

IMEKO TC26 International Conference on Metrology for Archaeology and Cultural Heritage 2025

Bergamo, Italy
15-17 October 2025

ISBN: 979-8-3313-3654-7

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2025) by the International Measurement Confederation (IMEKO)
All rights reserved.

Printed with permission by Curran Associates, Inc. (2026)

For permission requests, please contact the International Measurement Confederation (IMEKO)
at the address below.

IMEKO Secretariat
Dalszinhaz utca 10, 1st floor, Office room No. 3
H-1061 Budapest (6th district)
Hungary

Phone/Fax: +36 1 353 1562

imeko@t-online.hu

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Integrated Workflow for 3D Modelling of Historic Architecture: A Multi-Sensor Approach	1
<i>Vincenzo Saverio Alfio, Domenica Costantino, Mathab Fallah, Alfredo Restuccia Garofalo, Massimiliano Pepe, Paolo Piumatti</i>	
UAS-Based Capacity Building for Enhancing Minor Archaeology	7
<i>Joel Aldrighetoni, Maria Grazia D’Urso</i>	
High-Resolution Photogrammetric Survey of a Romanesque Mosaic Floor: A Comparative Analysis of UAS and a Custom-Built Acquisition System.....	14
<i>Barbara Fazion, Daniele Treccani, Andrea Adami, Luigi Fregonese</i>	
New Discoveries at the Castello Sforzesco in Milan: An Integrated Approach Through 3D Modelling and GPR Survey.....	20
<i>Maurizio Porcu, Francesca Biolo, Franco Guzzetti</i>	
Integrating Geomatic High-Detail Surveying and Thermography for the Documentation of Historical Masonry	26
<i>Anna Forte, Francesca Trevisiol, Giulia Fiorini, Gabriele Bitelli</i>	
Underground Surveying of the Porticus Minucia as a Basis for the Georeferencing of a Fragment of the Marble Plan of Rome (Forma Urbis Marmorea)	32
<i>Luca Alessandri, Valerio Baiocchi, Marta Baumgartner, Diego Blanco, Alessandro Bosman, Andrea Guaglianone, Felicia Vatore</i>	
Infrared and Terahertz Imaging for the Analysis of a Fresco Sample.....	37
<i>Emma Vannini, Ilaria Catapano, Alice Dal Fovo, Valentina Di Sarno, Alessandra Rocco, Pasquale Maddaloni, Raffaella Fontana</i>	
2D and 3D Optical Techniques for Manuscript Analysis: Diagnostics Based on Data Integration	42
<i>Nicole De Manincor, Sara Mazzocato, Dumitru Scutelnic, Claudia Daffara</i>	
Shearography and 3D Scanning for Assessing the Strip Lining in the Case Study: Pericles Observes Phidias’s Artwork on the Parthenon, by Gaspare Landi	47
<i>Chiara Saltarelli, Vito Pagliarulo, Maria Rosaria Vigorito, Melania Paturzo</i>	
Preliminary Tests of Millimetric Crack Detection in Ancient Wall Paintings Using a Terahertz Radar	53
<i>Fulvia Gennari, Andrea Campostrini, Agnese Babini, Raffaella Lamuraglia, Giancarlo Ruocco, Valeria Giliberti, Arianna Traviglia, Michele Ortolani</i>	
Multidisciplinary Approach of Conservation of the Fistulae Aquariae from the Archaeological Site of Baiae	57
<i>Paola Fenelli, Alessandro De Rosa, Paola Cennamo, Giorgio Trojsi, Massimo Rippa, Enrico Gallochio</i>	
From Italy to the UAE: A Multidisciplinary Approach to Studying Islamic and Arabic Manuscripts on European Papers	63
<i>Nagmeldeen Morshed Hamza, Islam Shaheen</i>	
Structural Assessment of the Propylaea Church Archaeological Remains in Jerash (Jordan) Using 3D Discrete Element Modelling	69
<i>Florin Cristinel Stan, Stefano De Santis, Sara Fares, Gianmarco De Felice</i>	

