Heritage Science and Conservation Research at The National Archives

Strategic Implementation Plan
2021-2025

Lora Angelova / Collection Care

UK HSCR Landscape

Heritage science and conservation research (HSCR) is multifaceted and collaborative, drawing on disciplines spanning engineering, physical and social sciences, and the humanities; it is carried out by universities, organisations responsible for managing the UK's heritage assets, and industry. HSCR explores scientifically and ethically sound methods and materials for the long-term understanding, preservation, enjoyment, and commercial exploitation of our heritage. HSCR is strongly public-facing - able to engage large audiences with the physical sciences through heritage and to contribute to promoting the heritage economy, which in England alone added *c.* £30 billion to GVA and was the driver behind 218.4 million trips in 2019.[1]

The potential of HSCR to contribute to developments in adjacent fields (advanced visualisation, novel materials, sensors), as well as its centrality to ensuring the preservation and access to our shared cultural heritage was formally recognised in the UK by the 2006 House of Lords *Science and Heritage* report.[2] Since then, commitment to the success of HSCR in the UK has been evidenced by investments like the AHRC-EPSRC *Heritage and Science Programme* (£8.1M, 2009-14);[3] the EPSRC CDT *in Science & Engineering in the Arts, Heritage and Archaeology* (£4.7M, 2014-22);[4] developments like the 2010 National Heritage Science Strategy[5] and the 2018-2023 Strategic Framework for Heritage Science in the UK[6] produced by the National Heritage Science Forum (NHSF, formed in 2013).[7] HSCR was again highlighted in the 2019 by the UK National Commission for UNESCO in their report *Cultural Heritage Innovation: Opportunities for International Development;*[8] in the 2020 UK Research and Innovation (UKRI) *Opportunities to Grow our Capability* report;[9] and in the Arts and Humanities Research Council's (AHRC) 2019 Delivery Plan.[10]

Within the UK, fora for advocating and advancing the HSCR agenda include the NHSF, the Independent Research Organisation Consortium (IROC),[11] which has several members engaged in HSCR, and E-RIHS UK, the national node of E-RIHS (European Research Infrastructure for Heritage Science),[12] which is a European distributed infrastructure for HSCR with global ambitions. A 2019 report commissioned by The Infrastructure and Access Working Group of E-RIHS UK found that there are at least 55 active HSCR facilities in the UK across the heritage, public, and higher education sectors, though informal sources suggest there may be closer to 80 such facilities.[13]

In 2020, the AHRC was granted more than £15M through the UKRI World Class Labs programme, to create the Capability for Collections (CapCo) fund, in order to secure the future of the UK's galleries, libraries, archives and museums. These funds were be invested in research and conservation labs and creative learning spaces that are central in the heritage sector's ability to generate research and create marketable products. Much of the funding granted thus far has been for urgent upgrades to heritage science laboratories throughout the UK, and the replacement or upkeep of analytical equipment therein. In addition, in 2021, the AHRC funded three

Infrastructure Policy & Engagement Fellowships in Heritage Science and Conservation as a part of its drive to create a distributed but integrated national HSCR infrastructure.

Most recently, in 2021, the UK Department for Digital, Culture, Media and Sport released the report *Valuing Culture and Heritage Capital: a framework towards informing decision making*,[14] which aims to create a formal approach to generating statistics and guidance that can be used to articulate 'the value of the culture and heritage sectors in decision making.' The framework, part of the Culture and Heritage Capital Programme, describes heritage science research as a method 'to estimate the condition of physical assets, how this condition changes over time and how the condition affects the flow of benefits the assets produce.' The report links the work of heritage scientists to conservation research in stating that heritage scientists are 'best placed to estimate the impact of conserving assets and therefore rates of degradation and irreversible loss'. According to the report and the Culture and Heritage Capital Programme, to meet the above mentioned aims, HSCR studies should be linked to economic valuation methodologies to provide evidence in decision making.

