the field, heritage scientists are forced to re-evaluate their career choices at the end of each short-term employment period.

Training Providers/Employers

Perceptions of Heritage Science:

Training providers and employers are aware that they are recruiting for heritage science roles; but frequently do not use the term 'heritage science' in advertisements. There is no universal recognition of what constitutes heritage science. Higher-level postgraduate opportunities are more likely to use the term, partly due to increased specialisation at this level. Collaborative doctoral training programmes, especially, are seen to provide particularly good opportunities for those studying heritage science at a postgraduate level.

Employers are aware of the concerns of students and alumni that career progression can be limited in an environment where short-term contracts predominate, yet increased funding is required to fulfil the needs of the sector and create more secure roles.

Recruitment challenges:

Training providers often find that candidates from Arts & Humanities backgrounds need additional support in basic scientific training as part of taught postgraduate programmes. Employers also identify a need to provide on-the-job training due to a lack of transferable skills and laboratory experience in applicants' previous level of study.

Both training providers and employers report difficulties in attracting people from a scientific background, although the students and alumni who participated in this study represented an even split in background. The difficulty in appealing to those from a scientific background is attributed in part to clearer and better paid career paths in other scientific sectors. For all students, the development of sustainable career paths is needed to highlight the benefits of careers in heritage science.

General Observations:

- Although heritage science was only introduced as a term in 2006, it has already gained considerable traction among UK-based students, training providers, and employers. Increased awareness of heritage science as a subject and use of the term by training providers, employers and practitioners will strengthen the 'heritage science identity'.
- Collaborative programmes between employers and training providers provide practical sector-related training and result in good industry experience and networks.
- Expansion of national infrastructure projects will generate increased demand for heritage science skills, requiring the sector to respond to skills shortages.
- It is perceived that Brexit will have a significant impact on the heritage science sector, but the precise nature and extent of such impact remains unclear.

Recommendations:

The report concludes with number of recommendations to NHSF and the wider sector that include:

- Encouraging wider use of an inclusive definition of 'heritage science' and identification with the term 'heritage scientist'.
- Utilise research and training networks to support students during training and employment, particularly in the development of transferable skills.
- Clarify career paths and give students realistic expectations of the challenges faced in pursuing a career in heritage science, including a broader understanding of heritage science beyond 'research-only' roles.
- Advocate for better pay, more secure job roles, and develop increased opportunities outside of London.
- Consider a wider range of outreach activities – including at primary-school age – to reduce socio-economic barriers to careers in heritage science.

National Heritage Science Forum

CULTURE SYNDICATES

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Acknowledgements

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All links checked and available as of 28/10/2019.

1. Introduction

The National Heritage Science Forum (NHSF) brings together the producers and users of heritage science to improve collaboration, help practitioners make better use of research, and demonstrate the public benefit of heritage science.

Capacity within the sector is key to growing and developing heritage science as a discipline. With the completion of the AHRC/EPSRC-funded Science and Heritage Programme in 2013[1], and with current programmes such as the EPSRC Centre for Doctoral Training in Science and Engineering in Arts, Heritage and Archaeology (SEAHA)[2], the AHRC South, West and Wales Doctoral Training Partnership[3] and the wider AHRC Collaborative Doctoral Partnership scheme[4] now well established, there is a need to understand how this funding is helping to build capacity in the sector, and better understand the factors that influence the recruitment and retention of early career researchers.

There is some anecdotal evidence that universities and their industrial partners are experiencing difficulties in attracting excellent candidates with the right skills to advertised PhD positions, and that heritage science may not be seen as a viable career path by students. NHSF seeks to gather labour market intelligence to establish the extent to which this is true, and to better understand the opportunities, barriers and constraints affecting those interested in pursuing a career in heritage science, so that the Forum and others in the sector can identify any action that may be necessary to improve prospects, break down barriers, and build capacity within the discipline.

NHSF commissioned Culture Syndicates to carry out this research. Identifying a range of stakeholders, Culture Syndicates has gathered a variety of evidence that will inform the strategic priorities of the National Heritage Science Forum (NHSF) in the future. In particular, research has focused on the pathways that students take to enter the sector, barriers to pursuing a heritage science career, and challenges highlighted by training providers and employers of heritage science students and alumni. This report presents the outcomes of the research and makes a series of recommendations for future action.

1.1 Aims of the project

The aim of this project is to gain a better understanding of why students choose, or choose not, to pursue a career in heritage science by taking up post-graduate training and research opportunities in the UK (master's degrees, PhDs and postdoctoral research). It also seeks to understand the career paths of those who have completed higher degrees in heritage science related disciplines.

By commissioning this research NHSF hopes to understand the opportunities, barriers and constraints that currently affect those interested in pursuing a career in heritage science, and identify actions that NHSF (and the heritage science sector as a whole) could take to attract people to the field, and retain and build on current expertise.

[1] http://www.heritagescience.ac.uk/
[2] http://www.seaha-cdt.ac.uk/
[3] https://www.sww-ahdtp.ac.uk/
[4] https://www.ahrc-cdp.org/

The project has the following objectives that focus on:

A) Students and alumni

- Understand who applies for post-graduate opportunities in UK (England, Wales, Northern Ireland and Scotland) in heritage science;
- Understand the motivations and aspirations of those who take up postgraduate opportunities in the UK;
- Establish whether applicants recognise themselves as embarking on a career in heritage science or define themselves differently;
- Gather information on applicants both successful and unsuccessful as well as those who registered an interest in posts but did not apply. This to include:
    - age
    - gender
    - ethnicity
    - disability
    - nationality
    - location
    - educational background
    - social background
- Understand the career paths of those who gained a post-graduate qualification since 2011.

B) Training providers and employers:

- Find out whether those advertising post-graduate opportunities and jobs in heritage science recognise them as such and if not, how they perceive them;
- Establish whether providers of post-graduate training opportunities and employers experience difficulties in attracting people with the right skills and experience;
- Collate lessons learnt about recruitment and retention from training providers and employers.

2. Methodology

Research consisted of the following methods:

- Online survey of 68 students and alumni of heritage science courses
- Telephone interviews with 5 individuals currently employed in the heritage science sector (identified from responses to the student/alumni survey)
- Telephone surveys with 5 employers of heritage science students
- Telephone surveys with 10 training providers for heritage science students
- Review of existing sector related reports

Survey templates are available as a supporting document, to show the questions asked of students and alumni, and employers and training providers. Follow-up interviews with individuals currently employed in the heritage sector were based on their responses to the survey; as such, questions were tailored to each respondent and so varied.

2.1 Students and alumni

2.1.1 Online survey

Data was collected from students and alumni who have been registered on either heritage science-specific courses or courses including elements of heritage science, where heritage science is defined as the application of science and technology to cultural heritage to improve understanding, management and engagement.

Culture Syndicates designed an online survey to collect information that would fulfil the objectives of the research brief. The survey was distributed to institutions and courses identified by NHSF. The course contacts then circulated the survey to their students and alumni[5]. Survey responses were collected using Survey Monkey, and included logic mechanisms to direct and filter questions, thus ensuring that the correct information was gathered from participants. The survey was targeted at people who have gained a post-graduate qualification since 2011; people who indicated they had graduated prior to this were excluded from the survey[6]. The date was chosen to include people who have participated in the Science & Heritage Programme[7] (which ran from 2008-2013). There were 68 responses to the survey, 4 of which were excluded as a result of a pre-2011 graduation date.

It should be noted that 'total population data' (i.e. the total number of students/alumni on the courses contacted) is not known. Some bias may have resulted from the self-selection of survey respondents. In order to build a more comprehensive picture of pathways into heritage science, there is scope for NHSF to create partnerships with a small number of universities and study their admissions data to gather further insight on who applies for courses.

2.1.2 Interviews

Following the completion of the online survey, participants were able to indicate whether they would be willing to discuss their answers in a subsequent interview. Interviews were carried out with five people who had completed their postgraduate training to explore motivations and aspirations, and career paths in greater detail. Questions focused on choice of career, choice of postgraduate

[5] A list of these institutions, departments and relevant courses can be found in Appendix 1.
[6] Please see the supporting document on the NHSF website for the survey and skip logic.
[7] http://www.heritagescience.ac.uk/

courses, volunteering opportunities within the sector, and where career paths may take them should they leave the sector.

2.2 Training Providers and Employers

2.2.1 Telephone surveys

Culture Syndicates carried out telephone surveys with training providers and employers identified by NHSF. The survey consisted of a structured interview. Participants were asked questions surrounding both postgraduate jobs and opportunities. These were defined as roles that necessitated a postgraduate qualification; jobs were defined as paid positions, including post-doctoral research, while opportunities referred to unpaid positions. Questions focused on their experience in attracting candidates to positions; the skills and experience of applicants to postgraduate roles; and the impact of external factors, including Brexit. All participants were asked whether they were happy to be featured as a case study.[8]

2.3 Review of Existing Sector Reports

Culture Syndicates carried out a review of recent industry reports to inform the development of the surveys and analysis of findings.

[8] Please see the supporting document on the NHSF website for a full list of survey questions.

3. Findings: Students and Alumni

3.1 Who applies for postgraduate roles?

The survey asked participants to give details of their current or most recently completed university course/programme, the graduation date of their current/most recently completed programme and for information about their qualifications (level and stage of completion). This was complemented with demographic data to build up a picture of those who undertake postgraduate heritage science roles.

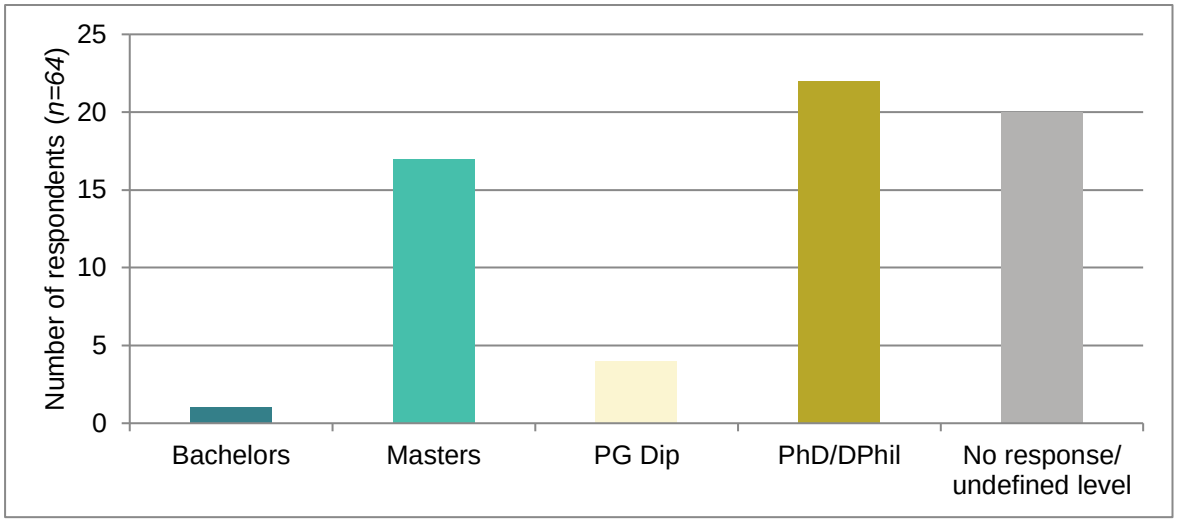
Approximately two thirds of survey participants (43 of 64) were current students; the other third (21 of 64) were alumni employed in either heritage science or a different sector.

3.1.1 Responses to question: "Please give details of your current or most recently completed university course/programme" (*n=64*)

The word cloud below is generated from the free text responses to this question (64 respondents who completed courses in 2011 or later). It gives a visual impression of the variety of courses that have been taken by those who completed the survey, a full list of which is available in Appendix 2. Words that feature repeatedly in answers to this question are shown more prominently in the word cloud.

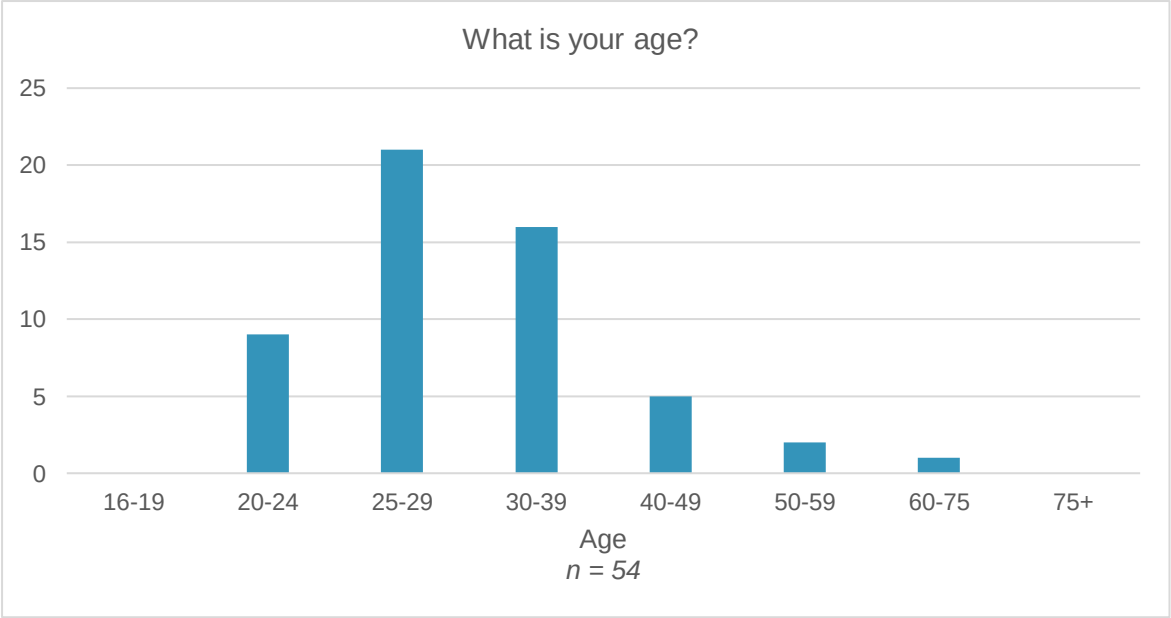
It can be seen that 'conservation' featured prominently in the course descriptions (it was mentioned in 27 of 64 responses).

44 out of the 64 respondents also specified the level of their current/most recent course in their free text response. The responses have been grouped into Bachelors, Masters, PG Dip and PhD/DPhil and are shown in the graph below. The most frequent response was PhD/DPhil indicating a highly qualified student/alumni body.



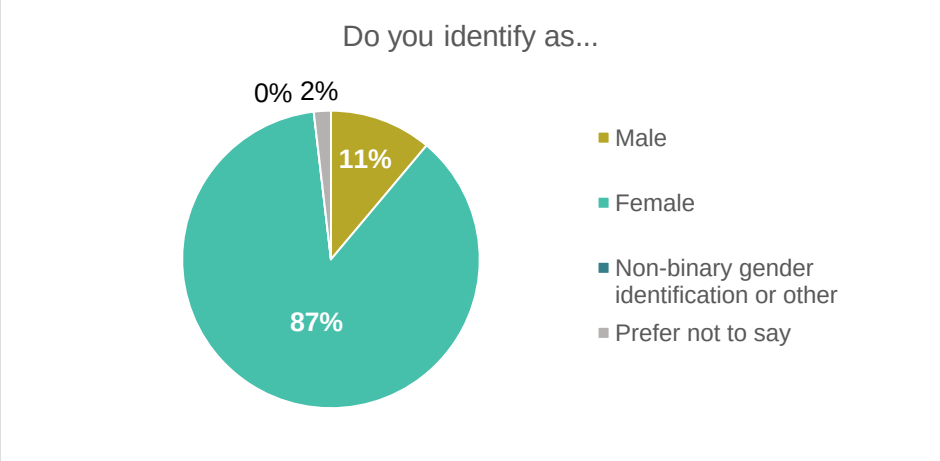
The survey asked for demographic data on age, gender, ethnicity, nationality, and disability status. There were also questions designed to give insight into socio-economic background. These questions were not answered by all respondents (answered by 54 out of 64).

