Strategic Framework

for Heritage Science in the UK

2024–2027

Contents

Introduction

Heritage science is the scientific study of cultural and natural heritage. It is an interdisciplinary field that draws on diverse humanities, science and engineering disciplines. It focuses on enhancing the understanding, care and sustainable use of heritage so it can enrich people's lives, both today and in the future.[1]

Heritage science has an increasingly important role to play in tackling key global challenges and addressing issues that matter to people. Research is helping to improve energy efficiency in historic buildings; it is protecting heritage collections, buildings and archaeology from decay; it is increasing our understanding of the risks and impact of climate change as well as strategies for mitigation and adaptation; it is helping us to understand where we have come from and can also inform where we are going.[2]

As a field of research, heritage science is carried out in many different types of organisations including higher education institutions, research centres, cultural and heritage organisations, and organisations in the voluntary and commercial sectors, large and small. The breadth of the field is a strength, but it requires coordination to bring together the strands of activity, maximise opportunities for collaboration and demonstrate benefits.

Our vision is that the UK's rich and varied heritage will be enhanced by better use of science and technology for the benefit of society.

The *Strategic Framework for Heritage Science in the UK* is a **tool** to enable coordination of resources and facilitate collaboration around shared goals which will help to achieve the vision.

This is the second framework. It covers the period 2024-2027 and builds on the achievements of the previous framework. Its development has been led by the National Heritage Science Forum (NHSF) with input from the heritage science community and wider stakeholders. The term framework is used to capture the high-level outcomes (or changes) that the heritage science community and stakeholders want to work together to achieve, whilst leaving flexibility for individuals and organisations to develop strategies or plans to achieve the parts they are best placed to deliver. Together we can monitor how collective action is making progress towards the outcomes.

The context for UK heritage science in 2024

NHSF has consulted the community and stakeholders to identify progress made towards the strategic outcomes of the previous framework, consider the challenges and opportunities for the years ahead, propose updated outcomes for 2024-2027 and look at alignment to other relevant plans and frameworks.[3]

Over the past five years, progress has been made towards all three of the previous strategic outcomes of excellent research, a skilled and diverse community, and demonstrable social and economic impact.

Excellent research

There has been capital investment to replace and upgrade equipment used for heritage science research (World Class Labs CapCo and CResCa funding).[4]

The community has worked with UK Research and Innovation (UKRI) through the Arts & Humanities Research Council (AHRC) to develop the RICHeS (Research Infrastructure for Conservation Heritage Science) programme.

£80M

In 2023 the UK government announced investment of £80M in the RICHeS programme over 10 years from 2024 as part of the Creative Industries Sector vision.[5]

In Europe, the E-RIHS (European Research Infrastructure for Heritage Science) programme has made progress towards establishment as a full ERIC (European Research Infrastructure Consortium) with the development of the UK's national node initially co-ordinated by UCL.[6]

The UK's involvement in IPERION HS (a major European Union-funded project) has **enabled access to equipment, expertise and learning opportunities from leading European institutions.**[7]

Five societal challenges have been identified to stimulate connections between heritage science and the issues that matter to people: sustainable development, climate emergency, improved well-being, equality and inclusivity, digital society.[8]

There is increased visibility of heritage science, for example its use in the names of departments, courses and roles, the growth of Icon's heritage science special interest group to over 1,000 members in 2024, and bibliometric analysis showing an increase in the number of heritage science papers published.[9]

Initiatives such as the **Joint Programming Initiative on Cultural Heritage** (JPI-CH) have been a source of funding for research and the UK has now associated to **Horizon Europe** unlocking access to this €95.5 billion research and innovation programme which runs until 2027.[10] [11]

A skilled and diverse community

The Technician Commitment and development of Apprenticeships have started to open up new routes into the field of heritage science and have led to new thinking about the skills needed and approaches to training and skills development.[12] [13]

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PhD students supported by the SEAHA Centre for Doctoral Training in an innovative programme that brought together academics and over 70 industry and heritage partners between 2014-2023.

Organisations including the Mary Rose Trust have successfully **raised funding for internships and NHSF has operated a mentoring programme** to connect 10 early career researchers with more experienced colleagues as they embark on their career within the field.

The refreshed Skills Investment Plan for Scotland's Historic Environment has developed a **heritage science skills profile** to support collaboration.

