# Geomatic sciences in the service of Art and Culture

Archeomatica is pleased to have had the opportunity to dedicate this special issue to one of the most significant projects exemplifying Italy's ability to apply geomatic sciences in the service of art and culture. This edition explores an initiative that looks toward the future while remaining firmly rooted in the past, offering a concrete and ambitious vision in which culture, science, and technology converge to create new ways of understanding, preserving, and experiencing cultural heritage.

The CHEDAR project—Cultural Heritage Digitalization And Reconstruction—stands as one of the most important Italian efforts dedicated to the digitization and safeguarding of cultural assets. The project is one of the initiatives funded by the Italian Ministry of Universities and Research (MUR) through the "Legacy Expo 2020 Dubai" call, with a €7 million investment supporting global research and advanced training in line with Italy's National Recovery and Resilience Plan – Mission 4: Education and Research.

Rather than limiting itself to documentation and conservation, CHEDAR seeks to regenerate cultural heritage through the use of advanced digital technologies, including 3D modeling, artificial intelligence, environmental sensors, and the innovative concept of the Digital Twin. A particular focus is placed on the wider Mediterranean region, regarded as a sensitive and complex crossroads from cultural, environmental, and geopolitical perspectives. In this context, the project embraces an integrated approach that blends scientific knowledge with technological tools and cultural strategies, contributing as well to the United Nations 2030 Agenda for Sustainable Development.

CHEDAR's activities are organized around the creation of high-precision, interoperable digital models, the integration of advanced technologies with artisanal expertise and historical techniques for conservation, and the development of more inclusive and engaging forms of heritage access through augmented reality and digital design. Furthermore, the project addresses climate change adaptation and risk management through predictive modeling and monitoring systems.

Several comprehensive case studies highlight CHEDAR's interdisciplinary vision. The Sammezzano Castle, a remarkable example of architectural Orientalism reinterpreted through a European lens, is currently undergoing in-depth digitization. The Grotto of the Animals, located in the garden of the Medici Villa of Castello, has been studied as a sixteenth-century hydraulic machine and reconstructed as a Digital Twin through 3D surveys and sensor technology. The historic center of Florence and the Arno River have served as a testing ground for the application of an Urban Digital Twin, offering practical tools for managing climate risks and preserving the urban landscape.

The project's interdisciplinary nature also fosters dialogue between traditional arts and emerging technologies. This is reflected in the digitization of Carlo Finelli's sculpture *Le Ore Danzanti* and in the creation of the CHEDAR metaverse, conceived as a space for interactive storytelling, experimentation, and cultural memory.

At the heart of the project lies a strong investment in education. CHEDAR academy, the project's training platform, offers online courses, webinars, seasonal schools, and field activities aimed at cultivating new professional profiles capable of navigating the intersections of technology, cultural heritage and strategies for its enhancement.

*Enjoy your reading!*

*Renzo Carlucci*