A CHARISMA round robin; comparison of non-invasive analyses and documentation methods for integration of results from multiple techniques on a single painting

Marika Spring[1], Rachel Morrison[1], Joseph Padfield[1], Magdalena Iwanicka[2], Łukasz Ćwikliński[3], Raffaella Fontana[4], Bernard Bluemich[5], Tyler Meldrum[5], Markus Kueppers[5], Wasif Zia[5], Paraskevi Pouli[6], K. Melessanaki[6], V. Tornari[6], D. Anglos [6]

[1]Scientific Department, National Gallery, London, UK.
[2]Institute for the Study, Restoration and Conservation of Cultural Heritage, N. Copernicus University, Toruń, Poland.
[3]Institute of Physics, Nicolaus Copernicus University, Toruń, Poland.
[4]INO-CNR, Istituto Nazionale di Ottica, Firenze, Italy,
[5]Institut für Technische und Makromolekulare Chemie, RWTH Aachen University, Germany.
[6]Institute of Electronic Structure and Lasers (IESL), Foundation for Research and Technology–Hellas (FORTH), Heraklion, Crete, Greece.

The CHARISMA project (2009-2013), funded by the EU under the FP7 programme, is a consortium of 21 European institutions offering transnational access to various facilities, and including research and networking activities. Within one of the research work packages a number of instruments for the non-invasive analysis of the materials of cultural heritage objects are being developed, and the work is now in the phase of exploring and testing applications. Taking advantage of the fact that this work is taking place within one project, a 'round robin' exercise was planned, where a test painting was examined by some of these techniques in turn, as well as with more conventional methods.

The test painting was first documented and examined at the National Gallery. High resolution images in visible and ultraviolet light were made, and X-radiography and digital infrared reflectography were carried out. Some paint samples were taken and mounted as cross-sections to examine the layer structure. The pigments in the cross-sections were analysed by scanning electron microscopy with energy dispersive X-ray analysis, as well as attenuated total reflectance-Fourier transform infrared microspectroscopic imaging. These results served to give background information that would help to interpret the observations with the non-invasive techniques.

The painting has so far been examined using optical coherence tomography(OCT) (at Nicolaus Copernicus University, Torun, Poland), single-sided Nuclear Magnetic Resonance (NMR) (at RWTH Aachen University, Germany), confocal laser scanning microscopy(CLSM) (at INO, Florence, Italy) and laser induced breakdown spectroscopy (LIBS) as well as Digital Holographic Speckle Pattern Interferometry (DHSPI) (at FORTH, Heraklion, Greece). The aim was not for this exercise to be a rigorous scientific comparison, but instead to act as a case study for demonstrating the specifications of each instrument and to allow the exchange of knowledge between the partners in the project on suitable applications. This talk will discuss the preliminary results of the exercise.

These examinations produced many different images, as well as data in various forms, including not only spectra of specific points, but various technical images of the whole painting, images of the real paint samples, and a large number of 'virtual' cross-section images from OCT and CLSM. The subject of digital technical documentation systems that integrate the results from many types of analysis or imaging is a focus of one of the networking tasks in the CHARISMA project, and will be discussed in the second part of this talk. This networking task in CHARISMA is surveying the methods currently used by the partners, as well as bringing together knowledge of new initiatives on this subject that might be useful to this research community. The results from the round robin provided an ideal case study for testing ways of sharing and documenting the data, to act as a springboard for discussion of these issues.

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