3.1.2 Responses to question: "What is your age?"



The graph above shows the age distribution of respondents. From the distribution, (and bearing in mind that all respondents have graduated post-2011), it can be inferred that many of the respondents have followed a path of continuous education if they are engaged in postgraduate study by the age of 25-29. However, a significant proportion (44%) are 30 years old or older, suggesting that postgraduate heritage science courses are also undertaken by people who have moved into the heritage science sector following a career change, or change in area of focus, via a new qualification.

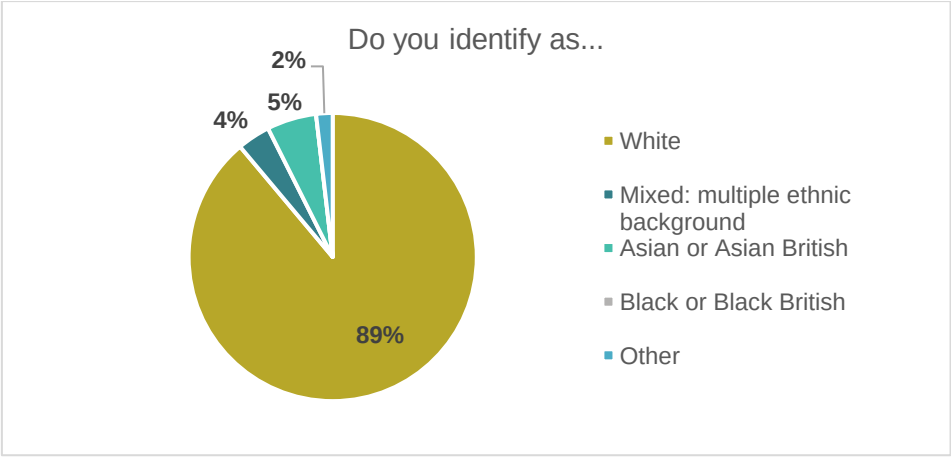
3.1.3 Responses to question: "Do you identify as?" (Gender) *(n=54)*



As shown in the chart above, 87% of survey participants identified as female, while 11% of participants identified as male and one participant "preferred not to say".

These results indicate that the vast majority of students and recent graduates within the sector are women. This is understood to reflect the current demographic of the heritage[9] (and heritage science[10]) workforce. Further research is required to establish whether this particular sample is representative of the wider heritage science sector population, and whether these proportions remain the same as heritage scientists' careers progress[11].

3.1.4 Responses to question: "Do you identify as?" (Ethnicity) *(n=54)*



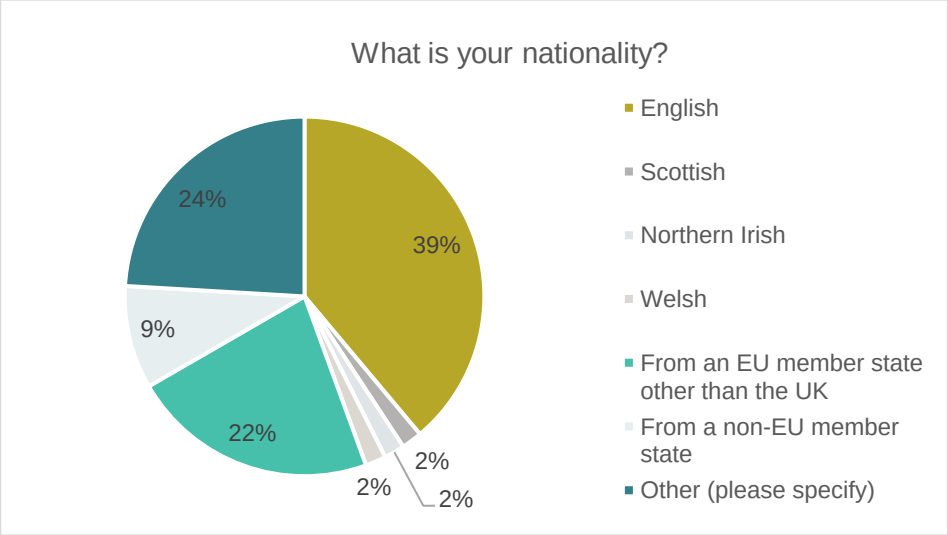
89% of survey participants identified themselves as white. In 2011, whilst 86% of the population in England and Wales identified as white[12], this statistic was decreasing. The survey sample appears to be roughly representative of the UK population; although the comparative national statistics are

[9] See Icon's *Conservation Labour Market Intelligence 2012-13* report, p.8 (conservation workforce), the ARA's 2015 UK information workforce survey (archives workforce), and the Arts Council's *Character Matters: Attitudes, behaviours and skills in the UK Museum Workforce* 2016 report, p.22 (museums workforce).
[10] UCL (2016) How heritage science is addressing the gender balance
[11] Yasmin Kahn, The Guardian, *Sex equality must be pushed higher up the museum agenda*
[12] Office for National Statistics, *Ethnicity and National Identity in England and Wales: 2011*

incomplete (covering England and Wales only rather than the whole of the UK) and somewhat out of date (comparing 2011 census data to our 2018 survey results).

11% of survey participants identified as non-white; however, none of the participants identified as "Black or Black British". Research by Museum Detox, the BAME network for museum and heritage professionals, found that 7% of the culture and heritage workforce is Black, Asian or Minority Ethnic (BAME)[13], suggesting that heritage science may be more ethnically diverse than the wider sector. Nevertheless, BAME representation in heritage science courses remains lower than the higher education average (22% overall and 19.5% for postgraduate courses as of 2016/17)[14].

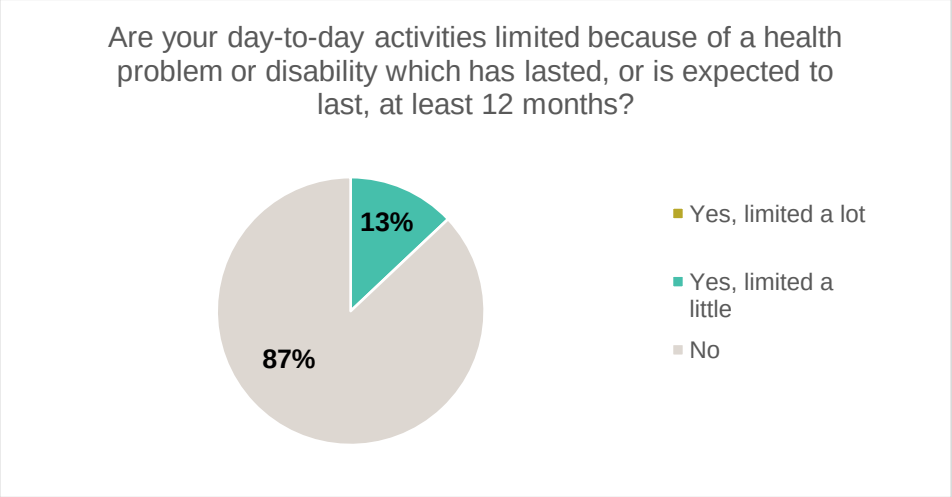
3.1.5 Responses to question: "What is your nationality?" *(n=54)*



Most of the respondents to this survey are from the UK, with 45% of respondents hailing from England, Scotland, Wales and Northern Ireland. International students appear to make up the remaining half of heritage science students and alumni, with European nationals comprising 31% of students and alumni. Of these, only 9% were from non-EU member countries. A further 24% of respondents came from countries outside of Europe. These individuals who identified as non-European came from the USA, Canada, India and Venezuela. Within this group, 'North America' was the most common response.

[13] https://artuk.org/discover/stories/introducing-museum-detox-being-bame-in-museums
[14] HESA, Higher Education Student Statistics: UK, 2016/17 – Student numbers and characteristics.

3.1.6 Responses to question: "Are your day to day activities limited because of a health problem, or disability which has lasted, or is expected to last, at least 12 months?" *(n=54)*



Under the Equality Act 2010, disability is defined as a physical or mental condition that has a negative effect on one's ability to undertake daily activities, and that has lasted or is expected to last at least 12 months[15].

87% of survey participants indicated that they were not limited by a disability or health condition. 13% considered themselves to be 'limited a little' by a disability or long-term health condition. No one chose the option, 'Yes, limited a lot'.

According to the Office for Disability Issues, 16% of working age adults in the UK are disabled[16]. The survey data therefore appears to be broadly consistent with the wider UK population, indicating that the field of heritage science may be considered somewhat accessible to disabled individuals.

3.1.7 Responses to questions: "Please give use the first part of your postcode (permanent address)" *(n=44)*; and "Which of the following best applies to the secondary school(s) you attended?" *(n=54)*

Location of permanent address and type of school attended were identified as two indicators of socio-economic background[17]. While the data gathered points towards some general trends, these factors need to be explored in much greater depth for their effect on those applying to postgraduate roles in heritage science to be properly understood.

[15] Gov.uk, *Definition of disability under the Equality Act 2010* https://www.gov.uk/definition-of-disability-under-equality-act-2010
[16] Gov.uk, *Disability Facts and Figures* https://www.gov.uk/government/publications/disability-facts-and-figures/disability-facts-and-figures
[17] Type of school attended is one of four measures of socio-economic background recommended to employers by Government https://www.gov.uk/government/publications/socio-economic-background/socio-economic-background-seb

Postcode

The location of survey participants' permanent address has been plotted on GoogleMaps using the first part of their postcode. (A full list of postcodes collected can be found in Appendix 3.) The resulting distribution is shown below, and this can be accessed on **GoogleMaps** to enable closer analysis of the data.

Map of postcode districts of survey participant's permanent address

Online version of map of postcode districts of survey participants (*n=44*)

There was an attempt to relate the postcode district data to mapping of the Index of Multiple Deprivation (2015) but the lack of full postcodes would have made any conclusions drawn from the plotting inaccurate, so it was not pursued. The postcode mapping shows that the majority of survey respondents are based in England, with many having a permanent address in the South East.

Secondary School

Answer Choices	Percentage of respondents
Free to attend (including home schooling)	68%
Fee paying	17%
Fee paying but some or all of my fee was covered by scholarships	13%
I'm not sure	2%

According to Independent Schools Council data, 5% of school children in the UK attend a fee-paying independent school[18]. As 30% of survey participants attended a fee-paying school, this suggests that heritage science students/researchers are disproportionately from a higher socio-economic background than the UK population as a whole.

Summary: Who applies for postgraduate roles?

Based on responses to this survey, heritage science students and alumni are…

- ➔ **From a range of academic and professional backgrounds**
  Just over half (56%) of heritage science students/alumni have followed a direct progression from undergraduate to postgraduate studies, while the remainder (44%) followed an "interrupted" progression; it may be inferred these are likely to have come into heritage science from another sector or research area. Some come from an arts-based background, others from a scientific background.

- ➔ **International**
  Over half of the students/alumni are international (55%). The biggest proportion of international students/alumni is from the EU (22% of total). The other 45% of heritage science students and recent graduates are British (principally English).

- ➔ **Mostly women**
  Much like the rest of the heritage sector, heritage science is a female-dominated sector at student and early career level. It is yet unclear whether this translates into a balanced, equally-retained workforce at higher levels.

- ➔ **Moderately diverse**
  Ethnic diversity amongst heritage science students appears to reflect diversity statistics amongst the broader UK population. With 11% of trainees identifying as non-white, the sector appears to be more diverse than the rest of the culture and heritage fields, but it struggles to attract individuals who identify as Black or Black British, and lags behind the national average for BAME students in higher education.

- ➔ **From a relatively 'high' socio-economic background**
  A third of heritage science trainees attended a fee-paying secondary school, six times the national average.

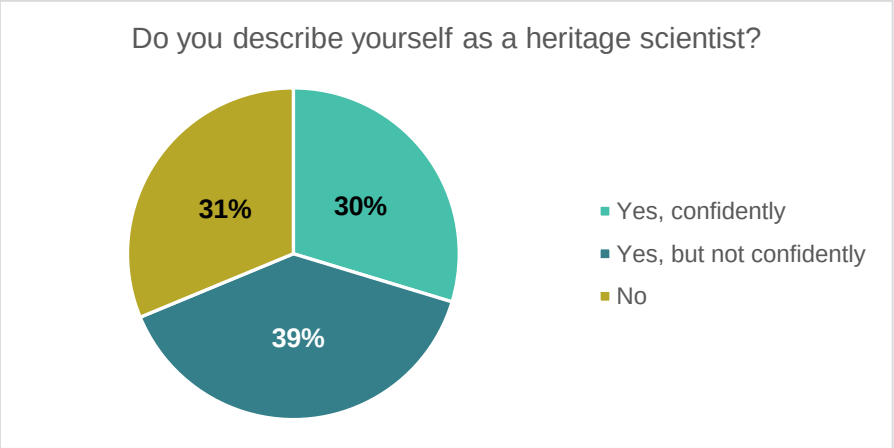
- ➔ **Sometimes disabled, but not "limited a lot" in their day-to-day activities:**
  Heritage science courses appear to be accessible to students who consider themselves "limited a little" in their day to day activities, but may be not at all accessible to those "limited a lot".

[18] Independent Schools Council, https://www.isc.co.uk/media/4092/68538-4.pdf

3.2 How do people identify with heritage science and a career in heritage science?

The survey sought to determine whether respondents saw themselves as embarking on a career in heritage science, or whether they defined themselves differently.

3.2.1 Responses to question: "Do you describe yourself as a heritage scientist?" (*n=64*)



The chart above shows that over two-thirds of respondents identify themselves as 'heritage scientists', despite the term only having come into broader usage in 2006.[19] This identification as a 'heritage scientist' has been made by respondents before any definition of the term 'heritage science' in the survey. Nonetheless, more than half of these were not 'confident' describing themselves as such, reflecting both uncertainty in understanding the term and, perhaps, a feeling that it did not fully encompass their work or a stronger allegiance to a different professional identity. Another third of participants (31%) saw themselves as something else altogether.

3.2.2 Responses to question: "If you do not confidently describe yourself as a heritage scientist, what do you describe yourself as?" (*n=39*)

Those people who answered 'No' or 'Yes, but not confidently' to the question 'do you describe yourself as a heritage scientist?' were then asked what they would describe themselves as (in "I am a…" free text answer format). The word cloud below presents their answers. Greater prominence is given to words that appear more frequently in the given responses (the full list of answers can be found in Appendix 4).

Given the breadth of courses contacted (see Appendix 1), some of which focus on heritage science and some of which only include an element of heritage science, and the relatively recent emergence of heritage science as a term, it is not surprising to see a range of professional identities given in response to the question.

[19] http://www.heritagescienceforum.org.uk/documents/HoL_inquiry_2005-6.pdf

In terms of field, 19 participants identified as conservators (or restorers), 4 as archaeologists, 4 saw themselves as museum professionals in curation or collections care, 3 as chemists, and the remaining 9 as researchers or scientists in other disciplines.

