PROGRAMME AND ABSTRACTS

TechnoHeritage 2017

Cadiz,Spain 21-24 May 2017

TechnoHeritage 2017, 21-24 May
Cádiz

Programme and Abstracts

Edited by

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Programme and abstracts of Technoheritage 2017

Cover design ©Pedro Braza Lloret, pedrobraza@arquired.es

Publishers: Miguel Angel Rogerio Candelera, María J. Mosquera, M.L. Almoraima Gil

ISBN: 978-84-697-2732-4

First printing, 2017

Printed in Spain

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Analysis of materials during the restoration of *Tota Pulchra* by Giuseppe Cesari

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Giuseppe Cesari (1568-1640), was an Italian Mannerist painter, very much valued in Rome by the Popes and other important clients. He developed a personal style shown by strong colours and chiaroscuros and was known as a fresco and as a canvas painter. Most of his works are conserved in Italy, however one is in the collection of the *Real Academia de Bellas Artes de Santa Isabel de Hungría* in Seville. It was painted around 1600 in the technique of oil on canvas and presents a *Tota Pulchra*. In the spring of 2016 the painting was sent to the *Instituto Andaluz de Patrimonio Histórico* for its restoration and material research.

In general, the conservation state of the painting was very degraded, principally due to a fracture in the lower part of the canvas, but also due to natural processes of ageing of the materials and to some unfortunate interventions in the past. Therefore, the restoration was principally directed towards the removing and repairing of the existing damages but also to return to the painting its aesthetic presentation.

During its restoration, material analyses were carried out, in order to identify pigments and painting preparation used by the artist. For this purpose, invasive and non-invasive techniques were used, such as UV light to distinguish later interventions, radiography to see the internal structure of the painting, and X-Ray Fluorescence (XRF), used for the identification of inorganic materials. The XRF was carried out directly *in situ*, in the restoration workshop. Different colours and tonalities were selected, in order to get the best overview of the materials applied by the artist. The XRF results revealed the use of Ca based preparation, probably chalk (identified by Ca peaks) with a thin layer of reddish priming, carried out as a mixture of red ochre (Fe) and vermilion (Hg). In the painter's palette we can also find lead white (Pb), used also for highlighting, yellow ochre (Fe) and lead-tin yellow (Pb, Sn), azurite (Cu) and smalt (K, Co, Ni, As) for blues and a copper based green pigment, being not possible to identify it with more precision by XRF; for dark colours umber and bone black were used. Also later interventions were confirmed with the help of the UV light and XRF, which identified the existence of modern pigments (20th century) as titanium white (Ti), cadmium yellow and cadmium red (Cd).