

*DIGITAL & DOCUMENTATION* IS A STUDY DAY, A MOMENT OF SCIENTIFIC-CULTURAL EXCHANGE AND UPDATING THAT HAS REACHED ITS THIRD ONLINE EDITION WITH ONLINE MEETING THE ORGANIZED IN ROME. THE MAIN PURPOSE OF THE INITIATIVE IS TO ENSURE AN UPDATE OF SCIENTIFIC INNOVATIONS IN THE FIELD OF DIGITAL DOCUMENTATION OF CULTURAL HERITAGE, AIMED AT ITS READING, PRESERVATION AND ENHANCEMENT.

THE DOCUMENTATION OF CULTURAL HERITAGE HAS ASSUMED, TODAY MORE THAN EVER, A FUNDAMENTAL ROLE IN THE COLLECTIVE GLOBAL CULTURAL HORIZON: MORE AND MORE FREQUENTLY WE ARE WITNESSING THE OCCURRENCE OF NATURAL AND SOMETIMES EVEN MAN-MADE EVENTS, WHICH UNDERMINE THE PRESERVATION OF CULTURAL ASSETS. THEREFORE, IT IS ESSENTIAL TO UPDATE THE DOCUMENTATION OF CULTURAL HERITAGE, INTENDED IN ITS BROADEST MEANING, WHICH BRINGS TOGETHER TANGIBLE AND INTANGIBLE ASSETS BELONGING TO MAN-MADE AND NATURAL SPACE.

THE MEETING BECOMES THE SCENE OF DEBATES, COMPARISON AND DEMONSTRATION OF INNOVATIONS, REFINEMENTS, TESTING, METHODOLOGIES, EXPERIMENTATIONS RELATING TO ACQUISITION PROCESS, CRITICAL AND SEMANTIC ANALYSIS, DISSEMINATION AND DIVULGATION OF CULTURAL HERITAGE.

Laura Carlevaris, Graziano Mario Valenti

edited by

# DIGITAL & DOCUMENTATION

Reading and Communicating Cultural Heritage

Volume 3



PROSPETTIVE MULTIPLE  
STUDI DI INGEGNERIA  
ARCHITETTURA E ARTE

Laura Carlevaris, Graziano Mario Valenti

edited by

# DIGITAL & DOCUMENTATION

Reading and Communicating Cultural Heritage

Volume 3

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The volume consists of a collection of contributions from the seminar *Digital & Documentation. Reading and Communicating Cultural Heritage*, realised on online platform on December 4th, 2020. The event, organized by Department of History, Representation and Restoration of Architecture, Sapienza University of Rome, promotes the themes of digital modeling and virtual environments applied to the documentation of the tangible, intangible and natural Cultural Heritage. The event has provided the contribution of external experts who are engaged in the management and conservation of the most important Italian cultural assets.

The scientific responsible for the organization of the event is Prof. Graziano Mario Valenti, Sapienza University of Rome.

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Her studies and researches mainly concern Descriptive Geometry, its methods, its fundamentals, history and teaching strategies, as well as representation and drawing of Architecture and the landscape and their techniques.

She's currently teaching Architectural and Urban Survey in the Master degree in Architecture of Sapienza University of Rome and Drawing and Representation in the Landscape and Environmental Planning and Design Bachelor's Degree of Tuscia University, in the DIBAF Department (Department for Innovation in Biological, Agro-food and Forest Systems).



Graziano M. Valenti, Associate Professor in the Dept. of History, Representation and Restoration of Architecture, Sapienza University of Rome, awarded the National Scientific Qualification as a Full Professor. His research activity focuses on the application of digital technologies to support design, construction, knowledge and communication of industrial and architectural products, with regard to Cultural Heritage, with the objective of anticipating future operational scenarios and solving current application problems. An expert in computer science, he's designed and implemented procedures and applications for sharing, integrating and representing data distributed over a geographic network. A specific topic in his research is the definition and representation of integrated and dynamic digital models that take on the role of both a container and a processing unit for heterogeneous information. From 2000 to the present, he's promoted and participated in numerous university research projects funded by Sapienza and MUR.