Conservators and archaeologists appear to strongly identify as members of their discipline and rarely expanded on their 'identity' – occasionally, they specified scientific methods used. Conservators were divided in whether they saw their work to be heritage science (13 'Yes, but not confidently' and 6 'No') perhaps reflecting that scientific knowledge is essential to conservation but not the only aspect of it. On the other hand, all but one archaeologist replied that they were decisively not heritage scientists.

Most 'scientists' (chemists, physicist, digital imaging specialist…) seemingly consider themselves first and foremost scientists of a specific discipline and saw heritage as an area of application of their research, for example as, "A scientist working for heritage."

A number of participants saw themselves as trainees, not *yet* heritage scientists but "looking to be a heritage scientist." They all had answered "Yes, but not confidently" to the previous question.

It is also worth noting that participants who described themselves as museum or collections professionals (e.g. curators), and did not identify as heritage scientists, justified their responses by stating that they "use heritage science all the time but do not undertake research projects." This reflects a belief that one is only a heritage scientist if one undertakes research.

The responses suggest that there is a range of job titles encompassed by the term heritage science, but the individuals who hold these posts are not clear on whether they themselves are heritage scientists. Awareness of a broader definition of heritage science, including the application of science to heritage management and engagement, needs to be increased in order to build a larger and more diverse heritage science community.

The next survey question included a definition for the term heritage science (see below). Participants were asked to select (all that apply) from categories relating to employment or training in, or outside of, the field of heritage science. When asked to consider their professional identity in light of this definition, their answers present a different picture of respondents' sense of identity as heritage scientists.

3.2.3 Responses to question: "The term heritage science is the application of science and technology to cultural heritage to improve understanding, management and engagement. Here heritage science is anything that includes an element of heritage science, it need not be purely heritage science based. Which best describes your current situation?" (*n=61*)

Respondents were able to select more than one answer to this question.

Answer choices	Percentage of respondents
Training in or studying heritage science (including teaching heritage science)	61%
Employed in heritage science (including teaching heritage science)	25%
Employed in an area other than heritage science	21%
Other	8%
Unemployed and not in training or studying	0%

Following the definition of heritage science, more than three-quarters of respondents (48 of 61 participants) identified themselves as heritage scientists by their training, employment, or both. This suggests that while individuals may not identify themselves primarily as heritage scientists, they are aware that they are working in that field. It also suggests that 'heritage science' is being applied at a broader level that encompasses a range of more specific careers and job titles.

Over half of the survey participants (61%) identified themselves as current students in heritage science. 25% of participants answered that they are employed in heritage science, but this is nearly equalled by the proportion employed outside of heritage science (21%). Some respondents answered 'Other,' though on inspection, it appears that some of these answers could be mapped to the categories given. 'Other' answers were as follows:

- Two individuals are volunteers in the heritage science sector:
  "Volunteering as an objects conservator as part of my fieldwork."
  "Volunteering in heritage science"
- One is a *"PhD student"*
- One is employed in conservation:
  "Sole proprietor, Paintings conservation/restoration"
- One is employed outside of the sector, but making use of the transferable skills developed on a heritage science course:
  "I apply some of my knowledge in heritage science but not with the usual heritage science purposes"

Summary: Do students/alumni see themselves as heritage scientists?

The participants contacted as part of this survey were students and alumni of postgraduate courses in heritage science, or with elements of heritage science. Not all of the courses contacted resulted in survey responses (Appendix 1) and some responses came from beyond the list of identified courses (Appendix 2).

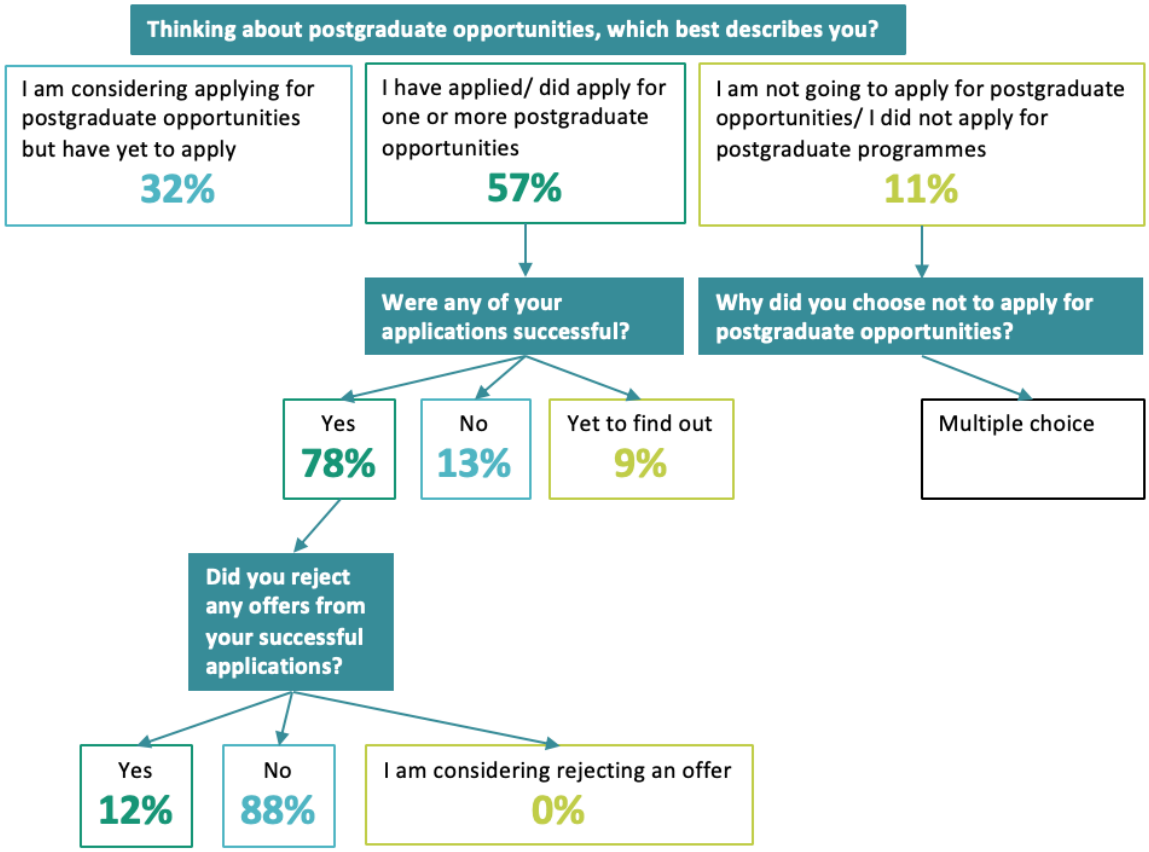
Survey responses suggest that:

- ➔ **Approximately two-thirds of the students and alumni surveyed consider themselves to be heritage scientists**
  However, over half of these are not "confident" in using the term. One-third of all respondents are certain that they are not heritage scientists. This range of different professional identities is due in part to the range of courses contacted and the breadth of the definition of heritage science courses. But it also reflects a varied understanding of 'heritage science' as a field and a restrictive interpretation of heritage science as an area of research only.

- ➔ **Heritage science is perceived as a sector of "researchers only"…**
  … rather than also encompassing the use of scientific methods and technology in the management, interpretation and engagement with heritage. The heritage science community would benefit from raising awareness of this more inclusive definition of heritage science.

3.3 Motivations and aspirations

A series of questions was asked to generate an understanding of why people choose (or choose not) to undertake postgraduate heritage science training/research and what they see that decision leading to. The diagram below demonstrates the survey logic pathway followed and is provided here to guide navigation of the survey responses.



3.3.1 Responses to question: "Thinking about postgraduate opportunities, which best describes you? Postgraduate opportunities are schemes or roles that are open only to graduates such as traineeships, internships, fellowships and graduate placements" (*n=56*)

Answer choices	Percentage of respondents
I am considering applying for postgraduate opportunities but have yet to apply	32%
I have applied/did apply for one or more postgraduate opportunities	57%
I am not going to apply for postgraduate opportunities/I did not apply for postgraduate programmes	11%

Of the survey sample, just over half of the respondents (57%) have at some point in their career applied for postgraduate opportunities, while 32% had not but intended to apply.

Six individuals (11%) had not applied and had no intention of applying for postgraduate roles – their answers as to why are given below.

3.3.2. Responses to question: "Why did you choose not to apply for postgraduate opportunities? (Please tick all that apply.)" (*n=6*)

The people who chose not to apply for a postgraduate opportunity gave a number of reasons for this decision:

None were relevant to my career choice	33%
It was not financially viable (e.g., low pay/other opportunities paid better/fees were prohibitive)	33%
I did not know the opportunities were available to me	0%
I did not think I could submit a successful application	0%
I had responsibilities that a postgraduate opportunity was not compatible with (e.g., caring or parental responsibilities)	0%
I was/am concerned about the impact of Brexit and/or uncertainty around this	0%
I wanted to/want to do something different (e.g., travel or work)	0%
Other	50%

Relevance of course to their career choice and financial pressures are key in the decisions that students make when considering postgraduate qualifications. Of the comments made within the 'other' section, none gave direct insight into why these participants did not wish to undertake a postgraduate role.

3.3.3. Responses to question: "Were any of your applications to postgraduate opportunities successful?" (*n=33*)

Participants who did apply for postgraduate opportunities were asked whether their applications had been successful. While most survey participants (78%) had been successful in their applications, 4 participants saw none of their postgraduate applications succeed[20].

Of these four, two were 25-29 years old and two were 30-39. All saw themselves as heritage scientists, although not confidently, and all wanted to pursue a career in heritage science. All were highly qualified:

- One had a BA, an MA and an MSc (in Conservation Studies), had volunteered in areas outside of heritage science and was currently employed in heritage science.
- One had a BA, an MA and was undertaking an MSc (in Conservation for Archaeology and Museums); they had volunteered both in and out of heritage science and had worked outside of the heritage science sector.
- One had a BA, an MSc and a PhD (in Archaeological Science), and was unsuccessful in applying for postdoctoral roles. They had volunteered in heritage science and in areas outside of heritage science, but had never been employed in heritage science at all. They were currently employed in the archives sector.
- One had a BSc, a Diploma and an MSc (in Museum and Heritage Management), and was currently employed outside the heritage science sector as a Museum Officer; they had volunteering experience in areas outside of heritage science.

These unsuccessful applications were from a range of nationalities and socio-economic backgrounds, and all were open to moving abroad for their career.

3.3.4. Responses to question: "Did you reject any offers from your successful applications?" (*n=25*)

12% of participants who were successful in applying for postgraduate opportunities rejected one (or more) of their offers. (The other 88% answered 'no'; there were zero responses 'I am considering rejecting an offer').

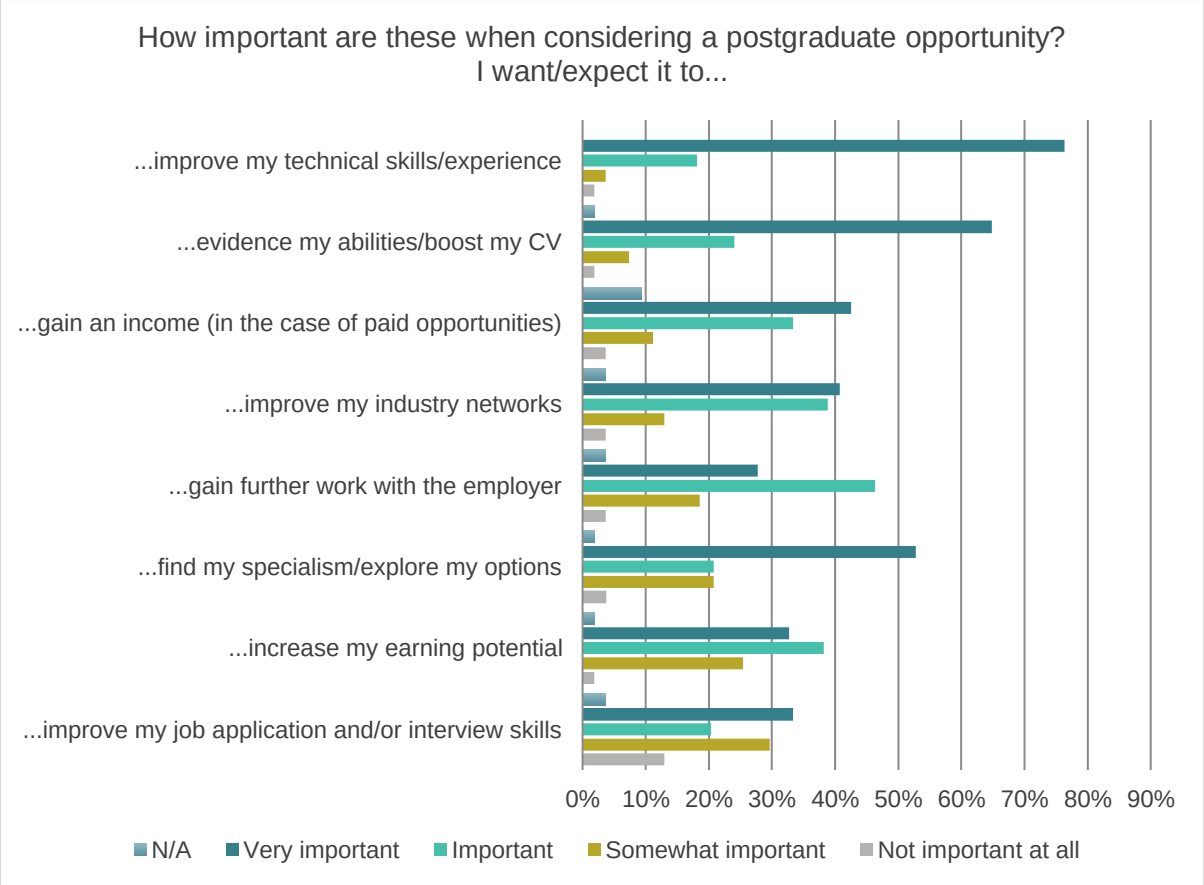
Reasons for rejecting offers of places were:

- Financial barriers of non-funded courses:
  "I rejected two offers for a master's in professional conservation because the cost was an overwhelming barrier. I was offered a funded PhD in analytical chemistry studying archaeological materials, and this was a much better prospect financially."
- Multiple course offers

The survey then sought to explore what postgraduates wanted from their opportunities by asking them to rate a number of factors by importance, and free text comment.

[20] A certain amount of selection bias should be noted, since the survey was distributed via university mailing lists. A partnership with a small number of universities to share data on admission rates would be required to fully understand the success rate of applications.

3.3.5. Responses to question: "Please rate how important these are/were to you when considering a postgraduate opportunity. I want/expect a postgraduate opportunity to…" (*n=55*)



The factors in the chart above are ranked top to bottom by "weighted average", which takes into account the relative importance of each answer based on its ratio of "not important" as well as "important" ratings. This is to make sure that the ranking and interpretation addresses the fact that some answers have nearly as many "not important at all" as "important" ratings[21].

Respondents have high expectations from their postgraduate opportunities: the answers show that a high proportion of the respondents felt that most of the categories were 'very important' expectations of their postgraduate opportunity. The following aspects were given the most 'very important' ratings:

- Improve my technical skills/experience
- Evidence my abilities / boost my CV
- Find my specialism / explore my options
- Gain an income
- Improve my industry networks

'Improve my technical skills/experience' was rated as 'very important' by the largest number of people. This suggests a vocational or skill-specific motivator when choosing opportunities. "Interest"

[21] For example, this is the case of the "to improve my job application and/or interview skills" factor.

emerged as an overarching theme when conducting follow-up interviews: regardless of previous specialism, an interest in heritage was common to all interviewees who had applied for a postgraduate opportunity.