From Scan to H-BIM: Towards an Automated Workflow for Cultural Heritage Vulnerability Assessment	75
<i>Pietro Meriggi, Antonio Napolitano, Alessio Pasquali, Luca Bianchini Ciampoli</i>	
Use of GPR for Supporting Structural Interpretation of Collapsed Archaeological Asset	81
<i>Roberta Santarelli, Alessandra Ten, Luca Bianchini Ciampoli, Andrea Benedetto, Fabio Tosti</i>	
Digital Twin for Railway Infrastructure and Historic Stations: State of the Art, Technological Architecture, and Development Perspectives	87
<i>Gianmarco Pireneo, Francesco Fabbrocino, Carlo Olivieri, Andrea Miano, Hamidreza Alavi</i>	
Planning Tools for Historic Centres Reconstruction. an Overview of Central Italy 2016 Earthquake	92
<i>Margherita Giuffrè, Francesco Fazio</i>	
In Situ Non-Invasive Analyses of the Painting “Cristo in Trono” (Amalfi, SA, Italy)	98
<i>Antonio Faggiano, Sara Carbone, Chiara Gallo, Oriana Motta, Carmine Napoli, Eduardo Caliano, Antonino Fiorentino, Enza Cobalto, Maria Ricciardi, Antonio Proto</i>	
Analyzing and Studying Ancient Polychrome Surfaces Using Advanced Imaging Techniques: Tracing Original Composition to Modern Intervention	103
<i>Islam Shaheen, Nagmeldeen Hamza, Mohamed Ragab</i>	
Characterization of Two Vases from Centuripe	108
<i>Bianca Irene Carnesale, Giacomo Biondi, Mario Colella, Federica Giacobello, Letizia Bonizzoni</i>	
Spectroscopic Investigation of a 17th-Century Illuminated Parchment from S. Maria Di Montalto Church (Messina, Italy)	113
<i>Giuseppe Paladini, Francesco Caridi, Domenico Majolino, Lorenzo Pistorino, Paola Cardiano, Alessandra De Caro, Gloria Bonanno, Arcangela Valenti, Enza Anna Passerini, Giuseppe Sampino, Valentina Venuti</i>	
Practical Solutions to the Biodeterioration Dilemma: Activity of <i>Dittrichia Viscosa</i> Extracts and Its Specialized Metabolites on Standard Organism <i>Raphidocelis Subcapitata</i>	118
<i>Alessandro De Rosa, Marco Morelli, Marco Masi, Alessio Cimmino, Andrea Carpentieri, Gaia Marzia Silvestre, Antonino Pollio, Paola Cennamo</i>	
An Integrated Approach to the Study of the Architectural Features of the Theatre of Tyndaris	123
<i>Marco Sfacteria, Stefania Tuccinardi, Marta Venuti</i>	
In-Situ Investigation of Mortar Fragments from the Theatre of the Archaeological Area of Tindari (Sicily, Italy) Through DRIFT and μ -Raman Techniques	128
<i>Giuseppe Paladini, Francesco Caridi, Domenico Majolino, Gabriele Lando, Paola Cardiano, Valentina Venuti</i>	
Multi-Technique Characterization of Mural Paintings at the Santa Maria Gratia Plena Church in Bruzzano Vetere (Calabria, Southern Italy)	132
<i>Lorenzo Pistorino, Francesco Caridi, Giuseppe Paladini, Pasquale Faenza, Domenico Majolino, Valentina Venuti</i>	
Historic Centers Between Reconstruction and Recovery. Urban Planning Considerations on a Post-Earthquake Survey in Amatrice and Accumoli	137
<i>Francesco Fazio</i>	

Remote Sensing for Heritage Conservation and Structural Monitoring: The Case of Wolvesey Castle, Winchester	143
<i>Efcharis Balodimou, Nicoletta Bianchini, Tasmin Withers, Laden Husamaldin, Moein Motavallizadeh Naeini, Tesfaye Tessema, Fabio Tosti</i>	
Experimental Investigation of a Masonry Arch Subjected to an Asymmetric Concentrated Vertical Load and Validation Via Static and Kinematic Limit Analysis.....	149
<i>Mario Fagone, Tommaso Rotunno, Natalia Pingaro, Gabriele Milani</i>	
Optimization of CVAE Parameters for the Damage Assessment of Historic Masonry Buildings.....	154
<i>Ivan Roselli, Domenico Palumbo</i>	
Time and Frequency Domain Analysis of Etruscan Pottery Magnified Videos.....	159
<i>Enzo Fioriti, Eugenia Verrigni Petrei Castelli, Alessandro Colucci, Ivan Roselli</i>	
Mineralogical Analysis of Viterbo Tuff Using X-Ray Diffraction and Raman Spectroscopy	165
<i>Giuliana Faggio, Francesco Caridi, Daniele Chiriu, Stefania Da Pelo, Michele Guida, Giacomo Messina, Maurizio Ponte, Silvestro Antonio Ruffolo, Domenico Majolino, Valentina Venuti</i>	
Role of Consolidants for Limiting the Radon Exhalation Rate in Building Materials of Historical and Artistic Interest	170
<i>Francesco Caridi, Daniele Chiriu, Stefania Da Pelo, Giuliana Faggio, Michele Guida, Giacomo Messina, Maurizio Ponte, Silvestro Antonio Ruffolo, Domenico Majolino, Valentina Venuti</i>	
Historical Urban Centers Built in Tuff and Indoor Radon Exposure.....	175
<i>Simona Mancini, Serpil Aközcan Pehlivanoglu, Natasa Todorovic, Albina Cuomo, Domenico Guida, Michele Guida</i>	
Natural Radioactivity Content, Radiological Hazard and Mineralogy Evaluation of Pumice Stone from Lipari, Sicily, Southern Italy: A Case Study	180
<i>Lorenzo Pistorino, Francesco Caridi, Giuseppe Paladini, Antonio Francesco Mottese, Domenico Majolino, Valentina Venuti</i>	
Radon Exhalation, Natural Radioactivity Content and Radiological Hazard Assessment for the Viterbo Tuff Stone: A Case Study.....	186
<i>Francesco Caridi, Daniele Chiriu, Stefania Da Pelo, Giuliana Faggio, Michele Guida, Giacomo Messina, Maurizio Ponte, Silvestro Antonio Ruffolo, Domenico Majolino, Valentina Venuti</i>	
Natural Ultramarine in the Roman Context of Volsinii (Bolsena, Italy): A Multianalytical Characterization.....	192
<i>Martina Bernabale, Anna Candida Felici, Pierfrancesco Atanasio, Luca Buccini, Daniele Passeri, Marco Rossi, Paolo Binaco, Danilo Dini</i>	
Intelligent Workflow for Real Time and Automated Analysis of Historical Pigments	197
<i>Irene Ferrara, Paola Benedetta Castellino, Salvatore Gallo, Anna Maria Gueli, Giuseppe Politi, Giuseppe Stella</i>	
3D Fluorescence Mapping: A Promising Technique for the Analysis of the Degradation of Pigments.....	202
<i>Stefania Porcu, Michela Podda, Giovanni Brodu, Stefano Columbu, Daniele Chiriu</i>	
New Results from the GPR Surveys at the Area Surrounding the Basilica at S. Croce in Gerusalemme (Rome, Italy)	207
<i>Salvatore Piro</i>	