LAURA CARLEVARIS  
GRAZIANO MARIO VALENTI  
Sapienza University of Rome

## FOREWORD

*Digital & Documentation 2020* focuses in its subtitle the verbs 'reading' and 'communicating' referred to Cultural Heritage. The choice of the two verbal lemmas, which seems natural, in fact, in relation to the objectives identified for the Study day, intends to highlight the centrality of Drawing interpreted in its broadest, modern, scientific and current meaning, within the complex process of Cultural Heritage valuing. A Drawing considered in the noblest and broadest meaning of the term, interpreted as a fundamental and main aid to the comprehension and communication of nature and artifacts belonging to real or imaginary space, which are expressed in the forms of tangible and intangible assets. A Drawing that is a privilege of humanity, through which humanity itself can express its Cultural Heritage and benefit from it. A Drawing that is embodied in a multiplicity of theories, tools and forms of expression, which are synergistically, seamlessly, integrated between analog and digital operations. Finally, a Drawing that stratifies over time, leaves its own traces and, as Franco Purini reminds us, is memory<sup>1</sup>: synchronic and diachronic documentation of the human existence and experience it makes manifest.

In this way, the terms 'digital' and 'documentation' also express their most notable meanings: the first, of memory; the second, of principal aid to the layering, integration, processing, representation and communication of documentation. Finally, with regard to the locution 'Cultural Heritage,' we would like to recall how vitally linked it is to the generalized dissemination of knowledge: it is evident, in fact, that communities are expected to preserve and protect the traces of their existence only in the case they know, understand and fully share the cultural value they represent. 'Valuing', then, means 'making accessible and 'transferring knowledge' to the widest and most diverse communities.

Although this publication was born and developed in the area of Drawing, it doesn't operate in an isolated scientific area. This is demonstrated by the fact that the event from which it originated is promoted by the Department that integrates the disciplines of History, Representation and Restoration of Architecture: a context of full contamination, the same contamination which is present in different forms in the other universities that contribute their scientific input to support the initiative.

From this perspective, the contributions here presented, devoting special attention to the considerable communicative, pervasive and persuasive potential of digital documentation of the cultural asset, interpreted as an augmented information support of the asset itself and a privileged way to get to its comprehension, are intended to accelerate the adoption and refinement of the best methodologies and practices of study. Thus, activities such as: documentary analysis; quantitative and qualitative knowledge investigations; technologies for data acquisition, normalization, cataloguing and interrogation; and modes of communication and interaction with digital information, with particular

regard for dissemination and popularization methodologies, considered vital communication processes for the enhancement of Cultural Heritage, fall within this context.

Taken together, these activities make it possible to operate on Cultural Heritage by organizing and integrating the processes of knowledge and communication which are characteristic of scientific research, orienting them toward a diverse audience in terms of nature and interests. Pathways of research, therefore, allowing both to disseminate results in different forms to a wide audience and to disseminate them in a scientific way to an audience composed with scholars. And it is precisely through these two priority communication channels, of raising awareness and attracting the interest of vast communities in the analyzed assets, that the main objective of the Study day is achieved in terms of dissemination of scientific culture and the transfer of knowledge: the valuing of the cultural asset.

The contributions of the authors here gathered and presented range from theoretical reflections, experimental activities, reports of experiences carried out or being conducted, and test operations of the best practices established to date.

The meeting we are presenting in these pages becomes the scene of debates, comparisons and demos of innovations, refinements, tests, methodologies, methodological experiments on the process of acquisition, critical and semantic analysis, dissemination and communication of Cultural Heritage.

In the three years of experimentation and evolution of Digital & Documentation Study days, which was intended to be itinerant, the founding committee, supported by scientific committee, has gradually matured a characteristic format, which for 2020 is divided into introductory reports by Cultural Heritage management actors and in-depth studies concerning original scientific activities produced by selected researchers, specially chosen for offering particular space to younger forces.