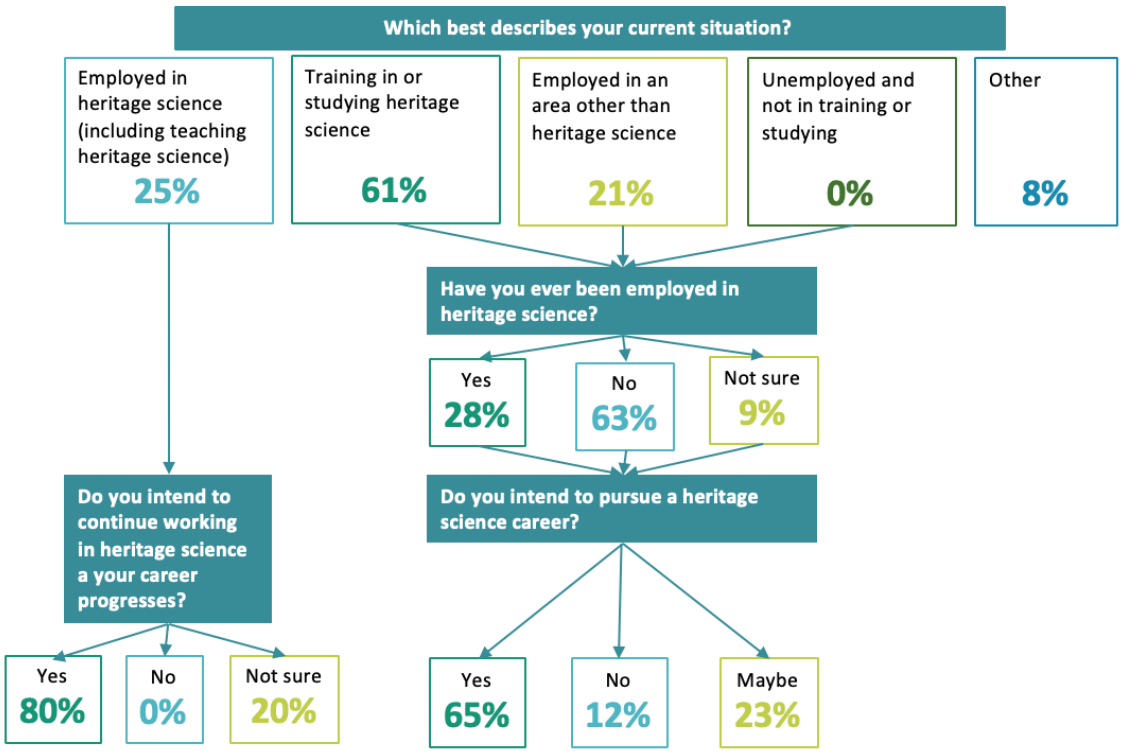
Factors deemed "important" when applying for postgraduate opportunities included gaining further work with an employer, improving industry networks and increasing earning potential: all strong practical considerations.

Participants in the follow-up interviews found that career prospects and better chances of earning competitive pay were major motivations for entering postgraduate studies; one interviewee felt that their options for employment were very poor without completing a PhD.

Another interviewee, who enrolled on a co-funded course, found it valuable in making the most of the expertise offered by both their academic training and their industry employer – effectively getting the "best of both worlds."

15% of survey participants rated 'other' options as being the most important factors for their consideration of postgraduate opportunities. These included "to gain and produce knowledge" and "finding long-term employment."

The next set of questions asked whether the survey participants were in training or employment, and whether they intended to pursue a career in heritage science (these questions followed those asked about heritage science identity in the survey logic; see diagram below).



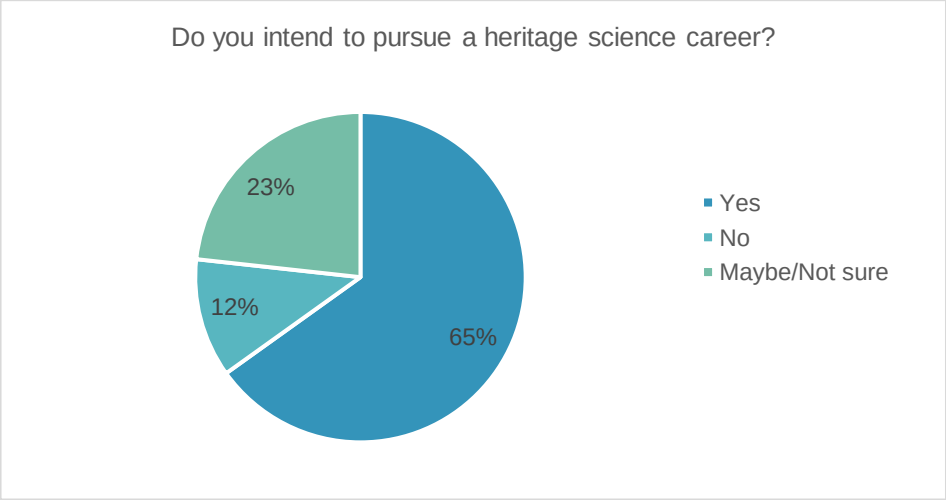
3.3.6. Responses to question: "Have you ever been employed in heritage science?" (*n=43)*

Over half of these respondents (63%, or 27) had never been employed in the heritage science sector. While this corresponds to the proportion of respondents currently in education (see 3.2.3), it does seem to highlight difficulty in obtaining industry experience at training level. In follow-up interviews participants did report a disconnect between training providers and employers that they felt hindered their training experience.

"Depends on whether you class a funded PhD bursary (and fees) as employment. It de facto *was in my case."*

They were then asked whether they intended to pursue a career in heritage science.

3.3.7. Responses to question: "Do you intend to pursue a heritage science career?" (*n=43*)



Two thirds (65%) of participants did indeed intend to pursue a career in heritage science.

Those who did not, or were unsure, cited low pay and a lack of opportunities as their main concerns:

> *"There are few jobs and when there are jobs advertised the pay is shockingly low compared to PhD-equivalent roles in other sectors – why start a job at circa £26k when I can be employed at £32k and have better career advancement prospects?"*
>
> *"Although I answered yes, I am well aware of the lack of positions, or more importantly at times the lack of range of research in the heritage field where I am. With one of the leading heritage science research organisations in Scotland, they have only hired individuals from one specific background, showing that the focus in* [sic] *on limited materials (although prominent) not fully encompassing the field which should be researched."*
>
> *"Differently from the conservators, there are not too many vacancies and positions as heritage scientist* [sic]*. Often the only way to pursue the heritage science career is through universities, but I am not personally interested in academia and I decided for a Ph.D. because I saw it as a needed requirement and a chance to acquire skills, but not to become a*

professor. So, I might consider a change of direction in my professional path, if I cannot find my way outside the academia."

There also appeared to be a lack of clarity regarding career paths available in heritage science, with participants saying that they were *"not sure what roles there are or where to look",* or that they had *"never really considered it as an employment option before."*

Many comments reflected a limited understanding of what heritage science is and encompasses as a sector; for example:

"I intend to pursue an academic career. The museum is too unethical."

"I prefer practical work."

Interestingly, one participant responded *"no… but only in the sense you defined heritage science"*, hinting at a definition still considered too restrictive by some.

Many participants were highly aware of their transferable skills and the alternative pathways open to them, or saw heritage science as only a small part of their work:

"It is something I would do, if the employment/career opportunity arises, but I am not specifically looking to get back in the field."

"It's definitely something I would be interested in but I would be equally interested in pursuing an environmental science career."

"I may continue scientific research for a few years, but depending on opportunities and geographic location I also consider going into built heritage consultancy and linking back with my architectural history background."

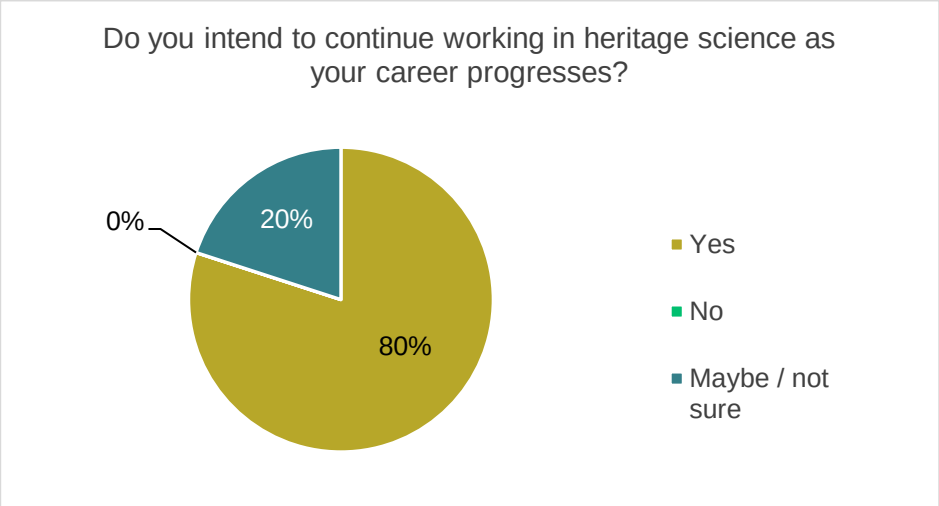
"I would like to work as a paper conservator but have not got a skilled job. I would like to study for an MPhil one day but have not yet found an opportunity that suits me."

"I use heritage science in my business, but more peripherally due to cost constraints for scientific analysis equipment."

"I am not confident with science at all beyond how I apply it – minimally – to my job."

Those people who indicated they are already employed in heritage science (including teaching heritage science) were also asked about their future career aspirations.

3.3.8. Responses to question: Do you intend to continue working in heritage science as your career progresses?" (*n=15*)



The majority of individuals already working in heritage science clearly wished to remain (80%). Nevertheless, 20% of individuals stated that they were 'not sure' about remaining in the sector. Relocation, impact on personal lives and limited career prospects outside of London were highlighted as reasons why people may not wish to continue working within the sector:

> *"I intend to [continue working in heritage science], but am wary of the few opportunities for permanent work."*
>
> *"Depends on jobs availability."*
>
> *"The job prospects are limited, and in this country (UK) often involve moving to London which I am not willing to do."*
>
> *"I have already slightly moved away from what is defined as heritage science. I used to be a heritage scientist but there are not enough job positions to work as such in the long term. If you love the field you need to find other ways to apply the knowledge. Heritage science positions are short terms (I had jobs maximum 1 year long) and require re-locating in different countries each time. It is a career that can have a serious impact on your personal life."*

Participants further commented in follow-up interviews that possibilities of securing work outside of London were very limited, but that low salaries prevented relocation to London at all, with typical heritage science salaries unable to support high costs of living in the city.

It is clear from these comments that job security plays a major role in individuals' decisions to continue working in heritage science. There appears to be strong interest in the field; however, heritage scientists are forced to re-evaluate their career choice at the end of each (often short-term) employment period.

Summary: What are the motivations and aspirations of heritage science postgraduates?

According to survey responses…

- ➔ **Financial considerations are a key concern for prospective postgraduate students.** Barriers to applying for postgraduate studies are largely financial; tuition costs for taught programmes were labelled *"an overwhelming barrier"*. Similarly, decisions to accept or reject a course offer are often financially motivated, with funded courses considered a better prospect. "Gaining an income" through a funded postgraduate position is the third biggest motivation when applying.

- ➔ **Applicants have high expectations of postgraduate opportunities.** Improving skills, knowledge and experience is the number one priority for applicants, closely followed by practical career considerations such as boosting their CV, improving industry networks and increasing earning potential.

3.4 Career paths of Heritage Science (post-)graduates

Of the 61 people that answered the question about their 'current situation' (see 3.2.3), 61% (37 people) were training or studying and 46% (28 people) were employed. People could give more than one answer to this question, and 7 people chose to do this.

- 1 was in training and also volunteering (other)
- 4 people were in training and were also employed in heritage science
- 2 people were employed in heritage science and employed in an area other than heritage science

Of those who indicated they are employed (28 people), 15 are employed in heritage science (54%).

Participants were later asked about their qualifications, to understand their career pathways (see section 3.4.1). To explore a different aspect of the career paths of students/alumni of heritage science courses, the survey asked all participants whether they have worked in voluntary roles, or outside of heritage science before getting their first heritage science role (section 3.4.2).

3.4.1. Responses to question: "Please tell us about your qualifications" *(n=64)*

Individual responses to the question "please tell us about your qualifications" have been illustrated through a chart (p.32) to show the range of qualifications held by each survey respondent (and therefore study pathway).

Heritage scientists clearly tend to pursue lengthy studies at graduate and postgraduate level: heritage science students/alumni appear to complete an average of three qualifications, including two postgraduate qualifications. One heritage employee reflected on the apparent imbalance between training and jobs in the follow-up interviews:

> *"…there's a lot of emphasis on training at the moment, but not a lot of emphasis on job creation and not a whole lot of emphasis on creating good jobs, like well-paying jobs that also allow you to progress career-wise afterwards."*

Participants in the follow-up interviews were concerned that the heritage science sector is too focused on training, to the detriment of developing secure and appropriately paid roles.

- 1 individual completed 5 qualifications
- 10 individuals completed 4 qualifications
- 24 individuals completed 3 qualifications
- 20 individuals completed 2 qualifications
- The remaining participants had completed 1 qualification so far in their careers

The following table shows a diagrammatic representation of responses to 'please tell us about your qualifications…'

BSc	Diploma / PG Dip	MSc	MRes	PhD/MPhil
BSc	PhD/MPhil	Post-doc	Post-doc #2*	
BSc	MSc	PhD/MPhil	Post-doc	
BSc	MSc	PhD/MPhil	Post-doc	
BSc	MSc	PhD/MPhil	Post-doc	
BSc	MA	MSc	PhD/MPhil	
BSc	MSc	MRes*	PhD/MPhil*	
BSc	MSc	MRes	PhD/MPhil*	
BSc	PhD/MPhil	Post-doc		
BSc	MSc	PhD/MPhil*		
BSc	MSc	PhD/MPhil*		
BSc	MSc	PhD/MPhil		
BSc	MSc	PhD/MPhil*		
BSc	MSc	PhD/MPhil*		
BSc	MRes	PhD/MPhil*		
BSc	MRes	PhD/MPhil*		
BSc	Diploma / PG Dip	MSc		
BSc	MRes			
BSc	MSc*			
BSc	Diploma / PG Dip*			
BSc	Diploma / PG Dip*			
BA	MA	MRes	PhD/MPhil*	
BA	MA	MRes	PhD/MPhil*	
BA	Diploma / PG Dip	MA	MSc	
BA	MRes	PhD/MPhil*		
BA	MSc	PhD/MPhil		
BA	MSc	PhD/MPhil*		
BA	MSc	PhD/MPhil*		
BA	MSc	PhD/MPhil*		
BA	MA	PhD/MPhil*		
BA	MA	PhD/MPhil*		
BA	MA	MSc		
BA	MA	MSc*		
BA	Diploma / PG Dip	MA		
BA	Diploma / PG Dip	MA		
BA	Diploma / PG Dip	MA		
BA	Diploma / PG Dip	MSc*		
BA	PhD/MPhil*			
BA	PhD/MPhil*			
BA	PhD/MPhil*			
BA	PhD/MPhil			
BA	MA*			
BA	MA*			
BA	MA			
BA	MA*			
BA	MA			
BA	Diploma / PG Dip			
BA	Diploma / PG Dip*			
BA	Diploma / PG Dip			
BA*				
BA*				
BA*				
BASC	MRes	PhD/MPhil*		
BE	MSc	MA*		
MA	PhD	Post-doc		
MA	MRes	PhD/MPhil*		
MSc	MRes	PhD/MPhil*		
MSc	PhD/MPhil*			
MSc	PhD/MPhil*			
MSc*				
Mchem	PhD/MPhil*			
Post-doc*				
Diploma / PG Dip*				
Diploma / PG Dip*				

3.4.2. Responses to question: Which of these statements apply to you? I have… (Please tick all that apply)" (*n=56*)

Answer choice	Percentage of respondents
Volunteered in heritage science	50%
Volunteered in areas other than heritage science	50%
Worked outside of heritage science before gaining my first heritage science role	45%
None of the above	27%

50% of respondents had experience volunteering in heritage science, and 50% had volunteered in other areas. The telephone interviews with current heritage science employees – identified from the student and alumni responses – highlighted that volunteering is considered an important step to gaining employment in the sector. This appeared to be more prevalent for those from a heritage background than those from traditional science backgrounds.

