

SCIENTIFIC RESEARCH

Green strategies to conserve the past and preserve the future of cultural heritage (GoGreen)

Katrien Keune*

Van 't Hoff Institute for Molecular Studies, University of Amsterdam

Conservation & Science Department, Rijksmuseum Amsterdam, The Netherlands

k.keune@rijksmuseum.nl

David Thickett

English Heritage London, UK

david.thickett@english-heritage.org.uk

Silvia Prati

Department of Chemistry, University of Bologna Bologna, Italy s.prati@unibo.it

Edith Joseph

Haute Ecole Arc Conservation-restauration (HE-Arc CR), HES-SO University of Applied Sciences and Arts Western Switzerland Neuchatel, Switzerland edith.joseph@he-arc.ch

Loïc Bertrand

Université Paris-Saclay, ENS-Paris Saclay, CNRS Gif-sur-Yvette, France loic.bertrand@ens-paris-saclay.fr

Arianna Traviglia

Centre for Cultural Heritage Technology, Fondazione Istituto Italiano di Tecnologia Venice, Italy

arianna.traviglia@iit.it

Austin NevinDepartment of Conservation, Courtauld Institute of Art London, UK

austin.nevin@courtauld.ac.uk

Caitlin Southwick

Ki Culture and Sustainability in Conservation Amsterdam, The Netherlands caitlin.southwick@kiculture.org

Maartje Stols-Witlox

Conservation and Restoration, University of Amsterdam Amsterdam, The Netherlands m.j.n.stols-witlox@uva.nl

Joel Taylor

Norwegian Institute for Cultural Heritage Research (NIKU)

Oslo, Norway joel.taylor@niku.no

Valentina Sabatini

SAATI S.p.A. Milan, Italy vsabatini@saati.com

Claire Betelu

School of Art History and Archeology, HiCSA Laboratory, Paris I Pantheon-Sorbonne University Paris, France Claire.Betelu@univ-paris1.fr

*Author for correspondence

The GoGreen project, a Horizon Europe funded project (2022–2026), develops green strategies for conservation by promoting preventive and remedial practices based on green principles (www.gogreenconservation.eu). The poster presents the scientific research activities and first results of this project. For preventive conservation, new damage functions are being developed for glass, metal, ceramic, oil paintings, limestone, and wall paintings on lime-based plaster using near infrared reflectance and time-resolved Fourier transform infrared spectrometry. These damage functions inform decisions about more flexible environmental control in collections, with the aim of decreasing the carbon footprint. Artificial intelligence algorithms are being applied in the elaboration of methods that support conservators in identifying early damage warnings and defining preventive conservation strategies in response. For remedial conservation, new cleaning solutions for paintings and metals and new consolidation materials for metal and glass are developed. The development of these materials is based on and inspired by historical recipes, biological processes, and green chemistry practices in order to obtain eco-friendly compounds from renewable sources. Examples include the evaluation of specific bacterial strains (such as Acidithiobacillus ferrooxidans) for silver cleaning based on their capacity to take up silver ions, and the synthesis of silica-gel nanostructures for consolidation using a synthesis procedure that takes place at room temperature and in water. GoGreen also mines historic data from archives, sources, recipes, and recent previous projects to support innovative strategies and methods to make sets of sustainability data accessible. To determine the efficacy of the new materials and methods emerging within GoGreen, cutting-edge analytical techniques, non-invasive chemical imaging and benchmark methods are used. For surface assessment, new combinations of photoluminescence spectral imaging and statistical data analysis are being developed to optimise the study of treatment efficacy. The results of semi-quantitative microand nano-computed tomography and X-ray Raman imaging for in-depth volume assessment are compared with those from conventional analytical techniques. An important component of the GoGreen project is the creation of tools that motivate and enable the conservation field to adopt green and sustainable practices, such as by improving access to technical information about green alternatives and by introducing green thinking in conservation decision-making (both for preventive and remedial conservation). GoGreen will develop both a digital web-app to aid conservators in the design of green preventive and remedial conservation treatments and a decision model. In addition, green thinking will be embedded in the field through bottom-up education modules and workshops for conservation educators, emerging conservators, and mid-career professionals, ensuring that the next generation of conservators is fully equipped to embrace the Green Deal.