In the first group you'll find the valuable contributions of Erminia Sciacchitano, who was working into the offices of direct collaboration of the Minister of Cultural Heritage and Activities and Tourism, Dario Franceschini; Alfonsina Russo, Director of the Parco Archeologico del Colosseo (Colosseum Archaeological Park), accompanied by executives such as Federica Rinaldi, Head of the Flavian Amphitheater, and Stefano Borghini, Curator of digital enhancement of the Archaeological Park; and, finally, Dario Aureli, head of the Technical Office of the Palazzo Barberini Museum.

Alongside this first group, a number of young researchers whose work has been specially selected have been invited by the Digital & Documentation Technical Scientific Committee, in a context of constructive dialogue and comparison with the longer-standing scientific community.

All contributions are introduced by moderators who, with extreme expertise, have reconnected in an original and purposeful way the authors' researches.

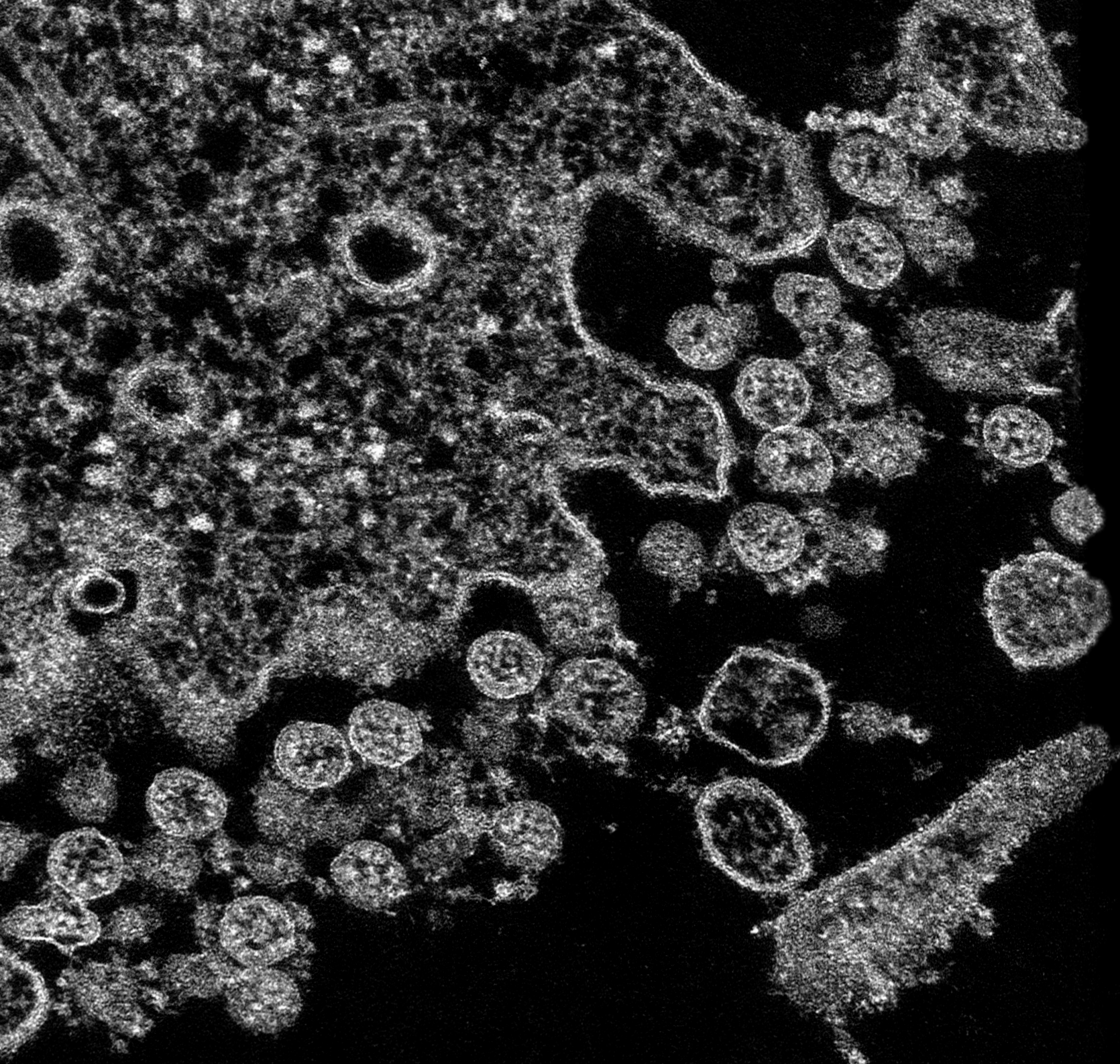
Therefore, we hope, that this publication will represent a moment of knowledge sharing and updating, of significant importance for scientific progress. We hope as well that it may facilitate the development of new and young ideas, raising from the solid foundation of the established culture of more mature generations.