Nearly half of participants (45%) had worked outside of heritage science before gaining their first heritage science role. This reflects a combination of extensive training periods, limited career prospects in the sector, and indications that approximately half of the survey participants came into heritage science following a career change. One person, for instance, recounted in the follow-up interviews having to work part-time outside of the sector to balance low salaries and poor job security.

3.4.3. Responses to question: "If you are employed, tell us about your current role" *(n=30)*

The word cloud above illustrates the range of roles in which survey participants – all recent graduates – are now employed; it gives an indication of the variety of careers that heritage science skills and knowledge can lead to. 30 participants provided both job title and organisation; 1 listed their job title as 'Student' and was discounted from the results in this section.

'Research Assistant' is by far the most prevalent job title, with 10 participants currently working as research assistants, doctoral or postdoctoral researchers. These roles occasionally involve additional teaching duties. 7 participants are employed in the field of conservation; 4 are museum and/or archive workers (with roles ranging from 'Museum Assistant' to 'Archive and Collections Care Officer'). Another 2 participants are employed in digital fields (as Digital Exhibitions Creator and Digital Imaging Specialist), and one is an archaeologist. Others are employed as scientists but do not specify their field ('Technical Assistant', 'Analytical Scientist'). At least one participant works outside of the heritage or science sectors entirely (as a Sales Manager).

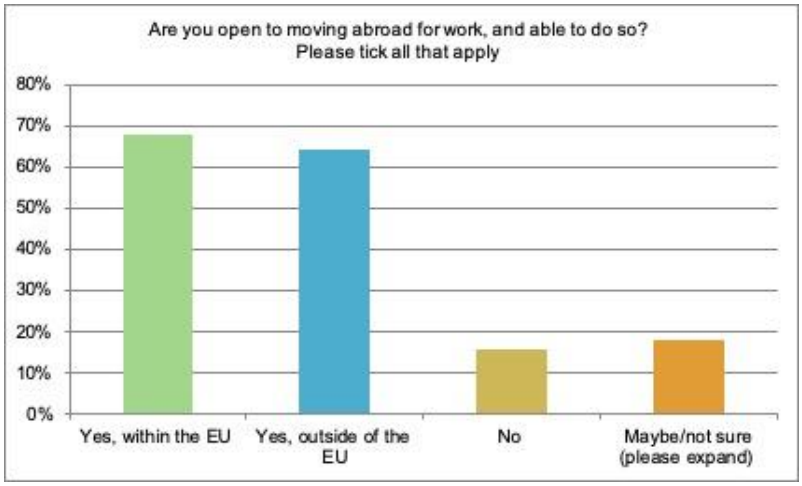
The following table presents all responses to the question and has been colour-coded to group responses into different fields of employment.

Job Title	Organisation
Conservation and Laboratory Technician	UCL Qatar
Postdoctoral Research Associate	University of Liverpool
Digital Exhibitions Creator (Part-time)	Charleston Library Society
Conservation Student (Placement)	University Museums Cambridge
Tutor	Durham University
Sole Proprietor	Own Consultancy
Painting Conservator	Hamilton Kerr Institute, University of Cambridge
Conservation assistant	
Senior Archaeologist (Consultant)	MOLA
Freelance Conservator	Lincoln Conservation at the University of Lincoln
Archive and Collections Care Officer	Chatham Historic Dockyard Trust
Sales manager	Old Elephant Fudge
Analytical Scientist	National Museums Scotland
Archives	Historic England
Museum Assistant	Natural History Museum
Trainee in Conservation of Books and Archives and Communicating Conservation	Private Consultancy
PDRA	University of Edinburgh
Museum Officer	Bassetlaw Museum
Research Assistant	University of Cambridge
Lecturer and Research Assistant	University of Glasgow
Knowledge Exchange Fellow (with Historic England)	University of York
Director	Own Consultancy
PhD student	University of York
Technical Assistant	The Courtauld Institute of Art
Research Assistant	The Fitzwilliam Museum, Cambridge
Doctoral researcher	UCL
Research Assistant	University of Oxford
PhD student	UCL
Digital Imaging Specialist	Smithsonian's Museum Conservation Institute

Universities are by far the biggest employer of recent heritage science graduates, with 16 participants employed by universities – including university museums and paid doctoral positions.

Other main employers of heritage science graduates were **museums** and their research centres (4 participants), **heritage organisations** (4 participants employed by large heritage organisations, including two registered charities and one public body), and **consultancies and private companies** (4 participants). In the case of the latter, two participants founded their own consultancies; another is a trainee and the final participant is employed in a private company outside of the heritage sector.

3.4.4. Responses to question: "Are you open to moving abroad for work, and able to do so?"



Two thirds (68%) of the participants that completed this question stated that they would be prepared to relocate to other countries within the EU to find work. Survey participants were equally prepared to relocate to other nations outside of the EU (64%). This indicates a mobile workforce within heritage science.

Those who were 'not sure' about moving abroad for work gave a variety of reasons for their answers, including:

- Family commitments:

"Not any more. Only considering work commutable from current family home."

"I have dependants which will influence decision."

- Visa constraints:

"As an American Citizen I feel my opportunities abroad are very limited."

"I am open to moving abroad for work. Whether I will be able to or not depends on visas and work permits that I will have to apply for and succeed in obtaining."

"I am a US national with the right to live and work in the UK through my spouse, although this is subject to proof of income requirements. This makes it difficult for me with short-term posts because the income does not qualify towards my visa, and I have to obtain a visa to work in the EU."

- Lack of long-term opportunities:

"During my education process I've been already abroad as intern more than once, but always in universities or research institutions that do not offer opportunities after completing the internship. Therefore, I am not sure it is worthy anymore to move again."

- Living costs

"Would depend on location and living costs."

3.4.5. Careers after heritage science

Early career heritage scientists were asked in follow-up interviews about the areas they would consider entering if they left the sector.

Responses included academia and a return to traditional and applied sciences (e.g. analytical chemistry), but interviewees worried that time away from those sectors would hinder their success in these alternative career paths. One person stated:

> *"I don't necessarily know if the qualifications that I'll get at the end of this [heritage science postgraduate degree] would be very good for industry… I don't know if there's enough cross-over there for industry."*

Summary: What are the career paths of heritage science graduates?

According to the survey and follow-up interviews:

- ➔ **Heritage scientists tend to pursue lengthy studies at postgraduate level.**
  Heritage science trainees appear to complete on average three qualifications. There are concerns that the sector is too focused on training, to the detriment of developing secure and appropriately paid roles.

- ➔ **Heritage scientists often work outside of heritage science before securing their first heritage science role.**
  This is due to a combination of extensive training periods with low or no pay, limited recruitment opportunities, and the fact that about half of heritage scientists come into the sector following a career change.

- ➔ **Trainees from a heritage background have found volunteering necessary to secure a paid role; those from a traditional science background have not.**
  This could hint at the necessity to incorporate more practical training or industry partnerships into heritage-based courses.

- ➔ **Universities are by far the biggest employer of heritage science graduates...**
  Followed by museums, heritage organisations, and consultancies and private companies. Recent graduates tend to find employment as research assistants, conservators, museum workers (in a range of roles) and archaeologists.

- ➔ **Sector retention is heavily affected by job security.**
  Despite strong enthusiasm within the field, heritage scientists are forced to re-evaluate their career choice at the end of each short-term employment period. Re-location to a different city can improve prospects, but is impaired by low pay, visa constraints and family commitments as their careers progress.

4. Findings: Training Providers and Employers

In the second phase of research, Culture Syndicates conducted telephone interviews with training providers and employers identified by NHSF.

Responses to question: "Are you a training provider or employer?"

Interviewees were asked whether they considered themselves a training provider or employer. Organisations who identified as 'both' were:

- Historic Royal Palaces
- University of Reading
- University of York (two different departments)
- University College London
- Nottingham Trent University

However, for the purpose of interpretation the interviewees were grouped as follows:

Training providers interviewed:

- University of Glasgow
- University of York (Building Conservation and Archaeobiology depts.)
- Queens University Belfast
- Nottingham Trent University
- University of Stirling
- University of Lincoln
- Cardiff University
- University of Reading
- University College London

Employers interviewed:

- British Museum
- Historic Royal Palaces
- English Heritage
- Historic England
- National Trust

Interview questions and collated responses are given in the following paragraphs.

4.1. Do those advertising postgraduate opportunities and jobs in heritage science recognise them as such?

4.1.1. Responses to question: "Do you advertise any of the following?"

- Postgraduate programmes, courses and/or opportunities in heritage science
- Jobs in heritage science
- Both of the above
- None of the above
- Other

Most of the employers and training providers interviewed recognised that they were offering opportunities in heritage science. Organisations that identified as both training providers and employers agreed that they offered both postgraduate opportunities and jobs in heritage science. Likewise, the British Museum, which advertises collaborative PhD schemes funded by the AHRC, where a student's time is split between a training provider and the British Museum, also identified themselves as both a training provider and an employer (see Appendix 5 for an example of a collaborative studentship). The British Museum does not otherwise recruit to training courses or opportunities.

Nevertheless, some employers recognised that they tended to advertise heritage science jobs under other names. The National Trust, for example, would advertise for archaeologists with specialist skills:

> *"We do have one person who is a heritage science assistant to our collections, but we would tend to call them by other names. So, for instance, we've got a national specialist who is a specialist in digital imaging, but he's employed principally as an archaeologist and it's the expertise of the heritage science that he brings to the role … It's a means to an end rather than an end in itself."*

Similarly, there was some debate amongst training providers as to what qualified as "heritage science" programmes: staff from the University of York considered MA programmes in Bioarchaeology to be heritage science, while the University of Lincoln was clear that its Conservation course was not.

Training providers also pointed out that university students at undergraduate or master's level often come into heritage science through a final year project, as part of a 'traditional' science course. For instance, an MRes student in physics or imaging science might discover there to be heritage science applications for their research. At PhD level, on the other hand, projects tend to be specifically advertised as heritage science based.

Summary: Do those advertising postgraduate opportunities and jobs in heritage science recognise them as such?

And if not, how do they perceive them? According to the employers and training providers interviewed…

- ➔ **Employers are aware that they are recruiting for heritage science roles, but do not always advertise them as such.**
  Large organisations such as the National Trust are likely to be more specific in the language they use for the role (e.g. archaeologist with specialist skills).
- ➔ **Training providers do not all agree on what constitutes a heritage science-based course.**
- ➔ **Higher level postgraduate opportunities are more likely to be advertised as heritage science projects.**
  While students often come into heritage science at undergraduate or master's level through applied sciences, it is usually PhDs and further research opportunities that are specifically labelled as 'heritage science'.

4.2 How do training providers and employers perceive the current heritage science landscape?

Employers and Training Providers were asked about their perspectives on postgraduate opportunities and jobs in the heritage science sector. The following responses highlight the range of possibilities for postgraduates who have completed courses with elements of heritage science.

4.2.1. Responses to question: "What is your perception of postgraduate opportunities and postgraduate jobs in heritage science?"

Employer perspectives:
In large organisations such as the British Museum, there is a sense that the opportunities for students who have completed courses in heritage science are looking increasingly positive. At the time this study was carried out, the AHRC funded six PhD opportunities per year in collaboration with the British Museum; although more would be advantageous for the sector, this small annual cohort is increasing the research opportunities available to sector entrants. Other options for funding similar collaborative projects are also being explored: the Wellcome Trust, for example, has been approached to discuss the possibility of a similar programme, albeit with smaller cohorts.

Some employers, however, are finding that positions rarely open up, limiting opportunities for early career heritage scientists. In some cases, these roles are also filled by internal candidates, further limiting the potential entry points for recent graduates.

Placement years are often necessary for recent graduates to gain the experience that employers require. Interviewees felt that developing generalist knowledge allows graduates to work on a variety of projects, as is often required of entry-level roles.

The biggest challenges for sector entrants are low pay and a lack of defined career paths within heritage science. Employers do not see many progression opportunities for their staff, as senior roles are rare.

Training provider perspectives:
Those supervising PhD students who are close to completing their studies are seeing graduates secure new roles, particularly in specialist areas such as Textile Conservation. However, these roles may require relocation, sometimes to other countries, and salaries vary greatly.

It is the opinion of some training providers that certain employers look for very specific technical knowledge in their recruitment drives, accompanied by general skills such as lab skills and project management. As a result, interviewees found that students of more generalist courses such as Conservation were not always able to secure employment in their field. One interviewee stated:

> "*I do foresee skills gaps because the range of courses and the balance of courses is about [students'] supply and demand rather than about the needs of the profession*"

They also highlighted that the specialist skill-based courses currently needed in the field are not as popular with students:

> *"Universities want courses that will rake in lots of money and bring in lots of students … I get loads of students asking me about forensics all the time, and I put so many through to various forensics courses at masters level at different universities, but I can't think of a single one that I've managed to stay in touch with that's ended up with a job in it. So it's tailored to money making rather than to the profession. Where I think with more development, we're going to need a lot more environmental archaeologists in the sub-disciplines that are not considered quite so sexy, so geoarchaeologists or archaeobotanists, zooarchaeologists, whatever it might be. You see that there's exceptionally few courses on offer for those, but of course even if there were courses on offer, would they actually apply to them?"*

Interviewees were concerned that increased tuition fees at master's level has reduced student numbers and, as a result, the number of students applying for PhDs. Meanwhile, universities are reliant on student fees, and thus driving greater recruitment. Where certain courses receive large numbers of international students, the associated job markets – such as forensics – are becoming saturated.

Funding is becoming a growing issue for the heritage science sector, as it is now forced to compete with wider science programmes for funding. One interviewee in the field of Building Conservation commented that where research is undertaken, roles are not available beyond the project's scope.

Interviewees found career prospects for heritage scientists in the UK to be poor in comparison with the wider heritage sector. Decreasing funding is resulting in gaps in research, albeit one that could be filled through more collaborative projects; placements in partnership with employers could tackle some of this practical research.

4.2.2. Responses to question: "What are the main challenges facing heritage science postgraduates entering the sector?"

As mentioned previously, funding is an issue for those completing postgraduate courses in heritage science. Where stipends for PhDs are offered, they are felt to be insufficient to cover living costs, particularly in London. Salaries are frequently lower than other science sectors employing postgraduates. Employers and training providers interviewed highlighted that other science fields

have long been attractive to graduates, justifying why many students choose not to remain in heritage science after completing their training.

Tellingly, interviewees consider that undertaking courses in any area of the heritage sector is a life choice, and that students must be aware that their chances of employment are low when entering the profession. Preparing students to have realistic expectations is vital for the survival of the heritage science sector and is now a major challenge for training providers.