Multidisciplinary Approach for the Stability Analysis of a Historical Hypogeum in the Municipality of Cisternino in the UNESCO Site of the Itria Valley (Puglia, Southern Italy), Aimed at a Refunctionalization and Valorization of the Site	212
<i>Maurizio Lazzari, Davide Palma, Pierpaolo Moretti, Valentina Leopizzi</i>	
GPR Survey at the Archaeological Site of Heloros (Noto, Sicily)	218
<i>Davide Tanasi, Rosa Lanteri, Vincenzo Di Fiore, Michele Punzo, Daniela Tarallo, Dora Francesca Barbolla, Lara De Giorgi, Ivan Ferrari, Francesco Giuri, Giovanni Leucci</i>	
From Point Clouds to Cultural Landscapes: Open-Source Machine Learning Applications for Archaeological UAV LiDAR Segmentation	223
<i>Nicodemo Abate, Alessia Frisetti, Gabriele Ciccone, Antonio Minervino Amodio, Maria Sileo, Rosa Lasaponara, Nicola Masini</i>	
Discovery and Study of “S.S. Egypte” Shipwreck Using Remote Sensing Techniques, off North Harbour of Patras City, Greece	228
<i>George Papatheodorou, Dimitrios Christodoulou, Xenophon Dimas, George Karelas, Maria Geraga</i>	
A Matter of Materiality: The Use of Multi-Analytical Methods for Reinforcing Urban Heritage	233
<i>Adi Sela Wiener, Laura Medeghini, Gabriele Favero</i>	
Exploring the Application of Interpretable Neural Networks for the Petrographic Classification of Ceramic Samples from the Levant	239
<i>Sara Capriotti, Alessio Devoto, Donatella Genovese, Silvano Mignardi, Simone Scardapane, Laura Medeghini</i>	
Unlocking the Information Potential of Lake Pigments Through SERS and Chemometrics	245
<i>Adele Bosi, Camilla Merola, Alessandro Ciccola, Federico Marini, Claudia Fasolato</i>	
XRF and Raman Spectroscopic Study of Wall Polychromes in the Saltworks Castle in Wieliczka	249
<i>Anna Klisinska-Kopacz, Pamela Grajny-Brzezinska, Tomasz Wilkosz, Michal Obarzanowski, Klementyna Ochniak-Dudek, Julio M. Del Hoyo Meléndez</i>	
Quantitative Approaches for Fiber Optics Reflectance Spectroscopy (FORS)	255
<i>Ricardo P. Vicente Rojas, Silvia Sotgiu, Véronique Cachia, Eugenio Delre, Nicola Schiavon, Mauro Giustini, Mauro Missori</i>	
Multi-Technique Archaeometric Investigation of a XVII Century Illuminated Parchment Belonging to the S. Maria Di Montalto Church (Messina, Italy)	260
<i>Giuseppe Paladini, Francesco Caridi, Domenico Majolino, Lorenzo Pistorino, Alessandra De Caro, Gloria Bonanno, Arcangela Valenti, Enza Anna Passerini, Giuseppe Sampino, Valentina Venuti</i>	
Remote Sensing Techniques for the Monitoring of the Villa of Sette Bassi Archaeological Site	266
<i>Jessica Clementi, Veronica Sanvito, Stefano Roascio, Michele Reginaldi, Paolo Mazzanti</i>	
Can Vandalism Reshape the Way We Perceive Cultural Heritage?	272
<i>Fabrizio Terenzio Gizzi, Cristina Cumbo, Maria Rosaria Potenza, Agata Maggio, Antonio Minervino Amodio, Canio Alfieri Sabia</i>	
ERT Geophysical Survey for Landslide Risk Management in Coastal Areas: Case Studies of Brovinje and Havišće (Croatia)	277
<i>Michele Punzo, Dora Francesca Barbolla, Giuseppe Cavuoto, Vincenzo Di Fiore, Daniela Tarallo, Giovanni Leucci</i>	