Indeed, we should not forget that the documentation of Cultural Heritage, today more than ever, has assumed a fundamental role in the collective global cultural horizon: natural phenomena and the dramatic and incomprehensible heinousnesses enacted in different historical and geographical settings and contexts put the preservation of Cultural heritage at risk on a daily basis and make it indispensable to continuously update the heritage of humanity in the different forms it may assume.

*Laura Carlevaris, Graziano Mario Valenti*

## Note

1. Purini, F. (2019). *Drawing as theory*. In *Journal of Aesthetics* (last accessed May 13, 2023). DOI: <https://doi.org/10.4000/estetica.5452>. [Online], No. 71. <<http://journals.openedition.org/estetica/5452>>



# PANEL DISCUSSION

LAURA INZERILLO  
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## MASSIMILIANO CIAMMAICHELLA

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Massimiliano Ciammaichella (July 12, 1973), Architect, Ph.D., Assistant Professor and Associate Professor in Drawing since 2014, was founding partner of New Design Vision (2017-2019), Spin off of the Università Iuav di Venezia. In the same University he has been director of the master's degree programme in *Science and Techniques of Theatre* (2016-2018). He has been continuously involved in research since the beginning of his career, both by collaborating in national research projects funded through calls for proposals (PRIN), and international (INTERREG), participating in University calls for funding of research activities, and independently, spending some periods of study abroad. The scientific path can be traced back to the field of Drawing, with a strong orientation towards the innovation of methods and tools for the representation of architecture, product and communication design, fashion design, visual and performing arts.

## CULTURAL HERITAGE. DECLINATION AND DRAWING OF THE EXPERIENCE

The Conference third edition focused on the study, protection, valorisation, and promotion of cultural heritage, recording a great versatility of approach in dealing with extremely competent research topics whose results have been presented and discussed by the protagonists: Ph.D. students and Ph.D. researchers of the drawing discipline.

The common trait of all the experiences is marked by experimentation with advanced digital technologies that invest in the representation, ranging from the artefacts survey to the reconstruction of three-dimensional models of tangible and intangible memories that are confronted with real narratives able to evoking their essence within the exhibition contexts.

The introductory contributions reflect on the specific meanings of the role that cultural heritage plays at the European level today, in being interpreted in a holistic and integrated way, which sees the active individuals in enjoying it and in giving it a value – because it is open to wider communities –, so the democratic principle of participation also becomes the collaborative expedient to preserve it and return it to future generations.

Hence the need to stimulate a collective intelligence, according to which the declinations of the heritage term become opportunities for dialogue and comparison, in the cultural identities' manifestation entrenched in the changing history of the territories in which they are positioned, opening the frontiers of their accessibility to anyone [Sciacchitano].

This principle can only be extended to the institutional venues of museums, where digital technologies applied to cultural heritage take into account conservation aimed at the documentation for archival and diagnostic purposes, for management, protection and access to knowledge, but are also excellent communication tools to be involved in the processes of reading and coding of works, facilitating their understanding by a heterogeneous audience [Russo, Rinaldi].

According to that logic, historical knowledge guides the research work in the drawn digital reconstructions of fragments, or entire architectural bodies, making them coexist with the real spaces that once housed them, as can be seen in the interventions that in recent years have involved the Colosseum's Archaeological Park in Rome. In particular, the multimedia itinerary, which guides visitors through Nero's Domus Aurea, uses video mapping in virtual restoration strategies that make reproductions of the ancient decorative skins, which have been lost, appear on the walls, and light becomes the leitmotif of the entire exhibition [Borghini].

