



Editorial to selected papers from the 3rd IMEKO International Conference on METROLOGY FOR ARCHAEOLOGY AND CULTURAL HERITAGE 2017

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Dear Reader,

this special issue of Acta IMEKO includes selected papers presented at the 3rd IMEKO International Conference on Metrology for Archaeology and Cultural Heritage – MetroArchaeo2017, which took place on October 23-25, 2017 in Lecce (Italy). The conference was held at the *Castello Carlo V*, a majestic fortification in the heart of Lecce.

All over the world, and in particular in the Mediterranean countries, there is a growing attention on the need to promote and strengthen the importance of developing multidisciplinary measurement approaches, which are the key for an effective preservation, management and understanding of cultural heritage.

Today more than ever, it is generally agreed upon that heritage scientists, engineers, conservators and archaeologists have to share their common interests and understanding in the cultural heritage areas, while maintaining their different perspectives. For instance, heritage scientists and engineers' focus is often oriented towards the development of measurement system and to the interpretation and validation of the measurement data. On the other hand, conservators and archaeologists concentrate more on a pragmatic understanding of heritage assets and of the social/historical contexts in which they originated.

MetroArchaeo gives all these actors of the scientific and humanistic world the opportunity to meet, share knowledge and discuss new ideas to provide effective and comprehensive solutions to age-old problems in research, protection, monitoring and exploitation of cultural heritage artefacts and sites.

In this perspective, MetroArchaeo2017 confirmed to be an important annual meeting collecting experts and researchers with

different expertise, who are interested in open-minded discussion on the recent advances in research on instrumentation and measurements in the cultural heritage field.

More than 200 papers were presented in Lecce and after a careful peer review 16 papers and one technical note were eventually accepted for the ACTA IMEKO Special Issue. These papers give an interesting overview of the integrated analytical and measurement approaches in cultural heritage and archaeology.

Most of the papers published in this special issue focus on innovative methods and on enhancements of state-of-the-art systems for the characterization of Cultural Heritage, as well as on methods for the preservation of archaeological artefacts and historical sites.

In this regard, the paper presented by Gigante et al. addressed the use of X rays for the characterization of the metallurgical characteristics of Moche tombs “*Señor de Sipán*” and “*Señora de Cao*”. Cesareo et al. address the use of a portable EDXRF-device for a 3D map of chemical elements distribution. The chemical and physical characterisation of cultural heritage assets is as important as the development of tailored methodologies for their long-lasting preservation. In this contest, a new fibre optic sensor for monitoring the pH of water is proposed by Dinia et al. to assess the effect of corrosion on different materials. Di Francia et al.'s work focused on a low-invasive and selective laser cleaning procedure for the removal of reactive corrosion products on Cu-based artefacts without damage the substrate. Eventually, degradation of cultural heritage materials can be studied both on real fragments as well as on reference samples as in the case of the infrared thermography investigation performed

by Forestieri et al. to assess the water absorption/desorption mechanisms in building stones.

Several papers employed current investigation methods (or their combination) to bring to light new discoveries and features of invaluable art and monumental pieces.

For instance, Leuzzi et al. addressed non-invasive exams, combining imaging techniques (including UV fluorescence (UVF), infrared reflectography (IRR), infrared false colour (IRFC), X-ray fluorescence (XRF) with analytical analyses, for the scientific examination of the Nursing Madonna (*Madonna del Latte*). Di Giacomo et al. employed integrated geophysical surveys for the study and the reconstruction of the sixteenth-century fortifications of the city of Lecce. De Giorgi et al. addressed non-destructive testing to assess the conservation state of the elements constituting the roofing of the Cathedral of Foggia (Italy) by means of ground penetrating radar. Diaferio et al. discussed the results of an in-situ dynamic measurement campaign on a stocky masonry clock tower situated in the Swabian Castle of Trani (Italy) for assessing the effects of the shaking device on the vibrations of the tower. Eventually, an integrated measuring approach was used by Rosselli et al. for the structural diagnosis of the Temple of Minerva Medica, in Roma (Italy).

Finally, other papers focused on software and management tools for optimal investigation and/or fruition of Cultural Heritage.

For example, De Nunzio's paper addresses a software tool for interactive and semi-automatic segmentation, characterization, and annotation of 3D models produced by photogrammetric surveys, while Buzi et al. present a new digital approach also based on photogrammetry to study a paleoanthropological specimen: the Neanderthal skull Saccopastore 1.

Malagino et al. addressed the application of a new integrated approach (resorting to Business Process Management (BPM) and

Building Information Modelling (BIM)) to optimize the data flow, to gather information and to share knowledge during the restoration process, thus facilitating the ordinary and extraordinary maintenance. The work by Tanasi et al. addressed the strategies for the optimization of the dissemination of 3D models on Cultural Heritage: they presented the case of the Archaeological Museum 'Paolo Orsi' in Syracuse (Italy), as best practice on digital dissemination through platforms. Eventually, Angelini et al. presented some effective strategies to reduce the errors inherent to range-data and image-based systems applied to the archaeological heritage, with particular focus on photogrammetry from drones compared to traditional acquisitions. 3D survey and metric analyses also allows more reliable interpretation of historical data, as in the case study of Late Roman Fort of Umm al-Dabadib (Egypt), discussed by Fiorillo et al.

Last but not least, the technical note on ancient psychological instruments by Tošković highlighted the importance of these artefacts, which allow the reconstruction of a psychological laboratory from the very beginning of this scientific discipline, as well as of the partnership between science, measurements and psychological research.

We hope that this special issue will give the reader new points of view in metrology and measurement applied to cultural heritage, taking also into account their fundamental role in our society. The special issue wants to highlight the importance of the synergy among all heritage scientists and actors and among the different disciplines, which provide important tools for the monitoring, preservation, management and safeguard of cultural heritage assets.

Hope you will have an interesting reading!

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