HSCR at The National Archives

Among organisations in the UK GLAM (galleries, libraries, archives, and museums) sector, The National Archives is the only archive with a fully equipped HSCR laboratory. As an AHRC-recognised IRO, we are eligible to receive funds for research, postgraduate training, and associated activities. With the support of the organisation and funds received from the Research Councils over the past decade, we have established a hub for student training and continuing professional development, and an incubator for challenge-led research, where heritage scientists and conservators work collectively to co-create projects and to address topics relevant to the conservation, preservation, and documentation of archival collections. Our studio is part of a dynamic, international network of HSC practitioner-researchers, hosting workshops and roundtables[15] that foster knowledge exchange and enable collaboration with organisations that lack access to analytical capacity.
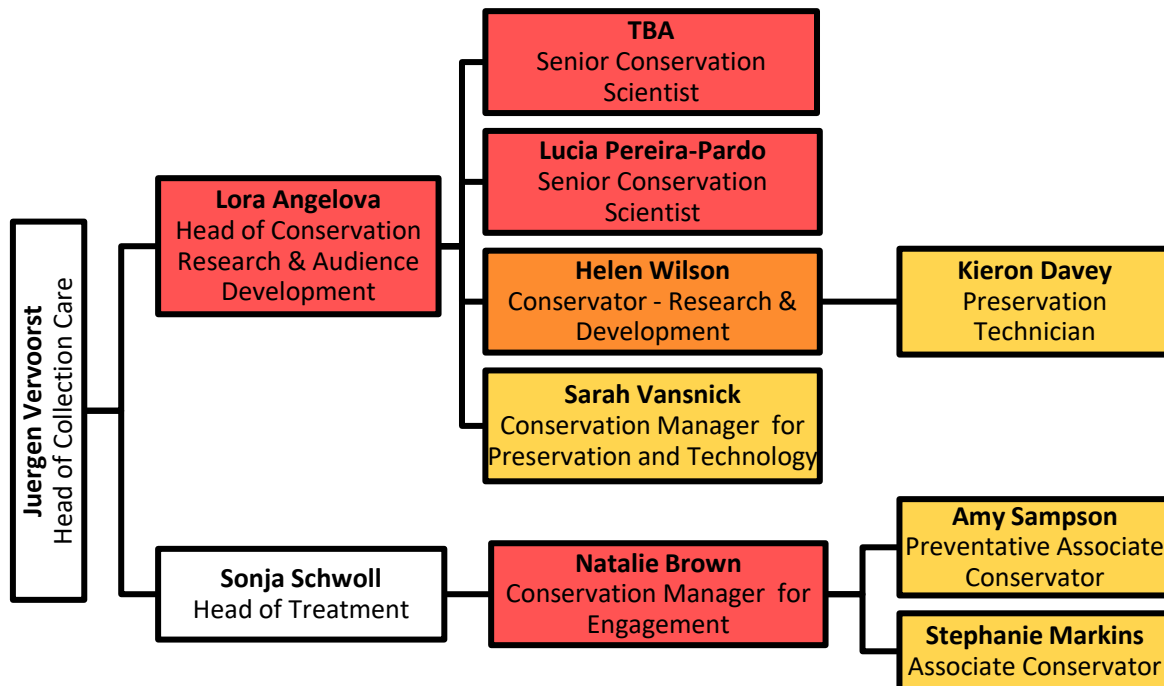
Our laboratory can be viewed as covering all four heritage science platforms, as defined by the international HSCR community (IPERION-CH[16] and E-RIHS)[17]:

– MOLAB: our suite of portable, non-destructive analytical instruments

– FIXLAB: our immobile laboratory, including our advanced imaging, analysis, and digitisation studios

– ARCHLAB (physical archives of technical documentation, data, samples & reference collections): TNA's collection, viewed through the collections as data[18] lens, our documentation systems and the data acquired from our collections as they are studied and digitised.

- DIGILAB (digital archives as research resources and advanced digital tools for research): our research on HSCR documentation (AHRC Linked Conservation Data, collaboration with ResearchSpace[19]), and the DIGILAB platform developed through our AHRC projects *AI for DIGILAB* and *From Lima to Canton*.