Networks (such as the Icon Heritage Science Group[22] or the Heritage Science Research Network[23]) are a valuable source of knowledge for heritage science professionals. Those new to the sector do not always know about these networks, and interviewees felt that students should be introduced to them as part of their postgraduate training. This would also help bridge the gap between industry and academia, and thus more fully prepare students for a range of career options.

Summary: Training providers and employers' perspectives on the UK heritage science sector

Employers and training providers offered the following insight:

- ➔ **Research prospects for heritage science graduates are increasing, with a rise in collaborative projects bridging the gap between industry and academia.**
  These opportunities are welcomed as a beneficial training tool, but also a way to tackle research gaps in areas that have suffered from loss of funding.

- ➔ **Nevertheless, career progression is severely limited.**
  Due to the project-based nature of the work, posts tend to be short-term contracts with few prospects for career progression. Rare senior positions are often filled by internal candidates.

- ➔ **The recent rise in tuition fees is changing the job market landscape.**
  To compensate for funding cuts, universities are recruiting large numbers of students to postgraduate programmes, saturating the market in certain areas and skills.

- ➔ **Popular postgraduate courses do not always match employers' needs.**
  Universities tend to offer generalised courses (e.g. Conservation) rather than the more specialised skills currently in demand with heritage science employers (e.g. Textile Conservation). This is resulting in skills gaps and a less employable workforce.

- ➔ **Students should be introduced to professional networks early on.**
  Training providers believe that encouraging students to engage with research networks would better prepare them for the range of career options open to them.

[22] https://icon.org.uk/groups/heritage-science
[23] https://heritagescienceresearch.com/

4.3 Difficulties recruiting to roles

The interviews sought to establish whether providers of post-graduate training opportunities and employers experience difficulties in attracting people with the right skills and experience.

4.3.1. Responses to question: "Do you experience difficulties in attracting people with the right skills and experience to postgraduate opportunities?"

Opinions were divided and a range of answers were collected, depending on location, course type and specialism, and potential applicants.

The locations that employers and training providers can recruit from affects the success of recruitment drives. For example, at the University of York's' Building Conservation department, European students make up a large proportion of the student body, so while recruitment from Europe is still easy, no problems occur in ensuring that course numbers are met. However, post-Brexit, this may be a different story.

Similarly, Nottingham Trent University has found that recruiting European students who would not be eligible for stipends limits recruitment from these areas. The interviewee stated that students could be unwilling to undertake courses where only the university fee is paid, without a stipend. This is also the case for science-based students from within the UK; the interviewee stated that expecting students to complete postgraduate study, particularly PhDs in a science subject without a stipend for living costs is unheard of. Internal university funded projects do tend to include stipends for UK students, but international students are still excluded from applying for these roles because of funding restrictions.

In some specialist areas, such as Textile Conservation (University of Glasgow), the interviewee stated that recruitment is not a problem: the course typically has a waiting list of up to two years. For the most part these students also come with the appropriate qualifications, particularly scientific background, and standards of recruitment are high. Likewise, courses at the University of Cardiff, and opportunities at the British Museum, are frequently in high demand, resulting in no issues for recruitment at these institutions.

However, there is not uniformity as other specialist programmes reported finding it increasingly difficult to recruit appropriate candidates. Within the Bioarchaeology department at the University of York the interviewee stated that recruiting for post-graduate roles is increasingly difficult. Ongoing projects have sourced students by handpicking participants, but this requires extensive staff capacity and potentially limits diversity.

Some courses/roles find it difficult to recruit students with the complete skills set required, and mitigate this by providing training as part of the courses or continuing professional development (for example, the University of Reading mentioned that lack of skills at the point of recruitment is not an issue due to training provided on the course). Small applicant pools were viewed as a threat to master's courses by several training providers; Queen's University, Belfast recently closed a heritage science course due to low intake, despite offering training to students providing they met basic entry requirements.

In particular, recruiting a cohort of students with strong scientific skills to courses appears to be a problem, as stated by one interviewee. It was suggested that alternative jobs in other sectors that pay better salaries could be the cause of this, as stipends and salaried roles within heritage science do not compete with other industries such as Electrical Engineering. Likewise, Historic Royal Palaces

have found that attracting students from scientific backgrounds is becoming increasingly difficult, as more obvious career paths are available to students who study science; typically, alternative career paths within the wider science sector offer better-paid and more secure roles.

Attempts to diversify the workforce remain difficult for both employers and training providers. In London, UCL identified that applications across ethnic minority groups were 'very few and far between.' In a bid to diversify the workforce, Historic Royal Palaces funds a Black, Asian & Minority Ethnic (BAME) scholarship for heritage science, supporting BAME candidates to progress through an MSc or MRes in conjunction with part-time research work experience at Hampton Court Palace. Initiatives such as this could be extended to other sites and organisations in order to increase diversity in heritage science.

An advertisement for a Collaborative PhD opportunity (British Museum and UCL) is included as Appendix 5 as an example of the qualifications, skills and experience sought from postgraduate applicants.

4.3.2. Responses to question: "Do you experience difficulties in attracting people with the right skills and experience to postgraduate jobs?"

Employers, on the other hand, appeared to have few difficulties in recruiting qualified staff to their roles. Several employers highlighted the importance of on-the-job training. Some employers pointed out that the nature of heritage science at the intersection of the heritage and science sectors made for a smaller pool of applicants, as graduates of "traditional disciplines" often looked for jobs with a more obvious applications of their skills.

One large organisation did report that finding applicants from the UK was harder than recruiting from the EU, mirroring comments from training providers. In contrast to recruitment to (specialised) postgraduate opportunities, it seems evident that some employers face problems in recruiting staff to specialised roles, though it is not difficult to recruit to broader roles. Roles within object dating teams, for example, have been particularly difficult to recruit to in Historic England's experience, due to a lack of skills in mathematics and statistics. English Heritage frequently find that courses do not teach the skills they require of employees, so they have committed to undertaking prolonged training in entry-level roles.

4.3.3 Responses to question: "What skills are you missing (if any)?"

For postgraduate courses and opportunities, skills shortages do occur in certain subjects, particularly specific scientific knowledge.

Others include:

- Laboratory skills – the British Museum identified trouble-shooting and analysis of malfunctions in technical equipment as an area most applicants to jobs were lacking. These skills are important as in museums, employees are required to look after the equipment that they use on a daily basis. This is less common within university settings, as technicians are available, so typically students do not develop these skills as part of their studies.
- Mathematics and science skills – some interviewees identified these to be lacking from post-graduate sector entrants. One interviewee stated that students entering the sector from the Arts and Humanities area are frequently required to complete extra qualifications before they reach the same standard as their fellows educated through science programmes.

- Archaeologists – a shortage of archaeology undergraduates has been identified, which is impacting on Archaeology as a sector. There are not enough applied archaeologists working in the field, nor are there students wanting to fill PhD and research roles.
- Building Conservation – this has been identified by one interviewee as an area where it is likely to be difficult to recruit to academic posts. The University of York is likely to need to recruit lecturers to their Building Conservation Course programme in the future, and it is not yet clear whether this will be an easy role to recruit for.
- Project management and budget control – these have been identified as skills that are frequently missing in applicants to roles at the British Museum. This highlights areas where transferable skills are not being taught as part of postgraduate training, resulting in less rounded individuals when they enter the job market. Although this is a reasonably specific case where Project Management is required, such skills would benefit any postgraduate entering any sector.

Summary: Difficulties recruiting to roles

When asked about the difficulties they experienced in attracting people with the right skills and experience to postgraduate jobs and opportunities, training providers and employers found that:

➔ **There is an imbalance between 'popular' courses in high demand and other specialist programmes which are finding it more challenging to attract students.**
The popularity of a taught postgraduate course does not always reflect the needs of employers.

➔ **Training providers are finding it increasingly difficult to attract postgraduate students from scientific backgrounds.**
This is in part because students from science backgrounds have access to more obvious career paths, offering better paid and more secure roles.

➔ **The resulting influx of students from various non-scientific backgrounds has created a need for more basic scientific training at postgraduate level.**

➔ **Similarly, employers are having to provide on-the-job training and prolonged entry-level roles,**
because they are recruiting applicants from a wide variety of backgrounds.

➔ **Employers and training providers both find it easier to recruit in Europe than in the UK.**

➔ **Diversity is a persistent issue in the heritage science sector.**
This is the case for both students and employees in heritage science. Some organisations, like HRP, are offering BAME scholarships in an attempt to resolve this issue.

4.4 Recruitment and retention lessons

4.4.1. Responses to question: “How do you recruit to postgraduate opportunities? What lessons have you learnt?”

Typical locations for advertising postgraduate opportunities in heritage science are:

- Internal university websites
- Social media via university recruitment teams
- www.findaphd.com
- www.findamasters.com
- www.jobs.ac.uk

Other methods for advertising postgraduate opportunities and courses are through Subject Specialist Network links, conference networking, and the use of personal contacts of staff (particularly in the case of specialist PhD opportunities).

In the case of very successful and specialist courses, such as the University of Glasgow’s Textile Conservation course, word of mouth is sufficient to fill up the course consistently. The situation is different, however, for less established courses. For example, the University of Glasgow has also struggled to market new courses effectively because of tight deadlines. A new MSc in Modern Materials Artefacts has been postponed until 2019 as a result. Likewise, Queens University Belfast have been forced to close a heritage-based course because of a fall in application numbers.

4.4.2. Responses to question: “How do you recruit to postgraduate jobs? What lessons have you learnt?”

Typical locations for advertising postgraduate jobs in heritage science are:

- www.jobs.ac.uk
- LinkedIn
- Newsletters (e.g. NHSF)

The recruitment of conservators is also done through specialist websites or mailing lists (e.g. ConsDist List).

4.4.3. Responses to question: “Tell me about your retention of postgraduates in these schemes/jobs?”

Student retention within postgraduate courses and opportunities is excellent across the UK. Many courses boast 100% completion rates. Students that do drop out, usually do so for financial reasons.

In employment, funding is usually the reason that staff are not retained. Those employees who secure permanent contracts tend to remain with their employer, particularly as these posts are so rare. Fixed-term contracts are increasingly found to be the reason why people are leaving the sector. Those who do leave employment at the end of short-term contracts state that they would have stayed if further employment had been available. One strong factor for companies that retain staff are the opportunities for Continuing Professional Development (CPD); where strong CPD opportunities are offered, such as at English Heritage, staff tend to remain with the company.

Summary: Recruitment and Retention lessons

- ➔ **Networks play an important part in recruiting students to postgraduate opportunities.** Training providers do use websites and social media to recruit students, but opportunities are also advertised through Subject Specialist Networks, conferences and personal contacts, and word of mouth plays a big part in determining a course's popularity.
- ➔ **Employers mainly advertise heritage science posts online, through a combination of general and specialist platforms.** There is some overlap between employers' and training providers' methods, with both types of opportunities being advertised on some of the same platforms (e.g. www.jobs.ac.uk).
- ➔ **While student retention rates are excellent, the prevalence of short-term contracts in heritage science sees retention rates declining as careers progress.** Heritage science trainees who participated in the online survey were also well aware of this situation and saw it as the main barrier to their career progression.

4.5 Perspectives on the future

The final area covered by the interviews asked members of the heritage science community on some of the current issues that are likely to shape the training and employment landscape for future heritage scientists.

4.5.1. Responses to question: "Do you foresee Brexit having an impact on your organisation?"

In the opinion of the interviewees, Brexit is likely to affect a wide spectrum of organisations that train or employ heritage scientists, although this will not necessarily be limited to negative impacts. Interviewees thought that training providers are likely to be affected most. The current high levels of uncertainty around factors such as funding and student and workforce mobility, limit the ability of those within the sector to plan for the future. One interviewee stated, "we're living with it on a day to day basis here and it's impacting on my colleagues".

Students are concerned that visas may not be as accessible as they have been. Fee statuses could also change, meaning that universities may no longer attract international cohorts to the same extent, thus reducing their income from international students. However, some universities have reported an increase in students from North America and Asia; should fees change for European students, recruitment of students from these areas is unlikely to be affected.

The movement of people in academic environments is important; Brexit may limit the prospects for this, particularly between European universities and the UK, thus preventing UK institutions from accessing specialist researchers. It is the view of interviewees that access to European Union research collaborations may also disappear as a result of new legislation related to Britain's departure from the European Union. This may trigger additional consequences such as preventing the UK from having access to Europe-wide standards, reduced access to shared resources based in Europe, and damage to the UK's research potential through exclusion from collaborative projects.

One interviewee was concerned that certain specialist areas will be directly affected. In Bioarcheology for example, students frequently come from the European continent to study. Likewise, one interviewee mentioned a recent programme of study backed by European funding has been moved from the University of York to the University of Copenhagen already; this involved one professor and seven postdoctoral staff leaving the UK in order to continue their work.

Amongst employers who attract a large number of European candidates to roles, there are concerns that they are likely to struggle to recruit the best candidates in the future, and that they may be forced to drop their recruitment standards as a result. Staff from other countries are also thought to be increasingly likely to leave the UK, as the current atmosphere in the UK is not welcoming. There is evidence amongst the interviews conducted for this research that staff are already making decisions to return to their home nations; this is not limited to Europe but also includes North American workers.

It is felt by several of the universities that were interviewed that they are likely to lose out on European research grants. It was reported that in many cases, this funding supports heritage science postgraduate opportunities; some opportunities will disappear as a result of changes in funding allowances, or there may be severe limitations on who can apply for such roles depending on nationality. This is not limited to training providers and employers also expect to be hit by changes in funding; one interviewee reported that at present 90% of their research funding is European, presenting significant budget challenges should these streams of funding become inaccessible (and not replaced) in the future.

4.5.2 Responses to question: "Do you foresee an impact from national infrastructure projects on your organisation?"

On the other hand, national infrastructure programmes are perceived as likely to have very beneficial impacts on the heritage science sector. In particular, there is likely to be increased demand for archaeological specialists.[24] Where students have undertaken courses that are linked to physical infrastructure projects, their employability increases drastically, with opportunities for excavation, finds processing, and analysis stemming from national infrastructure projects.

Although some sites are not actively engaged in work with the private sector, in the future projects will likely be undertaken with universities to tackle the backlog of archaeological material resulting from programmes such as HS2. This new material will generate new research questions and openings for more researchers, and new potential projects for training providers. Collaborative studies could be developed as a result of such projects, bringing more heritage science subjects to the forefront.

In some cases, national infrastructure projects have limited the time certain employers have to take on other projects, as their advisory capacity is drawn on more frequently. However, in the case of some organisations, such as the National Trust, individuals have been employed specifically to deal with the effects of such projects.

In Northern Ireland and Scotland, interviewees considered there to be few major infrastructure projects that will impact on employers or training providers at present.

[24] National Infrastructure Development and Capacity 2015-33: An Assessment

Summary: Perspectives on the future

- ➔ **Brexit is a great cause of concern for training providers.**
  Potential issues include visas (for student and staff), changes in fee statuses driving down application numbers, restrictions on freedom of movement for researchers and access to European shared resources, and decreases in funding.

- ➔ **Employers worry about having to lower their recruitment standards post-Brexit.**
  As a high number of EU candidates currently apply for (and fill) heritage science roles in the UK, restricted freedom of movement would result in a smaller pool of applicants.

- ➔ **Upcoming national infrastructure projects, on the other hand, are seen as a great opportunity for the sector.**
  These are seen as particularly beneficial for archaeology, and are expected to create jobs, research and training opportunities.

