

# Archaeometry and Machine Learning for Cultural Heritage

Giulia Festa

Centro Fermi - Museo Storico della Fisica e centro Studi e Ricerche "Enrico Fermi"

P.za del Viminale 1, Roma

Cultural Heritage artefacts show an intrinsic complexity which is related to their structure and history. They are often made of different materials and may have undergone alterations over time [1-2]. Archaeometry incorporates a variety of interdisciplinary techniques and approaches and allows us to obtain quantitative data which can help to solve archaeological and conservational research questions [3-5]. Machine Learning effectively complements Archaeometry allowing to process data supporting the identification of patterns, classification, and extraction of significant dataset features. Several successful studies have been conducted on ancient artefacts through the combined application of Archaeometry and Machine Learning spanning from Neutron Imaging for studying the morphology of ancient vases to Spectroscopy analysis for the extraction of elemental benchmarks in ancient pigments [6-8].

## REFERENCES:

- [1] Scientific Examination of Art: Modern Techniques in Conservation and Analysis, The national academies Press, 2005
- [2] Creagh, Dudley Cecil, and David Bradley. Physical techniques in the study of art, archaeology and cultural heritage. Elsevier, 2007
- [3] Janssens, Koen, and René Van Grieken, eds. Non-destructive micro analysis of cultural heritage materials. Elsevier, 2004.
- [4] Mazzeo, Rocco, ed. Analytical chemistry for cultural heritage. Springer, 2017.
- [5] Kardjilov, Nikolay, and Giulia Festa, eds. Neutron methods for archaeology and cultural heritage. Berlin: Springer, 2017.
- [6] Festa, Giulia, Claudia Scatigno, Francesco Armetta, Maria Luisa Saladino, Veronica Ciaramitaro, Viviana Mollica Nardo, and Rosina Celeste Ponterio. "Chemometric tools to point out benchmarks and chromophores in pigments through spectroscopic data analyses." *Molecules* 27, no. 1 (2022): 163.
- [7] Teodonio, Lorenzo, et al. "Late Middle Ages watermarked Italian paper: A Machine Learning spatial-temporal approach." *Journal of Cultural Heritage* 57 (2022): 53-59.
- [8] Scatigno, Claudia, and Giulia Festa. "Neutron Imaging and Learning Algorithms: New Perspectives in Cultural Heritage Applications." *Journal of Imaging* 8.10 (2022): 284.