Over the past 5 years, we have invested more than £400,000 in new laboratory equipment purchases and upgrades, including a portable (p) XRF, an MFT, a p-FTIR, an MSI, a FORS, and an open-geometry Raman analyser. Acquisition of analytical equipment in the laboratory has been guided by four priorities: instruments should be (1) portable, so that research can be carried out in our repositories and at other GLAM organisations that lack capacity/capability; (2) non- or micro-destructive; (3) reflect our current and future research programme and collection's needs; and (4) operable by HSCR staff, accessible to other research staff at TNA and our collaborating partners. The HSCR laboratory and Collection Care studios currently hosts a complete suite of analytical and imaging equipment for the non-destructive study of documentary collections. The equipment is detailed on the NHSF Kit-Catalogue[20] and available for other organisations with existing expertise to borrow free of charge.

The staff in our studio are active members of the international HSCR community, undertaking original, interdisciplinary and discovery-driven research that ensures the conservation of, and enduring access to, our cultural heritage collections, underscoring their value, and opening new avenues of research for humanists and specialists in adjacent sectors, creating a myriad of new understandings and engagement opportunities for the general public. Our HSCR team members have developed expertise in the field through working in world-leading laboratories at The Library of Congress, The British Museum, the Fitzwilliam Museum, Tate, The National Gallery, Washington D.C., University College London's Institute for Sustainable Heritage and History of Art Material Studies Laboratory, and Historic Royal Palaces.

Juergen Vervoorst — Head of Collection Care

- **Lora Angelova** — Head of Conservation Research & Audience Development
  - **TBA** — Senior Conservation Scientist
  - **Lucia Pereira-Pardo** — Senior Conservation Scientist
  - **Helen Wilson** — Conservator - Research & Development
    - **Kieron Davey** — Preservation Technician
  - **Sarah Vansnick** — Conservation Manager for Preservation and Technology
- **Sonja Schwoll** — Head of Treatment
  - **Natalie Brown** — Conservation Manager for Engagement
    - **Amy Sampson** — Preventative Associate Conservator
    - **Stephanie Markins** — Associate Conservator

Our Team: members with a heritage science background and focus are highlighted in red, and with a preservation background and focus are highlighted in yellow. Members covering both areas are highlighted in orange. Many members of our Conservation Treatment team undertake research independently or in collaboration with the Research team; we view our conservation staff as practitioners-researchers.

Purpose of this document:

The past three years have demonstrated the enthusiasm for, and breadth of research possible within our department, as well as the wealth of connections that forms our departmental network, within and beyond TNA. There have been many challenges, including team restructures, Covid-19-imposed limitations on working on site and constraints on our time at home, an expanding engagement programme and its requisite time commitments, creating development opportunities for staff, and finding the right balance between external and internal-facing research priorities.

Currently, our research projects and initiatives are categorised under the following overlapping headings (see Appendix 1 – Research Projects 2020-2021 Q4):

- Material Analysis
- Preservation and Environment
- Imaging
- Digital
- Treatment
- Instrumentation/Technology

HSCR projects are allowed to organically emerge during assessment of collection items that need conservation attention, the environmental management needs of

the collection, conversations around planned loans and exhibitions, approaches from external collaborators, historic/material interest from TNA CEE members and external partners. Funding applications have been prioritised *ad hoc* based on:

- Themes of current funding calls
- Staff expertise and interests
- Approaches by external collaborators
- Potential/requirements of the collection

Projects revolving around material analysis and treatment are prevalent, many include imaging and digital platform development or implementation. As our capacity and reputation for HSCR has grown, so has our involvement in funded research projects (see Appendix 2 – Funded Projects 2020-2021 Q4). We are commonly approached by colleagues in the sector with new project ideas, while simultaneously, conservation staff in the Collection Care are also rapidly developing new ideas that require HSCR support. A research strategy will help to visualise our current strengths and weaknesses, outline our mission and vision so that we can define research goals in line with our departmental, organisational, and professional affiliations; it will provide a framework for prioritising projects, measuring impact, and an argument for resource allocation.

HSCR Research Strategy

Mission: The HSCR mission is aligned with that of the Collection Care Department in its aims to guarantee access and ensure the health to the collections held in The National Archives through innovative programmes of environmental management, conservation treatment, and documentation, and to enhance understanding of the collections through cross-disciplinary heritage science research.

