

The Heisenberg Principle of Heritage

Matija Strlič¹

¹*UCL Institute for Sustainable Heritage, University College London, UK*

Abstract: Light is essentially linked to the heritage experience: humans use sight 60% of the time when communicating with the environment. Unfortunately, in its interaction with matter, light simultaneously transmits and annihilates information – an agonizing Heisenbergian dilemma for any heritage scientist or conservator: it is either possible for an object to exist, or to know everything about it. (One could assume that metadata is the object – but let's leave metaphysics aside.)

We use the extraordinary power of lasers to intentionally remove unwanted layers of objects, and at the same time we produce art objects using the additive manufacturing method of selective laser sintering. We use light bleaching in conservation and protect objects from light during exhibitions. Light is used to activate self-cleaning coatings for historic surfaces and sometimes it forms the artwork itself.

A heritage scientist is required to look beyond the usual science toolkit to examine some of the issues arising from the above apparent dichotomies. To understand the existence value of an object in relation to its instrumental (informational) value, we need to engage the relevant stakeholders who hold these values. Using social science research methods in the context of management of geological collections, metadata about objects has been shown to be potentially more valuable than the object itself [1], sampling is therefore potentially not an issue. With chromogenic prints, the loss of colour was found to be less acceptable if dyes fade selectively [2]. In an examination of the public attitudes towards discolouration of paper-based library and archival objects, it turned out that colour contributes insignificantly to the overall notion of damage [3]. Comments such as "Degradation is a sign of objects having had a good life" were not uncommon.

Heritage science not being quantum physics, social science methods might shed some light on our predicament.

1. J. Robb et al.: Quantitative Assessment of Perceived Value of Geological Collections by 'Experts' for Improved Collections Management, *Geol. Cur.*, 9 (2013) 529-543.
2. A. Fenech et al.: Modelling the Lifetime of Colour Photographs in Archival Collections, *Stud. Conserv.*, 58 (2013) 107-116.
3. C. Dillon et al.: Collections demography: stakeholders' views on the lifetime of collections, *Climate for Collections Conference, Munich, 7-9 November 2012, Postprints*, J. Ashley-Smith, A. Burmester, M. Eibl (Eds.), Archetype, London, 2013, pp. 45-58.

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BIO NOTE

Matija Strlič | m.strlic@ucl.ac.uk

Matija is Professor of Heritage Science at UCL Institute for Sustainable Heritage, and Deputy Director of the EPSRC Centre for Doctoral Training in Arts, Heritage and Archaeology. He has been involved in more than 30 research and networking projects, attracting ~£20M funding predominantly for heritage science. Matija's research focus is in the cross-disciplinary field of heritage science, particularly development of new scientific tools and methods to study heritage materials and collections, and their interactions with the environment. Among the pioneering contributions are the development of the concepts of collections demography, of degradomics, use of Near Infrared Spectrometry with chemometric data analysis in heritage science, use of chemiluminometry for studies of degradation of organic heritage materials, and studies of volatile degradation products in heritage collections, including the smell of heritage. His current research interests include development and use of damage functions and integrated modelling of heritage collections. Matija is also interested in the field of heritage science itself, and has been involved in a research project examining the attitudes of heritage scientists to collaborative research.

Presently, he is a Co-Investigator on the UK EPSRC Centre for Doctoral Training in Arts, Heritage and Archaeology (2014-2022) and a Co-Investigator on the EPSRC Complex Built Environment Systems (CBES) Platform Grant "The Unintended Consequences of Decarbonising the Built Environment" (2011-2016). He was the PI on several large collaborative projects: UK AHRC/EPSRC Science and Heritage Programme "Collections Demography" (2010-2013), EU FP6 "SurveNIR" (2005-2008), and scientific coordinator of EU FP5 project "Papyrus" (2001-2004).