Water Leaks as a Hidden Risk to Cultural Heritage Sites: Application of the TEAMWIRE Project and the Geophysical Challenges.....	281
<i>Chiara Torre, Sebastiano D'Amico, Emanuele Colica, Julian Mamo, Lara De Giorgi, Dora Francesca Barbolla, Giovanni Leucci</i>	
Earth Observation Based Products for Risk Assessment of Cultural and Natural Heritage Against Climate and Pollution Impact.....	286
<i>Alessandro Sardella, Ramiro Marco Figuera, Stefano Natali, Alessandra Bonazza</i>	
Environmental Monitoring of the Grotto of the Animals: A Case Study for the SENNSE IoT Platform.....	291
<i>Francesco Valentino Taurino, Irene Muci, Davide Zecca, Cristiano Riminesi, Grazia Tucci, Alberto Bucciero</i>	
From Thermal Signatures to Conservation Insights: A Fixed Camera Network Approach for Heritage Structure Health Monitoring.....	296
<i>Giandomenico Mastrantoni, Jessica Clementi, Antonio Molinari, Ioannis Farmakis, Paolo Mazzanti</i>	
Multi-Scale Non-Invasive Techniques for Assessing Instability Conditions: Examples from the Val Di Cornia Parks System (Tuscany, Italy).....	302
<i>Tommaso Beni, Silvia Guideri, Debora Brocchini, Marta Coccoluto, Diletta Borselli, Lorenzo Bonechi, Sandro Gonzi, Irene Centauro, Anna Palamidessi, Vitaliano Ciulli, Raffaello D'Alessandro, Giovanni Gigli, Deodato Tapete, Veronica Tofani, Silvia Bianchini</i>	
Application of Digital Photogrammetry in Damage Mapping on Facades of Historical Buildings	308
<i>Tallis Rubens, Fabiana Oliveira, Fabricio Costa, Luciana Toledo, Ana Elisabete Jacintho</i>	
Geophysical Exploration of Subsurface Structures in the Presbytery of Tarragona Cathedral.....	314
<i>Josep M Macias Soler, Mahjoub Himi Benomar, Andreu Muñoz Virgili, Aritz Urruela García, Andreu Muñoz Melgar, Albert Casas Ponsatí</i>	
València La Vella (Spain) and Late Antique Mortars: A Regional Geochemical Approach	319
<i>Manel Gòrriz I Villar, Mirco Ramacciotti, Iván Pérez Torralba, Angel Morales Rubio, Iván Fumadó-Ortega, José Maria Macias Solé, Albert Ribera, Gianni Gallelo</i>	
Multi-Technique Characterization of Mortars from Gammarth Villa (Tunisia)	325
<i>Manel Gòrriz I Villar, Mirco Ramacciotti, Iván Fumadó Ortega, Hamden Ben Romdhane, Ángel Morales-Rubio, Gianni Gallelo</i>	
XRD and PCA Analysis of Historic Mortars from the Venetian Fortress of Bergamo (Italy)	332
<i>Renato Pelosato, Isabella Natali-Sora, Virna Maria Nannei, Giulio Mirabella Roberti</i>	
The Advent of Complex Metallurgy.....	338
<i>Yuval Goren, Yotam Asscher, Sarel Shalev, Danny Rosenberg</i>	
Characterization of Early 20th Century Measurement Instruments: A Heritage Approach.....	344
<i>Emma Angelini, Margherita Bongiovanni, Sabrina Grassini, Leila Es Sebar, Federico Di Iorio</i>	
Preliminary Investigation into pre-Industrial Salt Production: An Experimental Approach.....	350
<i>Martina Sciortino, Alessia Santiglia, Monica Azzarone, Laura Magnano, Giorgio Baratti, Laura Santagostini, Vittoria Guglielmi</i>	
Preserving the Past with Gamma Rays: Real Case Studies from the Montecassino Abbey Collection.....	356
<i>Beatrice D'Orsi, Rocco Carcione, Ilaria Di Sarcina, Jessica Scifo, Teresa Rinaldi, Nicola Tangari, Alessia Cemmi</i>	