Vision: To establish, define, and foster the development of the field of documentary and archival heritage science and conservation research, showcasing and enabling the innovation and engagement potentials facilitated by analytical studies of documentary collections; to serve as a sector leader and international hub offering advice and developing policy around the technical study, advanced care, documentation and access of large-scale and archival collections; to become 'digital by design' by streamlining our data collection, management and interpretation processes and by identifying opportunities to address the needs of archival collection users through the integration of advanced digital methods with traditional heritage science research; and to develop a diverse, inclusive, and collaborative research agenda, focused on collections created by, or concerning underrepresented communities and histories.

Our vision will be achieved through activity under the following four **Strategic Themes and their underlying priorities**. Existing and new projects and funding proposals will be prioritised based on their scope and benefit to our vision, through their potential to meet at least one, but preferably several of our strategic themes.

Collaborative: We will strengthen existing and secure new collaborative partnerships with colleagues in the HSCR sector and adjacent fields; we will explicitly seek to work with underrepresented communities; and we will put our expertise to practice in shaping national and international research priorities and policy decisions in HSCR.

- *Strategic Priority:* Research initiatives that create new bonds, strengthen existing networks, and that in particular, connect us with archives and documentary collections in the UK and abroad.

- *Strategic Priority:* Initiatives that create opportunities to directly work with underrepresented communities through (1) employment opportunities, (2) co-creation of research projects that focus on collections created by, with or about these communities, (3) volunteering opportunities, (4) mentoring, and (5) knowledge-exchange and engagement with schools

- *Strategic Priority:* Actively serving in the HSCR national and international networks by, for example, (1) maintaining our NHSF membership and serving on the Board of Trustees or Members Council, convening and participating in the working groups tasked with delivering the strategic framework for heritage science;[21] (2) serving on the committee of The Institute of Conservation Heritage Science Group;[22] (3) contributing to, or serving on the Royal Society of Chemistry's Heritage Science Expert working group;[23] (4) contributing to surveying and impact assessment exercises, meetings and discussions with the E-RIHS UK and E-RIHS; and (5) serving on the AHRC's Heritage Science Infrastructure Advisory Group for the development of a second phase proposal to UKRI.

Digital: We will become 'digital by design' by streamlining our data collection, management and interpretation processes and by identifying opportunities to address the needs of archival collection users through the integration of advanced digital methods with traditional heritage science research.

- *Strategic Priority:* Work closely with partners who are developing advanced data management and documentation methods for HSCR (e.g. Linked Conservation Data, ResearchSpace); seek out such partnerships specific to heritage science data processing and management and ensure that this information is integrated into our collection management practices.

- *Strategic Priority:* Ensure all existing and new HSCR data is FAIR[24]

- *Strategic Priority:* Contribute to the development of DIGILAB platforms that allow data management and open access to our HSCR outputs and create advanced data processing and interpretation methods.

Unruly & Emergent: We will strive to be at the frontier of archival HSCR, defining and fostering the field and serving as a sector leader by actively liaising and sharing our expertise and ideas with other archives around the world.

- *Strategic Priority:* Develop new ways of 'reading' the archive by demonstrating the potential of existing technologies and developing new tools and methods for uncovering artefactual or obscured information in our collections.

- *Strategic Priority:* Work closely with colleagues in the field of Digital Humanities to explore the cross-over between heritage science research and collections as data; develop and define the field of Computational Archival Heritage Science.

- *Strategic Priority:* By working closely with the conservation team and colleagues in the sector, contribute to mapping the current state of archival conservation practice, rethinking the concept and consequences of scientific conservation, and actively participating in breaking down barriers between siloed conservation and preservation cultures (e.g. archival vs book, paper, and modern material conservation, physical vs digital preservation).

- *Strategic Priority:* Explore research possibilities at the intersection of archival preservation practice and environmentally sustainable operations.

Integrated & Impactful: We will prioritise research that creates opportunities for knowledge exchange, learning and development, and advancement of our conservation team as practitioner-researchers who identify and steer research in their own collection care practice.

- *Strategic Priority:* Ensure that outcomes of our research are disseminated through a variety of channels, both formal (academic, professional) and social (widely accessible).

- *Strategic Priority:* Seek out projects and initiatives that allow for mentoring and supervision, working at all education levels, from school age to Early Career Researchers.