NHSF has held themed member meetings to share information on approaches to **improving Equity, Diversity and Inclusion.**

The National Archives and NHSF commissioned a matrix to show the **links between heritage science and primary school curricula** which is being used to support the development of learning programmes to connect people to heritage science at an earlier stage in their life.[14]

Demonstrable social and economic impact

NHSF members have **explored what impact and value mean** to the heritage science community and **identified models for collecting evidence of impact** that are relevant to the community.[15]

Published case studies demonstrate the value and impact of heritage science and give examples of the different benefits heritage science can bring to society, for example linked to the five societal challenges identified by NHSF's research working group.[16]

The development of the business case for investment in the RICHeS (Research Infrastructure for Conservation and Heritage Science) programme by AHRC involved analysis of potential benefits including economic benefit and a range of case studies demonstrating other forms of value.[17]

DCMS initiated the Culture & Heritage Capital programme, commissioning scoping research in 2021 and, in 2023, funding six projects (with AHRC) to address distinct research questions including heritage science research into damage functions to articulate the economic value of caring for heritage.[18] [19]

Challenges ahead

This progress shows how much can be achieved by working together, but challenges remain.

At a macro-level, the rate of change combined with economic and political uncertainty can make it difficult to plan long-term goals. Pressure on the finances of individual organisations, resulting from the impact of the Covid-19 pandemic and subsequent inflation and increases to cost-of-living, has created a challenging environment for funding of research and heritage science activity.

Poorly understood workforce demography, capacity and skills needs hinder the ability to grow the workforce to address the needs of this developing field, either as trainees or by attracting scientists and researchers from other fields.

The key issues that have been highlighted through our consultations include:

Caught between funding streams

Despite an increased emphasis on the value of interdisciplinary research at UKRI level, funding for **heritage science research is still caught between funding streams** being too science-focused for most arts & humanities programmes and too heritage-focused for many science programmes. There has been no dedicated funding stream for heritage science research since the end of the Science and Heritage Programme in 2013.

Limited range of funding

Many organisations which are active in the field of heritage science research lack the capacity to develop to the level required to be eligible for UK Research and Innovation funding and **therefore cannot apply for significant tranches of research and capital funding.**[20] A greater diversity of funding streams, which are accessible to smaller organisations, is needed. More opportunities for small organisations to partner with UKRI-eligible organisations would help to spread the benefit of funding and stimulate research more widely.

Pressures on institutional finance

Pressures on institutional finance (post pandemic and cost of living) place limits on research and staffing.

Recruiting and retaining staff

Employers are finding it increasingly **difficult to recruit and retain staff** and there are **barriers to growing the workforce** including low salaries, poor job security and few career progression opportunities.

Reduced workforce mobility

There is **reduced international workforce mobility** following the UK's exit from the European Union. Visa and salary rules place additional limitations on the available workforce adding to recruitment challenges, particularly for experienced staff.

Lack of data

The lack of robust data on skills strengths, gaps and needs makes it difficult to articulate where investment and new approaches to skills development will bring most benefit.

Training routes

It is difficult to secure **funding for interdisciplinary training routes.** There is a need for training that occurs outside of the academic sector, as well as traditional doctoral training and technical training.

Under-developed knowledge-exchange mechanisms

Knowledge-exchange mechanisms are under-developed meaning that opportunities to use heritage science research to benefit society are not maximised.

Difficulty accessing specialist scientific instruments

Students, postdocs and scientists find it **hard to access specialist scientific instruments** which are not available in their own organisation; this challenge extends to organisations without specialist staff which also struggle to access scientific research equipment and knowledge.

Variation in digital capability

There is **widespread variation in digital capability**, and a need for systems to store and access data.

Impact rarely captured

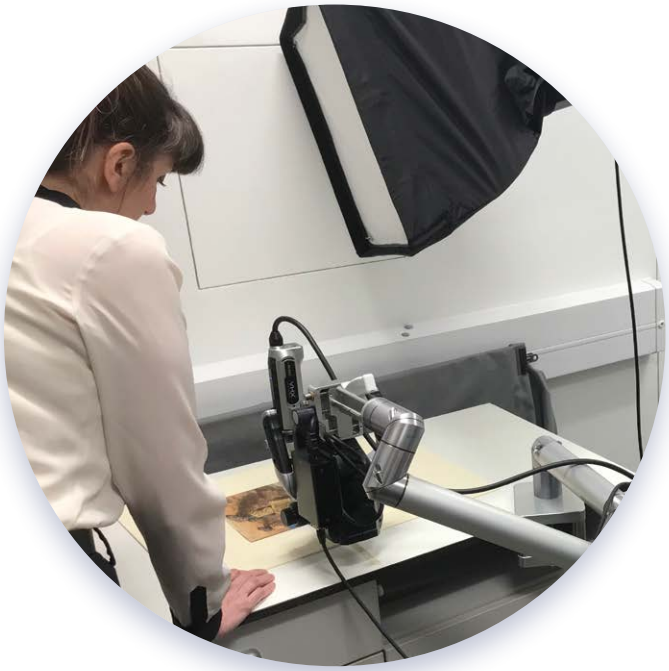
Links with industry are weak in many areas and evidence of the longer-term use and **impact of heritage science research is rarely captured** and is poorly understood.