5. Conclusions

5.1 Who applies for postgraduate roles?

Two thirds of survey respondents were current students and the other third were alumni of post-2011 courses. The data collected in this survey identified a typical applicant as between age 25-29 (though the 30-39 age group is also strongly represented), female, white, and with no recorded disability. They are most likely to have attended a 'free to attend' school (although a third of survey respondents had attended a fee-paying school, which is six times the UK average). They are most likely to be English (as opposed to any other survey response category), although 55% are from beyond UK borders.

5.2 Do students/alumni identify themselves as heritage scientists?

Before being offered a definition of the term 'heritage science', a third of survey participants 'confidently' described themselves as heritage scientists, a further third described themselves as heritage scientists, 'but not confidently' and the remaining third did not identify with the term. After being given a definition of 'heritage science', over three quarters of survey participants identified as heritage scientists either through their employment, or through their training. This reflects a strong growth in awareness of 'heritage science' since the term was introduced in 2006, while indicating a need to further publicise a more inclusive definition of the field with which people can comfortably identify.

Many of the individuals who initially did not, or did not confidently, describe themselves as heritage scientists identified as Conservators. Amongst those who definitely did not see themselves as heritage scientists, 'Archaeologist' was a frequent response to the question 'I am a …'. People appear to identify with more well-recognised or established disciplines in preference to heritage science and see heritage science as an area of application. The study reveals a widespread interpretation of heritage science as an area of research (rather than practice).

5.3 Motivations and aspirations

Of the survey respondents, 89% are considering applying, or have applied, for postgraduate roles (including study opportunities). In terms of expectations, the survey identified 'improving technical skills/experience', 'evidence my abilities/boost my CV' and 'find my specialism' were most often mentioned as the most important reasons for applying to postgraduate study. Other key considerations included 'to gain an income' and 'improving my industry networks'. This indicates that individuals apply to postgraduate courses to increase their technical knowledge and experience; they also want opportunities to develop a wider network, and one that will improve their employability and earning potential.

Most students who had applied for postgraduate study had been successful. Respondents who had not applied for postgraduate study or had not taken up offers of places gave financial pressures and multiple course offers as their reasons for rejecting course offers. Individuals interviewed for this research undertook further education because of their sheer interest in the subjects. The completion of PhDs is also considered to be an important influence on future pay.

Participants employed within the heritage science sector mostly intended to stay within the sector, suggesting high levels of commitment to career pathways. Respondents who did not intend to stay in the sector stated that lack of job security and the need to relocate for work were reasons why this may not be possible. Where respondents were employed, it was typically in junior roles. This is

somewhat unsurprising, as the survey targeted individuals who had graduated from heritage science courses in 2011 or later.

A high proportion of those who are not employed within the sector intended to work in heritage science in the future, although lack of financial security and unclear pathways were causes of uncertainty.

5.4 Career paths of Heritage Science (post-)graduates

The survey demonstrated that there are various career pathways that lead to postgraduate studies; the most common route being to undertake an undergraduate degree, a master's degree and a PhD or MPhil. Individuals tend to complete multiple postgraduate courses in order to enter the sector: ten respondents, for instance, reported that they had two master's degrees. This indicates a multi-disciplinary field in which a high level of academic study is perceived to be required before a role can be secured.

Heritage scientists often work outside of heritage science before gaining employment as a heritage scientist. Many have also volunteered (50% have volunteered in heritage science; 50% have volunteered in areas other than heritage science); students and alumni regard volunteering as an important route to securing employment but report that these roles are not often labelled 'heritage science'.

In terms of the roles that individuals have secured after their postgraduate training, 'Research Assistant' is the most prevalent job title and universities are the biggest category of employer.

Where possible, survey participants stated that they would relocate to other nations in order to secure further employment. Respondents would be open to moving to both within the EU and outside of the EU. This indicates a mobile workforce.

Key challenges for postgraduates entering the heritage science sector, from their perspective, include the training and research required to secure roles, financial pressures (and low salaries in comparison to other scientific employment), and the low number of new jobs that are created (particularly at entry level). They identify an increasing need for links between training providers and employers, clearer career pathways once qualified and more job opportunities at senior levels.

5.5 Training provider/employer perspectives on heritage science roles

The research revealed that training providers and employers perceive that collaborative training positions are increasing in number and are providing good opportunities to sector entrants. Collaborations between heritage organisations and the AHRC have been gradually increasing and are preparing students well for their on-going career. The recent report by the AHRC, UKRI, and the British Museum (2019) has indicated that most students from these courses highlighted the benefits of an "industry based" doctorate; half of collaborative doctoral students go on to work in museums, galleries, libraries or other art-related sectors, in contrast to a "standard" doctorate.[25]

Where collaborative opportunities are not available, placements are still required in order to give students the experience required to secure paid roles. Opportunities for collaborative studentships look set to increase, with the AHRC – a significant funder of collaborative doctorates – indicating a

[25] AHRC, UKRI, and the British Museum (2019)

desire to enable smaller organisations to benefit from this model.[26] EPSRC-funded Centres for Doctoral Training have also contributed significantly to heritage science, such as the SEAHA-CDT, which is currently funded until 2022.[27]

Training providers are frequently finding that those who complete specialist training courses, such as Textile Conservation, are able to find employment, although they are often required to relocate in order to take up these roles. Postgraduates who complete generalist courses, such as Conservation, do not find paid roles as easily, as roles tend to require a specialism.

Funding is becoming an increasing issue for both training providers and employers of heritage science students. Low pay is common within the sector, and a decrease in the availability of funding will make well-paid roles within the industry rare. Training providers are finding that stipends for PhDs are not always available for European students, thus reducing the applications from European students to study at UK universities.

5.6 Training provider/employer difficulties in recruiting to roles

Some training providers, particularly of specialist courses, find that recruitment is not a problem. Typically, word of mouth provides plenty of interest for courses, and direct advertising is not required. This may impact on the diversity of students; further study in partnership with universities would be needed to determine if this is the case, as this data is not publicly available. More generalist courses do not find it as easy to fill their cohorts each year; some courses are experiencing reduced cohort sizes, to the extent that low numbers are endangering courses.

Typical student recruitment techniques used by all training providers include internal university websites, and national academic recruitment websites. In some very specific cases, individual lecturers have used their internal networks to recruit to post-doctoral posts. As mentioned above, this may be having a negative impact on course diversity.

Employers do not find difficulties in recruiting to posts. Although some employers have found that their recruitment from European applicant pools has decreased, roles have still been filled by strong British candidates. Recruiting diversely to roles is an issue; although measures have been put in place by a number of employers, their success at recruiting diverse candidates has been limited. For example, Historic Royal Palaces were required to advertise their scholarship for BAME individuals multiple times before finding a suitable candidate. This highlights the difficulty in recruiting diverse candidates to roles within the sector.

In both employers and training providers' experience, the following skills have been identified as missing from typical candidates who are applying for roles and courses:

- Training providers have identified that skills in mathematics and science can be lacking from students who have applied from an arts and humanities background. These students are often required to complete other courses in order to build knowledge before undertaking postgraduate training.
- General laboratory skills are frequently missing from new employees. Where candidates for new roles have come from academic study, technicians manage the technical aspects of projects and therefore individuals are not equipped to work without such support.

[26] AHRC Delivery Plan 2019, p.21
[27] http://www.seaha-cdt.ac.uk/

- Project and budget management is also a skill that is frequently missing in candidates. These transferable skills should be taught during postgraduate courses in order to give candidates more practical skills and improve their employability.

5.7 Training provider/employer recruitment lessons

Recruitment techniques are similar across both training providers and employers, typically using websites to advertise roles. Subject specialist networks are also used by employers to advertise roles. Employers and training providers did not keep a record of where successful applicants found the opportunity; in the future, both training providers and employers could record and share information on where successful applicants found their advertisements.

Typically, retention is high for both training providers and employers. This indicates that existing courses do not need to improve their retention processes at present, although this could be reviewed in the future.

5.8 Training provider/employer perspectives on the future

Brexit is perceived as likely to have impacts across the heritage science sector, particularly with regards to funding. At present, there is a lack of clarity of the true extent to which the sector will be influenced by Brexit, and it was felt by interviewees that organisations such as NHSF can have a role in supporting their members in the lead up to and aftermath of the UK's exit from the European Union.

National infrastructure programmes, such as HS2, are expected to have a beneficial impact on certain areas of the heritage science sector. Archaeology, for example, will be heavily affected as there will be a significant increase in demand for applied archaeology, as large expanses of excavation will need to be completed in order to accommodate the new services. Training providers may also benefit from the increased need for applied archaeology, whereby institutions may be able to undertake projects with national infrastructure teams in order to support infrastructure programmes, thereby creating opportunities to offer students experience on live projects.

6. Recommendations

This section presents a range of recommendations based on the findings of this study. They are split into recommendations for NHSF, and recommendations for the wider sector. The research shows that there are opportunities for NHSF to strengthen its position as an advocate for the sector and focal point for coordinated action. These recommendations should be considered in the context of the Strategic Framework for Heritage Science in the UK, 2018-2023.[28]

6.1 Recommendations to NHSF

a. Despite growing confidence in using the term 'heritage science', some individuals are less likely to identify themselves as 'heritage scientists' than by other terms. This reflects varying levels of confidence with using 'heritage scientist' as an identity among different specialisms. Establishing strong networks can be advantageous to creating a common identity. By engaging with existing networks such as local Emerging Museum Professionals groups and ICON Emerging Professionals Network[29], as well as the ICON Heritage Science Group, NHSF can introduce the term to the wider sector and create a platform for young professionals across the UK to interact and share challenges they face.

b. Students need to be given realistic expectations of the challenges in pursuing a career in the sector before embarking on PhDs and other high-level qualifications. In collaboration with universities and research councils – such as the AHRC and EPSRC – NHSF can work to provide a clear perspective of the current landscape in heritage science. This should include a broader understanding of the variety of heritage science careers, as current students perceive the sector to be 'research-only'. This limited view may mean students are currently missing out on opportunities in industries such as archaeology that are likely to increase recruitment.

c. Heritage science training programmes suffer from a clear lack of transferable skills. NHSF could broker 'skills swaps' among its members to fill obvious gaps in students' training, including both general (project management) and specialist skills (lab experience).

d. There is currently little public information available on students who have applied for courses containing a heritage science element. Further research is needed to understand pathways into heritage science: NHSF could partner with university admissions departments to share and evaluate this data. This would result in a more in-depth understanding of the pathways that students take to enter heritage science careers.

e. Although heritage science appears to be more diverse than other areas of the heritage sector, those from higher socio-economic backgrounds are still over-represented and BAME candidates are still under-represented. NHSF should consider further activities to address this, such as outreach activities with primary-school age groups through organisations such as Speakers 4 Schools[30] or STEM Ambassadors.[31] Awareness of heritage science from an early age will also raise awareness of heritage science as a field and strengthen its identity through familiarity.

f. Salaries within the sector remain low and insecure employment continues to provide a disincentive to individuals embarking on a career in heritage science. A sector-wide advisory pay-scale – such as those provided for the archive, library, and archaeology sectors[32] – could be one

[28] The Strategic Framework for Heritage Science in the UK, 2018-2023
[29] https://icon.org.uk/groups/emerging-professionals-network
[30] https://www.speakers4schools.org/
[31] https://www.stem.org.uk/stem-ambassadors
[32] https://www.cilip.org.uk/page/SalaryGuide; https://www.archives.org.uk/careers/salary-recommendations.html; https://www.archaeologists.net/practices/salary

means of advocating for better pay within the sector. This should be benchmarked against 'peer' sectors, including traditional sciences, if heritage science wishes to become an attractive career option to those from science backgrounds.

6.2 Recommendations to the wider sector

The study highlights a number of recommendations that are outside of NHSF's control. However, in many cases, NHSF may find a role to play in advocating improved practice.

a. Training providers and employers need to provide clear, structured career paths to encourage individuals to remain in the sector. This could be achieved by strengthening existing training and professional networks, both among professionals and by making these more inclusive of students. Existing examples, such as the ICON Emerging Professionals Network, provide good models for this.
b. To encourage identification with the term heritage science, training providers and employers need to explicitly identity postgraduate opportunities and volunteer roles under the umbrella of heritage science. Not only would this both broaden and strengthen the concept of heritage science – as applicants compare the broad range of activities that heritage science encompasses – it also enables young professionals to identify roles that will help them progress in their careers.
c. As well as job prospects, lifestyle and family commitments are significant barriers to careers in the sector. An emphasis on creating jobs outside of London needs to be made. Progress in this area has already begun, with institutions such as the National Trust's Conservation Studio in Knole, Kent and The Engine Shed, Stirling, opening in recent years. Diversification away from London needs to continue in order to support jobs growth across the UK.
d. Lack of job security, and uncertainty about opportunities and limited career progression have been identified as barriers to those seeking a career in heritage science. Short-term contracts have become the norm, with many attracting solely external funding: thus preventing any chance of extension. Creating long-term, secure employment needs to be a focus for many areas, especially those in high demand such as archaeology.
e. While limited career options remain a barrier, jobs with good Continuing Professional Development opportunities attract and retain more candidates and provide an opportunity to develop transferable skills, such as project and budget management, potentially lacking from postgraduate education. Employers need to make these benefits to working in the sector more visible during recruitment processes, demonstrating their commitment to supporting individuals in their career progression.
f. Some specialist courses have no trouble in attracting good candidates, although more generalist courses may struggle to recruit postgraduate students, particularly unfunded places which are not perceived as good value for money by students. Working with employers to develop modules that meet specific skills shortages and industry requirements may help to recruit a higher standard of candidates.
g. Both recruiters and students have reported positively on the benefits of a collaborative doctoral PhD (e.g. AHRC-CDP, SEAHA-CDT[33]). A wider adoption of these models could result in candidates who are better prepared to enter the workforce than those that take a solely academic route, especially the SEAHA-CDT, which also incorporates an industrial partner. However, this may need to be adapted to enable smaller organisations to host students.

[33] AHRC, UKRI, and the British Museum (2019); http://www.seaha-cdt.ac.uk/

7. Appendices

Appendix 1: List of institutions, departments and courses contacted about the survey

The following institutions and departments were sent the survey for forwarding to their students and alumni. Highlighted boxes indicate that a student or alumnus from that department/course took part in the survey.