Assessing Material Compatibility for Restoration: An Innovative Approach to Compare Hydraulic Properties of Repair and Historic Mortars.....	361
<i>Salvatore Menta, Antonio Stroschio, Gaetano Ortolano, Roberto Visalli, Cristina Maria Belfiore</i>	
Natural Vs Anthropogenic Constraints Address Changes of Plant Biodiversity in Italy During the Holocene.....	366
<i>Cristiano Vignola, Alessia Masi, Laura Sadori</i>	
The Long-Term Human-Mediated Success of Olive Trees in the Central Mediterranean: A Multiproxy Perspective	371
<i>Laura Sadori, Jordan Palli, Sabina Fiolna, Monica Bini, Federico Cappella, Adam Izdebski, Alessia Masi, Scott Mensing, Lorenzo Nigro, Gianluca Piovesan, Giovanni Zanchetta</i>	
Measuring Millennial Biodiversity with Pollen: Archaeo-Data from Southern Italy	375
<i>Eleonora Clò, Anna Maria Mercuri, Jessica Zappa, Cristina Ricucci, Lorenzo Braga, Assunta Florenzano</i>	
ARBOREA - A New Georeferenced Database for Plant Macro-Remains from Archaeological Sites in Central Italy.....	381
<i>Claudia Moricca, Erasmo Di Fonso, Rachele Nicolini, Laura Sadori</i>	
Biofilms on Limestones Specimens: Laboratory Tests Implementing a Non-Destructive Approach.....	385
<i>Davide Ripamonti, Emanuele Frabasile, Alessia Marzanni, Chao Gao, Chiara Bertolin, Villa Federica, Nicola Gherardo Ludwig</i>	
Multi-Technical Non-Invasive Analysis to Prevent Deterioration in Varnish-Coated Oil-Paintings.....	391
<i>Alice Dal Fovo, Laura Maestro-Guijarro, Paula Maria Carmona-Quiroga, Raffaella Fontana, Francesca Rosi, Martina Alunni Cardinali, Aldo Romani, Lucia Comez, Cristiano Riminesi, Magdalena Iwanicka, Piotr Targowski, Magdalena Kowalska, Aggelos Philippidis, Paraskevi Pouli, Marta Castillejo, Mohamed Oujja</i>	
Mediterranean Eustatic and Climatic Variations Vs the Phoenician-Punic Settlement/Abandonment Phases.....	396
<i>Alessandro Paladini, Maurizio Lazzari</i>	
Evolution of Anthropic Coastal Landscapes and Ground Deformation in the Campi Flegrei Caldera (southern Italy) Since Roman Times: Insights from Multi-Technique Surveys.....	402
<i>Claudia Caporizzo, Gaia Mattei, Gerardo Pappone, Pietro P. C. Aucelli</i>	
Minimization of Environmental Acoustic Effects: An Intangible Design Element of Greek Theatres	408
<i>Fabrizio Barone, Marco Casazza</i>	
Vibroacoustic Landscape and Defensive Network: Metrology for the Characterization of Potential Communication Systems in Medieval Basilicata Until the Longobard-Norman Transition	414
<i>Rosa Fiorillo, Marco Casazza, Fabrizio Barone</i>	
The Sound Emission of the Bell Tower of the Salerno Cathedral in Medieval Europe Between Architectural Structure and Bell Construction Techniques.....	419
<i>Fabrizio Barone, Rosa Fiorillo, Marco Casazza</i>	
A Case Study of Road Traffic Noise Intrusion Simulation in an Italian Archaeological Site.....	424
<i>Claudio Guarnaccia, Aurora Mascolo, Domenico Rossi</i>	
The Roman Bridge on the Savuto River: Understanding Its Dynamical Structural Behavior Through the Adaptive DFEM Method.....	430
<i>Fabrizio Barone, Salvatore Antonio Fornaro, Armando Di Maio, Marco Casazza</i>	