Low public engagement

Public engagement with heritage science is relatively low which contributes to a lack of understanding of its benefits.

Umbrella field

The strength of heritage science as an **umbrella field** encompassing many different disciplines can become a weakness and make consensus difficult when different interests compete.



A framework for 2024-2027

The updated framework retains its focus on community, research and public value as core elements to deliver the vision that the UK's rich and varied heritage will be enhanced by better use of science and technology for the benefit of society.

Strategic outcomes for each of these elements describe the changes we want to work towards. A virtuous circle is proposed with progress towards each outcome benefiting the others and addressing the challenges highlighted by the community.

Public Value

Outcome: measurable positive change for society resulting from heritage science.

This outcome is about how we find better ways to convey the public value of heritage science, by measuring it, explaining why it matters and highlighting its value to a range of beneficiaries.

Work during 2018-23 revealed the challenges associated with demonstrating the value of heritage science research and its impact. It showed that there are different types of value, from wellbeing to new knowledge; and it showed that there are many different contributors, beneficiaries and audiences for heritage science research from other researchers and practitioners to industry and members of the public.

The contribution of heritage science to addressing societal challenges, research on how to measure culture and heritage capital and research on how existing impact frameworks can be applied to heritage science can be built on during the period of this framework (2024-2027). Consultation has shown that there is strong appetite for demonstrating the positive impact of heritage science research on the environment, for its contribution to sustainable development to be more visible, and for more opportunities for knowledge-exchange and public engagement with heritage science.

Actions:

Thoroughly understand the multiple stakeholders for heritage science research.

Develop consensus on what to measure and how to measure it.

Increase opportunities for public engagement with heritage science, including through participatory research.

Improve the mechanisms for sharing, and making visible, examples of how research addresses societal challenges and delivers public value.

Develop connections with industry to increase knowledge-exchange.

Build stronger links between heritage science and public policy.

> **Together, we need to focus on building a collective understanding of the value heritage science generates, who benefits from it and how.**

Research

Outcome: excellent research leading to new knowledge, understanding and innovation.

This outcome focuses on ensuring that the conditions are in place to generate excellent interdisciplinary research and its associated benefits.

Consultation has shown that researchers and practitioners place great value on interdisciplinary research but can find it difficult to access funding that spans multiple funding interests, institutions or even departments within an organisation. Heritage science research and innovation needs an environment that fosters interdisciplinarity and recognises its benefits in practical terms.

We need to understand the mechanisms that are in place to support interdisciplinarity as well as the 'real-life' obstacles to funding research and collaboration that spans the arts and sciences. There is a need for greater variety of funding, particularly opportunities which can be accessed by smaller organisations (or individual researchers) that lack the capacity to become Independent Research Organisations and are therefore excluded from significant tranches of Research Council funding. Better systems and networks are needed to increase opportunities for collaboration and knowledge exchange, maximise the benefits of interdisciplinary activity and support the use and re-use of research and data.

Actions:

Increase the variety of funding streams that enable individuals and organisations from across the arts and sciences to work together.

Connect, and enable access to, research capability (expertise, facilities and FAIR data) across the UK, with links to international infrastructures including E-RIHS.

Provide mechanisms for collaboration on heritage science research priorities.

Increase the translation of research into practice, building on existing good practice and developing links with organisations outside of academia.

Generate support for innovation and cutting-edge research which pushes boundaries and generates new collaborations, for example with science centres.

Together, we need to strengthen the mechanisms and funding which support heritage science research.

Community

Outcome: an inclusive, confident, diverse and outward-looking heritage science community.

This outcome is about the people who make up the heritage science community, current and future.

As a multidisciplinary field we should make more of the possibilities for people from many different backgrounds to be part of the heritage science community. Consultation showed repeated concern about a shortage of people working in the field exacerbated by difficulties in recruitment, retention and workforce mobility. As part of growing the workforce, we need to know what skills are needed and we need to think creatively about how to ensure people have the opportunities to develop the skills they need; from doctoral and technical training to apprenticeships and CPD opportunities. We also need to ensure that people are aware of heritage science as a career option and that the field is attractive to work in with good opportunities for career progression and remuneration.