Institution	Department	Course/Research Area
Cardiff University	School of History, Archaeology and Religion	MSc Archaeological Science
Cardiff University	School of History, Archaeology and Religion	MSc Care of Collections
Cardiff University	**School of History, Archaeology and Religion**	**MSc Conservation Practice**
Edinburgh Napier University	School of Engineering in the Built Environment	Engineering research group – PhD supervision
Heriot Watt University	School of Energy, Geoscience, Infrastructure and Society	Centre of Excellence in Sustainable Building Design
Nottingham Trent University	**School of Architecture, Design and Built Environment**	Global heritage, Science Management and Development
Nottingham Trent University	**School of Science and Technology**	Imaging and Sensing for Archaeology, Art History and Conservation research group
Nottingham Trent University	School of Science and Technology	Supervised a Science & Heritage Programme Collaborative Research Studentship
Oxford University	**School of Geography and the Environment**	**Academic partner in EPSRC-CDT in Science and Engineering for Arts, Heritage and Archaeology**
Queens University Belfast	School of Natural and Built Environment; Environmental Change	MSc Heritage Science (no longer offered)
Robert Gordon University Aberdeen	Architecture and Built Environment	Architecture and Built Environment
University College London	**UCL Institute for Sustainable Heritage**	**Sustainable Heritage MPhil / PhD**
University College London	**UCL Institute for Sustainable Heritage**	**Academic partner in EPSRC-CDT in Science and Engineering for Arts, Heritage and Archaeology**
University College London	**UCL Institute for Sustainable Heritage**	**MRes Science and Engineering in the Arts, Heritage and Archaeology**
University College London	UCL Institute for Sustainable Heritage	Supervised a Science & Heritage Programme Collaborative Research Studentship
University of Bradford	School of Archaeological and Forensic Sciences	Analytical Sciences MSc

University of Bradford	School of Archaeological and Forensic Sciences	Archaeological Sciences MSc
University of Bradford	School of Archaeological and Forensic Sciences	Archaeological Sciences PG Diploma
University of Bradford	School of Archaeological and Forensic Sciences	PhD research in Archaeological and Forensic Sciences
University of Bradford	School of Archaeological and Forensic Sciences	Supervised a Science & Heritage Programme Collaborative Research Studentship
University of Brighton	**School of Computing, Engineering and Mathematics; School of Environment and Technology**	**Academic partner in EPSRC-CDT in Science and Engineering for Arts, Heritage and Archaeology**
University of Cambridge	Departments of Manuscripts and Printed Books, Fitzwilliam Museum Zeno-Karl Schindler/ MINIARE Fellowship	Research Fellowship
University of East Anglia	School of Environmental Sciences	Supervised a Science & Heritage Programme Collaborative Research Studentship
University of Edinburgh	School of Chemistry	Supervised a Science & Heritage Programme Collaborative Research Studentship – PhD Analytical Chemistry
University of Edinburgh	School of Engineering	Institute for Materials and Processes. Supervised a Science & Heritage Programme Collaborative Research Studentship – PhD Materials Science and Building Conservation
University of Exeter	Archaeology	MA Experimental Archaeology
University of Exeter	Geography / Archaeology	Tacit practices and the emergence of heritage crafts; Churches in the landscape; Household archaeology of 5th and 6th century settlements
University of Lincoln	**School of History and Heritage**	**Graduate Diploma Conservation Studies**
University of Lincoln	School of History and Heritage	MA Conservation by Research
University of Lincoln	**School of History and Heritage**	**MA Conservation of Cultural Heritage**
University of Lincoln	School of History and Heritage	MPhil/PhD Conservation of Cultural Heritage
University of London	**Courtauld Institute of Art**	Conservation and Technology
University of Manchester	School of Materials	Supervised a Science & Heritage Programme Collaborative Research Studentship
University of Manchester	School of Materials	Supervised a Science & Heritage Programme Collaborative Research Studentship
University of Reading	**School of Archaeology, Geography and Environmental Science**	Academic partner in AHRC South, West and Wales Doctoral Training Partnership e.g. Therapeutic

		Landscapes of Prehistory: Exploring the Potential for Prehistoric Landscapes to act as Therapeutic Environments in the Present Day
University of Reading	School of Archaeology, Geography and Environmental Science	MA Archaeology (BioArchaeology)
University of Reading	School of Archaeology, Geography and Environmental Science	MSc Environmental Archaeology
University of Reading	School of Archaeology, Geography and Environmental Science	PhD programmes
University of Reading	School of Archaeology, Geography and Environmental Science	Supervised a Science & Heritage Programme Collaborative Research Studentship
University of Southampton	**Archaeology**	Academic partner in AHRC South, West and Wales Doctoral Training Partnership e.g. Causewayed Enclosures under the microscope. Also PhD supervision.
University of Stirling	Centre for Environment, Heritage and Policy	
University of the West of England, Bristol	Geography and Environmental Management	Physical geography / geomorphology
University of the West of Scotland	School of Engineering and Computing	Construction, Innovation and Built Environment Research Group
University of York	Department of Archaeology	MA Archaeology of Buildings
University of York	Department of Archaeology	MA Conservation Studies – historic buildings (IHBC accredited)
University of York	Department of Archaeology	MA Conservation Studies in the built heritage
University of York	Department of Archaeology	MA Material Culture and Experimental Archaeology
University of York	Department of Archaeology	MSc Archaeological Information Systems
University of York	Department of Archaeology	MSc Bioarchaeology
University of York	Department of Archaeology	MSc Digital Heritage
University of York	**Department of Archaeology**	**Research Degrees (MA by research, MPhil, PhD)**
University of York	Department of Archaeology	MSc Zooarchaeology
University of York	**Department of Archaeology**	**Analytical and Environmental Geochemistry, BioArchaeology**
West Dean (affiliated to University of West Sussex)	**Art and Conservation**	MA Collections Care and Conservation Management
Imperial College		
University of Glasgow	**School of Culture and Creative Arts; Centre for Textile**	MLitt Technical Art History

	Conservation and Technical Art History	
University of Glasgow	School of Culture and Creative Arts; Centre for Textile Conservation and Technical Art History	MSc Modern Material Artefacts
University of Glasgow	**School of Culture and Creative Arts; Centre for Textile Conservation and Technical Art History**	**MPhil Textile Conservation**
University of Glasgow	School of Culture and Creative Arts; Centre for Textile Conservation and Technical Art History	PhD Textile Conservation
University of Cambridge	McDonald Institute	MPhil Archaeological Research

Appendix 2: Current or most recently undertaken course

Highlighted answers came from people on courses and/or institutions that were directly mailed the survey for distribution to their students/alumni.

Course Name	Institution
V&A Conservation & Collections Care Technicians Diploma	(V&A, workplace)
Earth History and Palaeontology	Birkbeck
Geographic Information Science	Birkbeck College, University of London
Historic Environment Conservation MA	Birmingham
MA Conservation	Camberwell College of Art, UAL
Conservation Practice	**Cardiff University**
Post-graduate Diploma in the conservation of easel paintings	**Courtauld Institute of Art**
MA Buddhist Art History and Conservation	**Courtauld Institute of Art**
MA in the Conservation of Archaeological and Museum Objects	Durham
MA Conservation of Archaeological & Museum Artefacts	Durham University
MA Conservation of Archaeological and Museum Objects	Durham University
Licenciatura en Restauración de Bienes Muebles	Escuela de Conservación y Restauración de Occidente
PhD Construction: Focus in Heritage Science / Conservation	**Heriot-Watt University**
PhD	JAMIA MILLIA ISLAMIA
PhD Applied Sciences (Chemistry)	Northumbria University
PhD (Optical and material properties of varnishes for paintings) (Applied Physics)	**Nottingham Trent University**
Museum and Heritage Management	**Nottingham Trent University**
PhD	Queens University Belfast
PhD in History of Art	**The Courtauld Institute of Art**
MSc conservation for archaeology and museums	**UCL**

Seaha	**UCL**
SEAHA	**UCL**
MRes Heritage Science	**UCL**
MRes Science Engineering and Archaeology in Heritage	**UCL**
SEAHA PHD	**UCL**
Centre for Doctoral Training in Science and Engineering in Arts, Heritage and Archaeology (SEAHA)	**UCL**
MSc Conservation Studies	UCL Qatar
Science for Cultural Heritage	Universita' degli Studi di Firenze
Materials Science and Engineering	Universita' degli Studi di Trento (Italy)
MSC for Conservation in Archaeology and Museums	**University College London**
PhD in Archaeological Science	**University College London**
SEAHA	**University College London**
PhD in Research Dept: UCL Institute for Sustainable Heritage	**University College London**
SEAHA	**University of Brighton**
PhD	**University of Edinburgh**
MPhil Textile Conservation	**University of Glasgow**
History of Art	**University of Glasgow**
PhD	**University of Glasgow**
Textile Conservation MPhil	**University of Glasgow**
PG Grad Dip Conservation Studies	**University of Lincoln**
Post graduate diploma in conservation studies	**University of Lincoln**
BA Conservation of Cultural Heritage	**University of Lincoln**
Conservation of Cultural Heritage	**University of Lincoln**
Graduate Diploma Conservation Studies	**University of Lincoln**
Conservation and Restoration	**University of Lincoln**
Conservation Studies	**University of Lincoln**
MA in Conservation and Restoration of Historic Objects	**University of Lincoln**
Conservation and Restoration	**University of Lincoln**
MA Conservation of Easel Paintings	University of Northumbria
MSc in Analytical and Bioanalytical Sciences	University of Oviedo
Masters and DPhil in Archaeological Science	University of Oxford
EPSRC SEAHA CDT	University of Oxford
DPhil SEAHA	University of Oxford
DPhil Geography and the Environment	University of Oxford

PhD Archaeology	**University of Reading**
PhD in Anthropology and Archaeology	**University of Southampton**
PhD Chemistry	**University of York**
PhD Archaeology	**University of York**
PhD in Analytical Chemistry	**University of York**
Chemistry PhD	**University of York**
PhD in archaeology	**University of York**
PhD	**University of York**
Conservation of Books and Library Materials	**West Dean College**
Conservation studies MA	**West Dean College**

Appendix 3: Postcode Data

SE4
SK13
PE27
W11
N8
YO17
LN4
LN1
NE1
E13
BT35
CF24
LN2
CT2
LN8
NG10
PR1
RG45
W9
EH7
OX1
LU6
GU1
TQ1
GU2
EH11
LN6
G20
G12
G12

G11
OX2
YO10
SE5
OX2
CB4
OX7
NW6
OX1
EH

Appendix 4: Responses to question: 'If you do not confidently describe yourself as a heritage scientist, what do you describe yourself as?'

"Identity"	Response	Do you describe yourself as a heritage scientist?
Conservator	Conservator interested in the application of science	Yes, but not confidently
	Conservator	No
	Conservator	No
	I am an anthropologist studying conservation practice in the UK. I am also an objects conservator.	Yes, but not confidently
	Painting conservator, trained in technical analysis	Yes, but not confidently
	Trainee conservator	Yes, but not confidently
	Paper Conservator	No
	Conservator	Yes, but not confidently
	Conservator	Yes, but not confidently
	I am a trainee conservator with a particular interest in scientific analysis.	Yes, but not confidently
	Conservator in training	Yes, but not confidently
	Conservation student	Yes, but not confidently
	Conservator	Yes, but not confidently
	Conservator-Restorer	Yes, but not confidently
	Restora [sic]	No
	Conservator	Yes, but not confidently
	Book conservator	No
	Textile conservation student	No
	Textile conservator	Yes, but not confidently
	I am a student completing my PhD who focuses on the conservation of heritage materials and buildings. I am hopefully going to be a conservation scientist working within the heritage field.	Yes, but not confidently
Archaeologist	Archaeologist, who is studying GISc	No
	PhD candidate in archaeology	Yes, but not confidently

	I'm an archaeologist training in textile conservation	No
	Archaeological scientist	No
Museums / Collections work	Collection care	No
	A curator. I use Heritage science all the time but do not undertake research projects	No
	Museum professional. I did not complete my science degrees with intention to apply them to heritage, but subsequently have found this is what I would like to do, utilising my knowledge of geology for museum curation or conservation.	Yes, but not confidently
Scientist (other discipline)	An applied physicist, where the "applied" part has been heritage science	No
	Scientist working for heritage	No
	Researcher	No
	Analytical Chemist / Mass Spectrometrist	No
	Environmental analytical chemist	No
	Organic geochemist interested in past climate	Yes, but not confidently
	I am trained as art historian and now undertaking scientific research for built heritage	Yes, but not confidently
	Digital imaging specialist	Yes, but not confidently
Trainee	student of art history and conservation, looking to be a heritage scientist	Yes, but not confidently
	Trainee Heritage Scientist	Yes, but not confidently
	PhD student	Yes, but not confidently
Other	I am trained and I used to work as a heritage scientist but this s not what I do anymore. I still use the knowledge and work with heritage institution but in a different role.	No

Appendix 5: A Collaborative PhD opportunity: British Museum and UCL

PhD Studentship: 'Containing commodities: determining organic residues in Greek painted pottery' with the British Museum and UCL

Project description

The successful applicant will prepare a doctoral dissertation that investigates the uses of Greek decorated pottery vessels in the 8th – 4th century BC Mediterranean through organic residue analysis. They will develop a systematic interdisciplinary approach that combines organic residue analysis, the investigation of a vessel's excavation, collection and conservation history and the study of archaeological and textual evidence for its ancient use. Data will be collected to answer questions such as: Which commodities, if any, did decorated Greek ceramics contain? How were vessels used

in different ancient socio-cultural contexts? To what extent does the collection, display and conservation history of the pottery affect its potential for scientific analysis?

As the first systematic study of its kind, the research will contribute significant results to classical scholarship, while the development of an integrated methodology for museum collections will be of wider scientific relevance.

The PhD will be registered at UCL Institute of Archaeology under the co-supervision of Dr Renata F Peters (Conservation) and Dr Corinna Riva (Mediterranean Archaeology). It will be co-supervised at the British Museum by Professor Carl Heron (Scientific Research) and Dr Alexandra Villing (Greece and Rome). The Institute of Archaeology at UCL, a research-intensive university, has a large and flourishing postgraduate student community. The British Museum supports 25 collaborative doctoral students, and the student will benefit from joint training and other opportunities arranged by the 28 museums and other cultural organisations that support Collaborative Doctoral Partnership studentships.

This full-time studentship is funded for three years at standard AHRC rates and includes a further 0.5 years of funding to support training and a placement. It is expected that the student will commence their research in October 2018.

The full studentship award for students with UK residency* includes University tuition fees and a stipend of £14,777 a year plus an additional stipend of £550 p.a. for the 3 years. The Student Development Fund (equivalent to 0.5 years of stipend payments) is also available to support the cost of training, work placements, and other development opportunities.

In addition, the student will receive further funds from the British Museum to undertake research (£1000 a year), and some additional support towards further research expenses. The successful applicant will be able to participate in additional training and other opportunities provided to CDP students by the CDP consortium of Museums, Galleries, Libraries and Heritage Organisations, and receive a British Museum staff pass, a workspace with computer and research library access.

Person specification

Potential applicants must have a Master's degree with an overall grade of 70% or better, with at least 70% for the dissertation in a relevant subject, such as archaeological science, conservation, materials science or a related discipline.

Some experience of analytical organic chemistry is essential, and an understanding of relevant laboratory methods such as GC-MS or LC-MS, data analysis and interpretation is highly desirable. Also essential is an interest in the archaeology of Archaic-Classical Greece and/or the Mediterranean world; some relevant knowledge of this is highly desirable.

The student should be a highly motivated individual with a keen interest in working across disciplinary boundaries, able to understand and study within UCL's academic regulations and with a capacity and willingness to study across institutions, from the UCL Institute of Archaeology to the British Museum.

Applicants need to demonstrate evidence of English proficiency. The required evidence may take the form of either: a) Substantial education (minimum one year) or work experience (minimum eighteen months) conducted in English and undertaken no more than two years prior to the proposed date of

enrolment, OR b) A recently obtained acceptable English language qualification or test result. The qualification or test result must have been awarded no more than two years prior to the proposed date of enrolment. The UCL Institute of Archaeology looks for 'Good level'. We look for the following: a) International English Language Testing System (IELTS) Overall grade of 7.0 with a minimum of 6.5 in each of the subtests; b) Test of English as a Foreign Language (TOEFL) and Test of Written English (TWE) or Essay Rating Internet based version: Score of 100, plus 24/30 in the reading and writing subtests and 23/30 in the listening and speaking subtests. c) Cambridge Certificate of Proficiency in English Pass at grade B. d) Cambridge Certificate of Advanced English Pass at grade A. e) UCL Language Centre: Pre-Sessional English Language Courses and Graduate Preparatory Course Mark of 70%.

Copied from Source: *http://www.ahrc-cdp.org/phd-studentship-containing-commodities-determining-organic-residues-in-greek-painted-pottery-with-the-british-museum-and-ucl/* (advertisement no longer available online).