Gradient-Based Analysis of Vertical Displacements in Urban 3D LiDAR Models Using SAR Data	436
<i>Salvatore Barba, Alessandro Di Benedetto, Margherita Fiani</i>	
Cultural Heritage Visualization Through Generative AI: A Unity-Based Plugin for Real-Time 3D Object Creation.....	442
<i>Attilio Della Greca, Ilaria Amaro, Giovanni Nocerino, Paola Barra</i>	
Federated Digital Twins and XR for Cultural Heritage: A Collaborative Framework.....	447
<i>Gizealew Alazie Dagnaw, Henry Muccini</i>	
Mobile Games for the Revival of Archeological Parks in Campania: A Pilot Experience Bridging Virtual Environments and Cultural Heritage	452
<i>Francesco Colace, Constanza Fiorella Duarte Petti, Angelo Lorusso, Michele Pellegrino, Domenico Santaniello</i>	
Towards an Operational Protocol for Virtual Tours in Complex Cultural Sites: The Norman Castle of Aci Castello.....	458
<i>Paolino Trapani, Eleonora Pappalardo, Anna M. Gueli, Filippo Stanco</i>	
High-Resolution 3D Digitization and Analysis of the Mesolithic Site of Latnija (Malta)	464
<i>Davide Tanasi, Alex Fawbush, Kaitlyn Kingsland, Dario Calderone, Eleanor Scerri, Nicholas C. Vella, Huw Groucutt</i>	
Preliminary Results of the Integrated 3D Digitization of the Prehistoric Artifacts Exhibited at the Museum of Archaeology of the University of Catania	468
<i>Paolino Trapani, Marianna Figuera, Simona V. Todaro, Anna M. Gueli, Filippo Stanco</i>	
Raman Analysis of the White Pigment Used for Decorating Caliciform Beakers.....	473
<i>Sakura Sanada</i>	
RTI and virtualRTI: Tools and Methodologies for Documenting Prehistoric Engraved Artifacts.....	479
<i>Francesco Colace, Angelo Lorusso, Michele Pellegrino, Domenico Santaniello</i>	
Digital Strategies for the Protection and Valorization of Prehistoric Landscapes: 3D Metrology at Cozzo Del Pantano (Sicily)	485
<i>Davide Tanasi, Alex Fawbush, Stephan Hassam, Dario Calderone</i>	
Geometry of a Medieval Town in the Context of Political Religious Governance of the Territory.....	489
<i>Fabrizio Barone, Rosa Fiorillo, Armando Di Maio, Marco Casazza</i>	
Non-Invasive Dating of Historical Church Bells Through Vibroacoustic Matching of Musical Temperaments	495
<i>Marco Casazza, Rosa Fiorillo, Fabrizio Barone</i>	
A New Protocol for the Reconstruction of the Auditory Ambiance in Palaeolithic Sites: First Results from Grotta Paglicci (Apulia - Southern Italy)	500
<i>Jacopo Crezzini, Adriano Farina, Enrico Armelloni, Riccardo Salvini, Annamaria Ronchitelli, Stefano Ricci, Francesco Boschin</i>	
Sensorial Identity of Ruins: Vibroacoustic Features of the Roofless Medieval Chapel of Madonna Del Fieno (Fisciano, Italy).....	505
<i>Elide Nastri, Paolo Todisco</i>	
Hidden Monuments Revealed: 3D Digitization of the Benedictine Monastery of Catania and Its Stratified Spaces	509
<i>Simone Pio Barbagallo, Maura Fugazzotto, Lucrezia Longhitano, Roberta Occhipinti, Dario Allegra, Germana Barone, Paolo Mazzoleni, Filippo Stanco</i>	

Adaptive Immersive Experiences: Comparative Study on Villa Regina	514
<i>Liliana Cecere, Francesco Colace, Muhammad Khan, Angelo Lorusso, Domenico Santaniello, Carmine Valentino</i>	
Gamified AR and Supervised AI for Cultural Heritage: The Amiternum Site Experience.....	520
<i>Federico Martusciello, Henry Muccini, Alfonso Forgione</i>	
From Surveying Techniques to a 3D GIS Geodatabase.....	526
<i>Barbara Marana, Giorgio Ubbiali</i>	
How Do Climate Change-Driven Renewable Energy Infrastructures Affect the Visual Perception of Landscapes? an Exploratory Empirical Study	532
<i>Canio Alfieri Sabia, Maria Rosaria Potenza, Agata Maggio, Antonio Minervino Amodio, Fabrizio Terenzio Gizzi</i>	
Implementation of Management Facilitators in Historic Buildings: Integration of BIM and GIS for Pathology Monitoring.....	537
<i>Crislandy Kaline Barreiro Marques, Rafael Fernandes Dionizio, Eloísa Dezen-Kempter</i>	
Tracing Construction Phases at the Roman Villa Horta Da Torre (Fronteira, Portugal): Insights from Mortars Aggregates	542
<i>Mizuki Takahashi, Cristina Galacho, André Carneiro, Patrícia Moita</i>	
Walls of the Castle of Alcácer Do Sal - Contribution to the Study of Mortars in Military Architecture	547
<i>Maria Almeida, Maria Pinheiro-Alves, Patrícia Moita, Cristina Galacho</i>	
Protecting the Past, Shaping the Future. High School Students Test Nanocomposites on Archaeological Samples	554
<i>Beatrice Calosso, Rosaria D'Amato, Valentina Nigro, Gaetano Terranova</i>	
An Integrated Approach for the Systematic Monitoring of the Indoor Air Quality and Microclimatology at Churches Located in the Central Mediterranean Region	559
<i>Antonio Proto, Francesca Cannizzaro, Maria Ricciardi, Maria Letizia Amadori, Jgor Arduini, Oriana Motta, Paola Donato, Alfred Micallef, Sebastiano D'Amico, Adriana Alescio, Luigi Mondello, Danilo Sciarrone</i>	
Application of 3D Ultrasonic Tomography in Cultural Heritage: The Case of the Ustica Sculpture	564
<i>Alessandra Carollo, Patrizia Capizzi, Raffaele Maritorana, Marco Vincenzo Majani, Franco Foresta Martin</i>	
Integrated Geophysical Prospection at the Roman Villa of Agosta (Comacchio, Italy): First Results	568
<i>Jessica Clementi, Enzo Rizzo</i>	
Micro-Geophysical Investigations for Structural Diagnostics at Coratelli Mill	572
<i>Lara De Giorgi, Dora Francesca Barbolla, Giovanni Leucci</i>	
ERT Surveys at the Necropolis of Baucina (Palermo).....	577
<i>Lara De Giorgi, Dora Francesca Barbolla, Giovanni Leucci</i>	
Virtual Reconstruction of the Ducal Palace of Oliveto Lucano (Basilicata, Italy)	582
<i>Maurizio Delli Santi, Massimiliano Passarelli</i>	
Post-Earthquake Structural Assessment Using Ground Penetrating Radar (GPR): Preliminary Insight for Guidelines from Literature Review.....	586
<i>Antonio Minervino Amodio, Giovanni Leucci, Fabrizio Terenzio Gizzi</i>	

