ADVANCED ANALYTICAL CHEMISTRY AND DATA TREATMENT METHODS FOR THE DIAGNOSIS OF CULTURAL HERITAGE

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The lecture aims to provide advanced knowledge related with the different micro-invasive and non-invasive analytical techniques used to characterise the material constitution and degradation patterns of heritage materials. Moreover, the course will also discuss issues related with chemometric methods for the analysis of data obtained from analytical investigations of cultural heritage with particular attention to multivariate methods for the evaluation and management of single point analysis and hyperspectral imaging (HSI) data matrices.

Fig. 1 Portable non-invasive x-ray fluorescence analysis of *Cimabue's Maestà*, a panel painting from the late 13th century from the Church of Santa Maria dei Servi in Bologna.

Rocco Mazzeo is currently Full professor of chemistry for cultural heritage at the University of Bologna where he is the head of the Microchemistry and Microscopy Art Diagnostic Laboratory (M2ADL) and Director of the Organisational Unit (UOS) Ravenna of the Department of Chemistry "Giacomo Ciamician". He is also the founder of the international Master degree course (LM) in Science for the conservation-restoration of cultural heritage completely taught in English language. As a chemist, he has devoted his entire career to science for conservation of cultural heritage training and research at both national and international level as responsible for the science for conservation programme at ICCROM (International Centre for the study of the preservation and restoration of cultural property).

He has been coordinating many national and international project among which the *first European PhD in Science for conservation* (EPISCON project) funded by the Marie-Curie VI Framework Programme (2005-2009). He is currently Chair of the EuChemS (European Chemical Society) Working Party on Chemistry for cultural heritage.

He is author of more than 200 scientific papers on books, journals, and conference proceedings, co-authored a book on "CHEMISTRY FOR CULTURAL HERITAGE. PAINTING AND RESTORATION MATERIALS" and edited a book on Analytical chemistry for cultural heritage, (Springer).

His main research interest and expertise deal with the application of different advanced non-invasive and micro-invasive analytical techniques, and FTIR and Raman molecular spectroscopy in particular, to the study and diagnosis of painted artworks and archaeological and artistic metal alloys. Moreover, a newly developed research area deals with the development and performance evaluation of new materials (nano materials and cleaning materials and methods) and technologies for the cleaning, consolidation and protection of cultural heritage.