Held in Trust

Science and Materials

Working Group Report Summary

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A foundation of cultural heritage preservation is cutting-edge science that unveils the complexity of aging processes and integrates some of the most powerful and networked data science to preserve our cultural patrimony amidst the climate crisis.

By combining art and science in formal and informal learning experiences, it is possible to inspire the next generation of Americans to think beyond traditional intellectual domains, and with significant depth, about how the humanities and physical sciences can work together for the betterment of human understanding.

While celebrating the importance of scientific inquiry for advances in the areas of innovation, environmental sustainability, and science for the humanities for Held in Trust (HIT), we must also recognize that for many decades, science has been used in the field to create a misleading veneer of "objectivity" and has been weaponized to normalize and codify exclusionary practices. If we want to chart an equitable, more compelling, and resilient path for heritage science in conservation, then we need to acknowledge the root cause of this exclusion and recognize that scientific research is done by people and is subject to interpretation just like any humanistic discipline.

Creating a roadmap for heritage science to thrive will have significant societal and scientific impact. The interdisciplinary collaborations required for this endeavor promote a respect for multiple authoritative voices. Harnessing the most innovative scientific processes to study tangible and intangible heritage will promote creative design thinking and innovation, moving beyond the hyper-specialization of today's research world. Ultimately, investing in heritage science programs and ideas as outlined in this document and the full report from the HIT Working Group on Science and Materials will help engage Americans with the value of science for humanity.

Outlined below are three areas of key consideration the Working Group identified to support synergistic interactions of the sciences with an array of heritage objects, sites, communities, and practices.

KEY CONSIDERATIONS

Innovation

Innovation can be defined differently within different contexts, yet always includes a sense of novelty and progression. The goal of innovation in this field is to positively address pressing challenges that are unique to cultural heritage, especially in finding solutions to the ever-more accurate identification of materials, assessment of condition, development of sustainable treatments, and in collaboration with others, a more nuanced understanding of the creation and history of objects and cultural heritage sites. The preservation and understanding of material culture and intangible heritage poses complex challenges that can push the development of novel technologies, tools, materials, and methods, leading to valuable transferable outcomes for other fields. Current challenges to innovation in the field include, but are not limited to, a paucity of specialized practitioners, a lack of broad awareness of cultural heritage science, inconsistent and insufficient funding, and low capacity in existing facilities.

Environmental impact

Scientific research is used to measure and suggest means to reduce the environmental impact of current conservation practices. It advances the implementation of sustainable methods and materials in the preservation and conservation field in ways that align with institutional, national, and global environmental sustainability goals. The Working Group advocates for a move to sustainable materials and methods in the entirety of conservation scientists' practices, as well as those used in the storage, display, and transit of collection objects; in treatments and interventions on historic buildings and sites; in setting preservation-forward environmental condition ranges; and in the scientific analysis of cultural heritage.

Science for the humanities

Combining science with the humanities in new and creative pedagogical, scholarly, and dissemination approaches can develop competencies and attitudes for American people that are essential for innovation, collaboration, problem-solving, and the communication of complex ideas. Encapsulated in this area are issues surrounding cross-disciplinary communication and collaboration, diversification of the professional field, accessibility, funding, and education.

STRATEGIC GOALS

The HIT Science and Materials Working Group has identified the following three strategic goals to guide the field's actions around conservation science and its collaborations with the humanities for cultural heritage preservation now and into the future. Further detail on these goals and an outline of benchmarks over the short, medium, and long term can be found in the Working Group's full report.

GOAL #1: Encourage innovation through expanded funding and partnerships for cultural heritage science.

Critical to encouraging and promoting innovation is achieving stable funding to generate awareness and overall scientific literacy among the public, to support heritage science research, and to diversify education. In addition, promoting collaborations inside and outside cultural institutions with academia, national labs, and industries will accelerate innovation for cultural heritage science and allied fields. Connecting U.S. scientists to a broad network of museums and cultural institutions to promote visual literacy and design thinking will foster a sustainable ecosystem of new idea generation for heritage preservation and training. This work includes expanding funding for under-resourced institutions and communities and developing pathways to connect them with conservation scientists when requested.

Offering innovative and cross-disciplinary training for youth will ensure longevity and broaden the reach of cultural heritage science: for example, support should be sought to establish *art innovation corps* for students offering returning year-to-year paid summer internships at the high school, undergraduate, and postgraduate levels to acquire sustained hands-on experience with research. In K-12, establishing a special program of after-school activities in collaboration with Indigenous and under-served communities will offer a focus on the science and technology of making, Indigenous knowledge, and heritage preservation. Communities who care for their own cultural materials must be engaged as partners to identify what training and research programs are needed to meet their goals.

GOAL #2: Support cultural heritage field's efforts to prioritize sustainability and work within the challenges of climate crisis.

Climate change and its impacts on our planet have become one of the most pressing issues of debate globally. From risk assessment and management approaches to the development of more sustainable exhibition and packing materials, cultural heritage science is ideally positioned to support the cultural heritage field's efforts to prioritize sustainability and work within the challenges of the climate crisis. This includes supporting a universal understanding that energy efficient and environmentally safe materials and practices are not antagonistic and can work in synergy with the preservation of material culture and sites. A key milestone is scaling and implementing successful transfers of research into practice to meet United Nations sustainable development targets in the preservation of cultural heritage. Furthermore, this area provides an excellent avenue to include traditional Indigenous knowledge systems as valuable sources of scientific knowledge for the environmentally sustainable care and preservation of cultural heritage.

GOAL #3: Increase awareness, engagement, and research between cultural heritage science and the humanities.

Creating bridges between arts and science pursuits provides models of interdisciplinarity and highlights the universality of human creativity. Heritage scientists have a great deal of valuable material and information to share with stakeholders in a variety of educational settings that can be used to highlight for educators and students the common ground between the arts, humanities, sciences, and engineering. This work includes achieving equitable practices of knowledge creation and learning that transcend rigid disciplinary boundaries and foster respect for multiple authoritative voices, including the incorporation of traditional Indigenous knowledge into scientific research. To amplify and democratize access to science for heritage and the humanities at a national scale will require the support for operations and staffing of multiple heritage science hubs in the East, Central, West, and U.S.-Caribbean regions of the United States. Leveraging facilities and expertise at the university and museum level, these heritage science hubs will create a diffuse infrastructure for heritage science that is available to underserved geographic locations and communities through a combination of mobile and fixed lab solutions.

IN SUMMARY

Creating a roadmap for heritage science to thrive will have significant societal and scientific impacts. Focusing in on three overarching areas—innovation, environmental sustainability, and science for the humanities—we have presented a possible path forward that grounds equity and access to science on local to national scales. In the sciences, it will promote innovative developments in sensing and modeling of aging phenomena and material properties, which also benefit other fields in the humanities and social sciences. In society, it will deepen the connections that the American public already have with certain objects, sites, and the values of their intangible cultural heritage. Examining the past through the lens of objects' materials and making creates a platform for sharing knowledge and ideas and promotes a respect for multiple authoritative voices. Ultimately, it will help engage Americans with the value of science for humanity.

To learn further details around the findings and recommendations of the HIT Working Group on Science and Materials, please access their full report.

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