As we know, the current pandemic condition has forced museums to close or open for intermittent periods, limiting the number of visitors. Although the planned timing of exhibitions has been respected, museum institutions have been forced to reflect on their communication strategies, opening as much as possible to the popular channels of web and social networks [Aureli].

In view of inclusiveness aimed at facilitating access to knowledge, circumscribed by the exhibition contexts, the research present case studies that question the ways in which the content can be used, in a direct dialogue between the tangible presence and its computerized digital cloning, which is entrusted with the task of describing it.

In the case of painted architecture, for example, the frescoes in the Capitolo room of the Scuola del Carmine in Padua have been surveyed to get perspective restitutions and three-dimensional reconstructions, starting with high-resolution ortho-photos to integrate the results obtained into virtual and augmented reality devices that allow visitors to interact directly with the works, including through the usual smartphones and tablets [Piccinin].

The Gorizia ConTatto project is dedicated to an audience of blind and visually impaired people, where 3D printed reproductions of architecture and sculptural models coexist with tactile maps to guide the visually impaired and the blind in an exhibition where learning is entrusted to direct contact between hands and the reproductions of works [Riavis, Cochelli].

On the techniques of digital prototyping, dedicated to the musealization of artifacts, mainly aimed at student training, is addressed the deepening of the application interconnections between mathematics and architecture through descriptive geometry, to enhance the collection of mathematical models contained in the Peano Library of Turin [Pavignano].

Great impact for the development of knowledge is the research results that resume the study of famous authors, artists and treatisers, in tracing the direct connections between theories, methods and design approaches that confronting them with the real places of experience.

For example, the activity of Leonardo da Vinci, as a military architect operating in Piombino in the early sixteenth century, is investigated starting from a careful analysis of the historical sources and drawings contained in the manuscripts, to re-read the transformations that over the centuries have affected the urban fabric of the fortified city, in which it has operated with survey campaigns that use the potential of digital photogrammetry and 3D laser scanning [Bigongiari]. The same technologies are used in the deepening of the obliquazioni proposed by Juan Caramuel de Lobkowitz, in the case of the Vigevano cathedral façade [Gasperuzzo].

On the stereotomic apparatus of the cylindrical vaults, offered by Guarino Guarini, instead, the scripts of the Visual Programming Language are applied, in a dynamic visual translation of the geometric fundamentals described in the third chapter of the fourth treatise of L'Architettura civile [Borin].

The richness of the proposed themes is compared with the updating of a technological complex, not strictly focused on the single instrument, if anything, on the ultimate goal of the achieved result that continues to evolve the meaning of the model transforming it into a computerized memory archive, interoperable and interrogatable through specific taxonomies [Quattrini].

The H-BIM applications extend from the chronological transformative evolution of individual architectures [Porfiri] to entire territory portions, dealing with huge amounts of data to be re-semanticized and brought back into usable protocols, in the management of a census database for the valorisation of cultural routes [De Marco, Dell'Amico]. In other cases, the development of data integration methodologies raises questions about the criteria for defining usage protocols, to build a common and shared vocabulary for open access to information [Cera].

Hierarchical classification of data simplifies the representation and interpretation of numerical models of architectures, whose structural elements are segmented into abacuses to be interpolated with machine learning algorithms [Grilli]. In other cases, the Visual Programming Language, VPL, is very effective in managing H-BIM platforms that integrate parametric models of monumental architectures [Calvano, Calcerano, Martinelli, Gigliarelli], or they are very suitable for the analysis of urban transformations of an entire landscape [Mancini].

From all this it is understood how drawing is a discipline in constant updating, taking on a central role in the management of the artistic and cultural heritage. We have seen how digital technologies powerful means at the service of the expert drawing researcher are, who uses them freely, both in the documentation and communication processes, and in performing exhibition strategies, but they are also aids to experiment with new forms of expressive language when you measure with your own subjective manifestation of a poetic visionary [Farinella, Greco].

*Massimiliano Ciammaichella*

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