Dust Detector for Museum Environment Based on Raspberry Pi	591
<i>Mariagrazia Leccisi, Giuseppe Schirripa Spagnolo, Fabio Leccese</i>	
The Theatre of Marcellus: Between Historical Memory and Digital Innovation	597
<i>Roberto Barni, Marika Griffo, Carlo Inglese, Simone Lucchetti</i>	
Reconstructing Galileo's Inclined Plane Experiments: Problems of Time Measurements	603
<i>Giuseppe Schirripa Spagnolo, Giorgia Satta, Federico Fina, Ilaria De Angelis, Fabio Leccese</i>	
Analysis of Hypogea Environments Based on Ambient Vibration Data: Application to a Case Study on the Palatine Hill	609
<i>Iolanda Gaudiosi, Maurizio Simionato, Daniel Tentori, Michele Livani, Salvatore Piro, Marco Mancini, Francesco Stigliano, Massimiliano Moscatelli</i>	
Historic Roofless Masonry Structures: The Role of Environmental Factors that Contribute to Decay and Collapse	615
<i>Nicoletta Bianchini, Efcharis Balodimou, Tesfaye Tessema, Laden Husamaldin, Fabio Tosti</i>	
Augmented Reality for Knowledge Transfer of Historical Masonry Vaulting Techniques	621
<i>Davide Prati, Orsolya Gaspar, Vittorio Paris</i>	
Structural Investigation Through Digital Modelling of Two Domes by Ferdinando Crivelli.....	627
<i>Virna Maria Nannei, Vittorio Paris, Davide Prati, Monica Resmini, Giulio Mirabella Roberti</i>	
Multitemporal SAR Data for Prospection, Monitoring and Preservation of Cultural Heritage.....	633
<i>Antonio Corbo, Antonio Napolitano, Deodato Tapete, Andrea Benedetto, Alessandro M. Jaia</i>	
Chemical Degradation and Mineralogical Transformations on Based Lime Blue Pigment	639
<i>Stefano Columbu, Giovanni Brodu, Stefania Porcu, Daniele Chiriu, Giuliana Fenu</i>	
Mineralogical and Petrographic Analyses of a Complex Finishing Plasters Stratigraphy from a 17th Century Sardinian Church	643
<i>Stefano Columbu, Giovanni Brodu, Daniele Chiriu, Stefania Porcu, Giuliana Fenu</i>	
Spectroscopic and Micro-Elemental Analysis of Some 20th-Century Paintings: Identifying Diagnostic Pigments.....	647
<i>Andrea Bergomi, Valeria Comite, Chiara Andrea Lombardi, Mattia Borelli, Giulia Galli, Gianluca Carabelli, Antonino Fiorentino, Paola Fermo</i>	
Optical Methods for Violin Diagnostics	652
<i>Vito Pagliarulo, Massimo Rippa, Chiara Saltarelli, Antimo Di Meo, Dimitru Scutelnic, Claudia Daffara, Melania Paturzo</i>	
Active Thermography Analysis of Wall Paintings in the Early Christian Basilica Complex of Cimitile (Italy).....	657
<i>Antimo Di Meo, Maria Palma Recchia, Massimo Rippa</i>	
3D Modelling for the Historical Reconstruction of an Archaeological Site: The Temple of Iuvanum.....	662
<i>Vincenzo Saverio Alfio, Domenica Costantino, Ahmed Kamal Hamed Dewedar, Massimo Leserri, Caterina Montanaro, Donato Palumbo, Massimiliano Pepe, Alfredo Restuccia Garofalo</i>	
High-Resolution 3D Surveying to Support Museum Inclusiveness Strategies.....	668
<i>Gabriele Bitelli, Anna Forte, Andrea Tirincanti</i>	