> **Together, we need to form a community which embraces diversity and celebrates common interests.**

Actions:

- Research who makes up the heritage science community, capacity of the current workforce and levels of demand.
- Research skills strengths, gaps and needs.
- Develop varied entry routes, forms of training and opportunities for career progression, including opportunities to move in and out of the field of heritage science.
- Address barriers to recruitment, retention and career progression.
- Build an identity for heritage science that celebrates common interests and maximises interdisciplinary collaboration.
- Increase the visibility of heritage science as a potential career, for example through opportunities for school-age children to learn about heritage through science.

Delivering the strategic outcomes

Many different organisations and individuals have valuable contributions to make to the three outcomes in this framework. It is important to acknowledge that the framework does not try to provide a solution for every challenge, but it does aim to provide a structure which people can use to show how the work they are doing connects to UK-wide heritage science priorities.

Some of the actions proposed in this framework are already being addressed; others provide opportunities for new collaborations. The next step is to build up our collective knowledge of who is doing what and spread the benefits of that activity through a shared delivery plan.

The National Heritage Science Forum's website acts as a hub for information and case studies which you can contribute to and use. We will monitor progress towards the delivery of the framework continuously and will collate an annual report highlighting achievements each year and inviting contributions for the year ahead.

Links

Find out more about the Strategic Framework for Heritage Science in the UK and how to get involved:

Visit the National Heritage Science Forum website

Subscribe to the National Heritage Science Forum newsletter

Email administrator@heritagescienceforum.org.uk

Acknowledgements

The National Heritage Science Forum is grateful to its members, consultees and wider stakeholders who have worked together to develop this framework.

1 See definition of Heritage Science provided by ICCROM (International Centre for the Study of the Preservation and Restoration of Cultural Property).

2 Case studies of research addressing five societal challenge themes on the National Heritage Science Forum website. Case studies of applications of heritage science research commissioned by the Arts & Humanities Research Council.

3 Strategic outcomes for the 2018-2023 Framework were: Excellent research; A skilled and diverse heritage science community; Demonstrable social and economic impact.

4 CapCo is the Arts & Humanities Research Council (AHRC) Capability for Collections Fund to renew and upgrade conservation and heritage science facilities (September 2020); CReSCA is the AHRC fund to renew and upgrade facilities for creative and cultural research, (July 2022).

5 The Creative Industries Sector Vision was published in June 2023 and sets out a plan for growth, building talent and developing skills.

6 E-RIHS is the European Research Infrastructure for Heritage Science. It is a distributed research infrastructure with a central hub and national nodes. It is envisaged that the national node will operate from within RICHeS once that is operational.

7 IPERION HS is a European Union-funded project *Integrating Platforms for the European Research Infrastructure ON Heritage Science*.

8 Information on the five societal challenges identified by NHSF members can be found on the NHSF website.

9 For example, the steady increase in the number of articles in the journal Heritage Science.

10 The Science and Heritage programme was a jointly funded (Engineering & Physical Sciences Research Council and Arts & Humanities Research Council) which ran from 2007-2013.

11 Horizon Europe is the EU's key funding programme for research and innovation for the period 2021-2027.

12 The Technician Commitment (UKRI action plan, January 2021) recognises the importance of technicians in the research and innovation system, and sets an expectation that UKRI-funded research organisations will support their professional development.

13 The Skills Investment Plan for Scotland's Historic Environment is an example of a sector-wide approach and includes a skills profile for heritage science.

14 Matrix to support identification of links between heritage science and primary school curricula commissioned by The National Archives and NHSF.

15 NHSF research into models for collecting evidence of impact.

16 Case studies linked to five societal challenges identified by the NHSF research working group.

17 A selection of case studies developed to support AHRC's business case for investment in the RICHeS programme.

18 The Culture and Heritage Capital portal brings together scoping work, reports and information on research projects.

19 Six research projects have been funded in 2024 in response to the AHRC/DCMS Culture and Heritage Capital Research Call, including ITHACA (Integrating Lifetimes in Heritage Capital).

20 UKRI research and innovation funding is often restricted to eligible organisations. UKRI eligibility not only affects access to Research Council funding but also access to some European funding e.g. the Climate and Cultural Heritage call.

Image Credits

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Bottom: Tate scientists Morana Novak and Angelica Bartoletti using Hirox digital microscopy on Bridget Riley's 'Hesitate', 1964 TATE T04132 © Bridget Riley.

Top left: Portable XRF in use on Bridget Riley's 'Hesitate', 1964 TATE T04132 © Bridget Riley.

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Assessing artist colouring techniques using AHRC CapCo funded 3D microscope © Ashmolean Museum.

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