

## ARCHAEOLOGICAL COMPUTING AND THE METROARCHAEO INTERNATIONAL CONFERENCE AWARD: AN INTRODUCTION

The annual 2020 IMEKO TC-4 International Conference on Metrology for Archaeology, MetroArcheo, organized by the Trento University, was held as a virtual event due to the Covid emergency. As the previous editions, regularly convened each year since 2015, also the 2020 event provided an important opportunity to bring together various contributions devoted to the expanding interest of archaeological sciences in new technologies and analytical techniques, with the aim of discussing production and interpretation of measurements and data.

While in 2020 «Archeologia e Calcolatori» published the special section on *Logic and Computing* presented during the 2019 Florence Conference, for this issue of the journal the ten best papers on archaeological computing were selected (<https://www.metroarcheo.com/ma2020/awards>). Awarded by an international Scientific Committee, the papers concern some case studies relating to archaeological sites, monuments and artifacts, in which digital technologies have enhanced innovative research and communication solutions, testifying to the potential strength of the dialogue between human and exact sciences. A common thread that seems to link almost all the selected papers is the use of 3D solutions for documentation, preservation and sharing of archaeological monuments and artifacts.

The first articles illustrate three relevant contexts: the Grado I Roman shipwreck (Costa, Beltrame), an interesting wreck found in 1986 by the coast of Grado (Gorizia), the late-Republican *insula* 4-6 in Paestum (Bosco *et al.*), and the NE slopes of the Palatine hill and the Colosseum valley area (Brienza, Fornaciari). In the last years digital technologies have largely supported documentation and studies of submerged heritage. In the Grado Roman shipwreck, the Ca' Foscari University research team processed the collected data in order to obtain a complete virtual 3D model of the shipwreck in its different phases, from the hull and the cargo *in situ* to the reconstruction of the original ship before the sinking, with the aim to make it accessible to a wider public and disseminate the importance of the underwater archaeological remains.

In the *insula* 4-6 in Paestum, thanks to BIM models the digital representation of the structures allowed a more precise identification of the buildings, their relationships and their transformation over the time. Also in the excavations conducted at the NE slopes of the Palatine hill the use of digital tools allowed to better understand the history of architectural and urban aspects of this central zone of Rome. For the analysis of the

ancient walls, image-based-modelling helped to create a very detailed 3D documentation linked to a DBMS dedicated to the ancient structural features. Reconstructive hypotheses have been formulated and chronological architectural sequences verified in order to analyze the relationships between the different buildings.

As for the use of 3D in the study of ancient artifacts, Tavella *et al.* estimate the volumetric capacity of some vessels from the Neolithic site of Lugo di Grezzana (Verona, Italy) thanks to an open source 3D computer graphics software. Guček Puhar *et al.* examine a Palaeolithic hunting weapon from Ljubljana River, emphasizing the importance of a 3D reconstruction obtained from microcomputer tomographic 2D images in order to select the right procedure for conservation and restoration. Finally, Aquino *et al.* illustrate the use of photogrammetry in 3D objects modelling, with a view to making otherwise inaccessible objects visible to the public.

Archaeological artifacts as object to be documented, analyzed and monitored for conservation over time through digital technologies are central in the papers by P. Triolo *et al.*, S. Mazzocato *et al.* and D. Giuffrida *et al.* In particular, in this last case study, which is focused on some findings preserved in the Archaeological Museum of Lipari, the virtual reconstruction is combined with the chemical analysis conducted within a ‘mobile laboratory’ that allows working without moving the objects from their place of preservation.

The interaction between archaeology and archaeometry continues to yield interesting results in order to solve questions on dating, provenance and originality of archaeological artifacts. In their paper, Antonelli *et al.* present the results of an archaeometric research conducted on architectural and sculptural white and polychrome marbles used in central Adriatic area during the Late Republic and Early Empire, with the aim of determining their geographical origin through macroscopic examination and laboratory investigations.

Finally, the Scientific Committee selected two additional papers (Piro *et al.* and Leucci *et al.*) presented during the 2020 Conference, in order to include the Special Session 1 ‘Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage’. The session focused on new approaches to geo-archaeological data for the study of ancient sites in order to enhance the knowledge of investigated areas in relation to historical reconstruction, creation of useful tools for preventive archaeology and preservation of archaeological and monumental heritage.

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