- *Strategic Priority:* Work to advance apprenticeship opportunities for HSCR.

- *Strategic Priority:* Engage with the entire Collection Care team to create learning and development opportunities and knowledge-exchange initiatives that ensure the benefits of HSC research reach all of our team members.

- *Strategic Priority:* Seek out projects that generate opportunities for wider knowledge-exchange and ideation with the HSCR community through workshops and roundtables that can be hosted at The National Archives.

Outcomes

The aim of this strategy is to create a framework that promotes connections between ideas that at first may seem disparate; to aid in project planning and implementation through highlighting a set of themes and priorities that can guide our decision-making and resource distribution. Success will take form in the

realisation of research projects that harness and focus our team's expertise, allow for further growth and development in areas that we are less comfortable, and create opportunities for knowledge exchange within our department, our organisation, the broader HSCR community, and beyond.

An outcome may be, for example, securing funding for a collaborative project, which connects us to new and/or existing partners (especially archives and libraries) to co-create avenues of research on collections related to under-represented communities, with, and led by the needs of members of those communities, and with implications for the conservation, access to, or material understanding of these collections. Through the framework established here, we would seek to achieve the aims of the project with members from that community, be they conservators, early career researchers, volunteers or apprentices; we would ensure that all data produced during the project is FAIR and managed through our new database (e.g. ResearchSpace), and if relevant, makes use of, or aids in the development of Digilab platforms. The research might showcase new and unforeseen ways of 'reading the archive' or employ and foreground local practices of care and access. The progress and findings of the work would be communicated through social and formal means, through engagement with school groups and professional workshops. Finally, the relevance of new practices or understandings that emerge through the research would be related back to our organisational strategy or professional strategic frameworks.

[1] https://historicengland.org.uk/content/heritage-counts/pub/2019/heritage-and-economy-infographics-nat-2019/

[2] https://publications.parliament.uk/pa/ld200506/ldselect/ldsctech/256/256.pdf

[3] https://ahrc.ukri.org/documents/projects-programmes-and-initiatives/science-and-heritage-programme-research-programme-specification-march-2009/

[4] https://www.ucl.ac.uk/seaha-cdt/

[5] http://www.heritagescienceforum.org.uk/documents/nhss_vision_strategy_web.pdf

[6] http://www.heritagescienceforum.org.uk/documents/NHSF_StrategicFramework-FINAL_Web.pdf

[7] http://www.heritagescienceforum.org.uk; NHSF 'brings together leading organisations that generate and use heritage science research and provides the impetus and mechanism for collaboration; it responds to policy issues, facilitates the sharing of equipment and resources, improves access to heritage science research, collates data on funding and research activity, and shares information on heritage science amongst public and professionals'.

[8] Cultural-Heritage-Innovation-2.pdf (unesco.org.uk)

[9] https://www.ukri.org/wp-content/uploads/2020/10/UKRI-201020-UKinfrastructure-opportunities-to-grow-our-capacity-FINAL.pdf

[10] https://ahrc.ukri.org/documents/strategy/ahrc-delivery-plan-2019/

[11] http://ahrc-iroc.org/

[12] http://www.e-rihs.eu/

[13] https://e-rihs.ac.uk/wp-content/uploads/2019/10/PublicReport_ERIHS-UK-Infrastructure_2019-02-13.pdf

[14] https://www.gov.uk/government/publications/valuing-culture-and-heritage-capital-a-framework-towards-decision-making/valuing-culture-and-heritage-capital-a-framework-towards-informing-decision-making

[15] In Practice: The Treatment Roundtable, Icon News, 88, 2020 34-36.

[16] http://www.iperionch.eu/

[17] NB, TNA CCD is not in partnership with these initiatives currently

[18] "Always Already Computational: Collections as Data, https://collectionsasdata.github.io/

[19] https://www.researchspace.org/

[20] https://equipment.heritagescienceforum.org.uk/

[21] http://www.heritagescienceforum.org.uk/what-we-do/strategic-framework

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

[23] https://www.rsc.org/membership-and-community/connect-with-others/through-interests/divisions/analytical/amc/heritafe-science/

[24] Findable, Accessible, Interoperable, and Reusable

All web addresses accessed on 26 February 2021