Editorial

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Biographical notes: Nicola Cavalagli is an Assistant Professor of Structural Mechanics at the Department of Civil and Environmental Engineering of University of Perugia in Italy. His research interests are mainly focused on the analysis of historical constructions, with special attention to the homogenisation techniques of masonry material and the analysis of masonry arches, vaults and domes, considering geometrical uncertainties effects. His recent studies have been devoted to the development of structural health monitoring strategies applied to heritage constructions for their preventive conservation.

Stefano Galassi is an Assistant Professor of Structural Mechanics and member of the teaching board of the PhD course in 'Architecture, Project, Knowledge and Safeguard of Cultural Heritage' at the Department of Architecture of University of Florence in Italy. Since 2016, he is also a Professor of 'Mécanique des Structures' at the Euro-Mediterranean School of Architecture in Fes, Morocco. In addition, he is a member of the editorial board of two international journals. He began his research on masonry constructions both from the theoretical point of view and by developing structural software since the early 2000s at the University of Florence. His main

research topics include mechanical modelling of masonry constructions, timber-masonry structures, rigid-block analysis, FEM analysis, seismic vulnerability assessment, foundation settlement-structure effect and strengthening interventions using fibre-reinforced composite systems, including FRPs and FRCMs.

Luisa Rovero is an Associate Professor of Structural Mechanics at the Department of Architecture, University of Florence. She is a member of the Committee of the PhD Curriculum Structures and Restoration of Architecture and the Cultural Heritage of PhD in Architecture of University of Florence. Her current research activity is mainly focused on the mechanical behaviour of masonry structures, analysis and modelling of fibre-reinforced inorganic matrix materials for the reinforcement of masonry structures.

Paolo Zampieri is an Assistant Professor of Structural Engineering at the University of Padova, Italy. He is an editorial board member of four international journals. His research interests focused on the modelling, assessment and retrofitting of buildings and bridges. He authored over 100 papers in journals and conference proceedings, and edited one journal special issue. Since 2022, he was included in the list of world's top 2% scientists according to the scientific impact of his research activity.

Cultural heritage plays a crucial role in defining and understanding cultural and historical identity of communities, but it is frequently threatened by exposition to environmental actions and natural hazards. For these reasons, preservation of cultural heritage is a priority and a challenge. In the last decades, the rapid evolution of advanced technologies, including digital control, 3D reconstructions, big data analysis, multi-field data integration, allowed the development of new effective procedures aimed at improving the conservation of cultural heritage.

This special issue collects a selection of the contributions presented in a Special Session of the First International Conference of 'Art Collections: Cultural Heritage, Safety & Digital Innovation' held in Florence from 21st to 23rd of September 2020. Among the themes characterising the conference, the special session was focused on *safety and diagnostic* and was aimed at stimulating the discussion about the vulnerability of archaeological heritage, the seismic protection of historical constructions, that hold museums, and the diagnostic procedures for the artefacts conservation, pivoting also on the indoor microclimate conditions.

Concerning the conservation of archaeological heritage, it is well known how archaeological sites can be considered open-air museums, where ruins and artefacts are continuously exposed to weathering, increasing intensity of rainfalls, frost-thaw alternate cycles, humidity variation, and other environmental threats. In this context, the contribution of Sassu opens the special issue, describing the 'three-R' strategy for consolidation and showing its application to three case studies located in Arabic Peninsula and Jordan. Coppola et al. present a paper in which the illustration of damages of the baths complex of Villa San Marco at Stabia allowed to define a multi-scale-reading approach aimed at achieving a systematic understanding of the damage dynamics and the vulnerability of the architectural artefacts. Innovative solutions for the consolidation of archaeological remains, with specific attention to the compatibility of the materials, are proposed by Boostani et al., analysing a solution for strengthening the perimeter walls of

the Noh Gonbad Mosque through a fibre-reinforced composite system aimed at jacketing the structure.

Regarding the seismic assessment of historical constructions holding museums and/or art collections, De Stefano and Cristofaro present a multilevel approach applied to the complex of the 'Galleria dell'Accademia di Firenze' based on a rigorous knowledge path that allowed to reach an exhaustive evaluation of its seismic performance. During the restoration phases of this kind of buildings, the study of the indoor microclimate conditions plays an important role in the conservation of artefacts. In this framework, Vicario and Balocco present a methodological approach, applied to the San Marco Museum in Florence, based on the integration between experimental measurement and numerical simulation by means of CFD environmental control techniques, aimed at identifying criticalities and risk conditions for cultural heritage. Sciurpi and Carletti, on the other hand, propose several solutions in the retrofitting of La Specola Museums in Florence based on a one-year microclimate monitoring and considering thermophysical characteristics of the envelope and technical features of the HVAC and lighting devices.

Finally, Domaneschi et al. discuss the protection of outdoor art works subjected to blast hazards with a focus on the dynamic response of the statue of Neptune of the homonymous fountain located in Piazza della Signoria in Florence.

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