Metal Finds from the Etruscan Site of Spina (Ostellato - FE - Italy), 2023 Field: Preliminary Results	674
<i>Colin Ongari, Elena Marrocchino, Negar Eftekhari, Carmela Vaccaro</i>	
Medieval Church Bell Sound Generation for Vibroacoustic Landscape Studies.....	680
<i>Marco Casazza, Fabrizio Barone</i>	
Hard Vibroacoustic Metrology for Intangible Cultural Heritage: The Case of Church Bells Tuning.....	685
<i>Rosa Fiorillo, Marco Casazza, Fabrizio Barone</i>	
Non-Destructive Multi-Analytical Preliminary Characterization of a Giuseppe Sabatelli Self-Portrait and Natale Longoni Inscription on a Shaving Bowl Lid	689
<i>Giulia Galli, Chiara Andrea Lombardi, Chiara Nenci, Carlo Mariani, Paola Fermo, Valeria Comite</i>	
Geophysical Data Acquisition for a Non-Invasive Diagnosis at the Convitto Palmieri in Lecce.....	694
<i>Dora Francesca Barbolla, Lara De Giorgi, Ivan Ferrari, Francesco Giuri, Giovanni Leucci</i>	
Integrating Historical Sources and Infrared Thermography for Detection of Seismic Damage in Architectural Heritage	699
<i>Fabrizio Terenzio Gizzi, Edoardo Geraldini, Maria Rosaria Potenza, Sileo Maria</i>	
Tracking the Research Landscape of Infrared Thermography in Architectural Heritage: A Data-Driven View.....	703
<i>Fabrizio Terenzio Gizzi, Maria Rosaria Potenza, Maria Sileo, Antonio Minervino Amodio</i>	
Geophysical Survey in the Area of Aguglia D'agosta (Priolo Gargallo, Sicily)	709
<i>Lara De Giorgi, Dora Francesca Barbolla, Giovanni Leucci</i>	
Geophysical Survey at the Coastal Tower of S. Caterina (Lecce, Italy).....	715
<i>Lara De Giorgi, Giancarlo De Pascalis, Ivan Ferrari, Francesco Giuri, Giovanni Leucci</i>	
ERT Survey at the Roman Bath in Sagalassos (Turkey).....	719
<i>Lara De Giorgi, Dora Francesca Barbolla, Giovanni Leucci</i>	
The Archaeological Site of Anglona (MT): Geophysical Surveys to Understand the Settlement Disposition	723
<i>Lara De Giorgi, Dora Francesca Barbolla, Giovanni Leucci</i>	
Archeology of the Future and the Simulacrum for Heritage As-Becoming Solutions.....	727
<i>Fernando Birello De Lima, Simone Helena Tanoue Vizioli, Amanda Kirchesch Castrillon Mendes, Luciana Pelaes Mascaro</i>	
Digital Built Heritage Representation and Documentation: A Systematic Mapping of Platforms and Hybrid Models.....	733
<i>Maisa Almeida, Marcela Noronha, Marcio Fabricio, Alfonso Ippolito</i>	
The First 21st Century Comprehensive Restored Plan of Hadrian's Villa and Its Metrological Analysis.....	739
<i>Michael Ytterberg</i>	
From Visual Perception to Automated Detection: Integrating NDVI, SCP, and AI for the Identification of Archaeological Surface Markers.....	745
<i>Filomena Papaleo, Simone Giosuè Madeo</i>	

Application of Charged Particle Activation Analysis (CPAA) in Archaeology	750
<i>Chaturvedula S. Sastri, Thierry Sauvage, Olivier Wendling, Aurélien Bellamy, William Hate, Paul Sigot, Frédéric Foucher, Christian Humburg</i>	
Multi-Technique Integrated Analysis to Discover the Invisible on the Camponeschi Monument in L'Aquila	756
<i>Luisa Caneve, Valeria Spizzichino, Massimiliano Guarneri, Federico Angelini, Roberto Chirico, Elena De Panfilis, Speranza Falciano</i>	
Digital Heritage Conservation: The SENNSE IoT Platform as a Structured Approach for Cultural Heritage Monitoring Projects	762
<i>Davide Zecca, Irene Muci, Francesco Valentino Taurino, Mohamed Ali Jaziri, Alberto Bucciero</i>	
Modeling Memory: Ethical Reuse and AI Training with Archaeologist-Produced 3D Reconstructions	767
<i>Simone Pio Barbagallo, Filippo Stanco, Davide Tanasi</i>	
Digital Documentation and Virtual Accessibility of Prehistoric Artefacts: Case Studies from Sicilian Museums	772
<i>Dario Calderone, Davide Tanasi, Enrico Greco, Stephan Hassam, Madeleine Kraft</i>	
Preliminary Findings from a Non-Invasive and Micro-Invasive Multi-Analytical Study of the Painting “Posa Della Prima Pietra” by Ismaele Teglio Milla (1853).....	777
<i>Paola Fermo, Valeria Comite, Chiara Andrea Lombardi, Mattia Borelli, Andrea Bergomi, Giulia Galli, Gianluca Carabelli, Daniele Bolleri, Letizia Bonizzoni, Francesca Sabatini</i>	
Virtual Reconstruction of the Temple of Olympian Zeus in Syracuse: A Journey in the Metaverse Between History and Technology.....	782
<i>Nicolò Di Marco, Elvia Maria Letizia Giudice, Filippo Stanco</i>	
Surface Features of the Giovanni Rasori Marble Monument (1840, Milan): Chemical Characterization of Degradation and Past Restoration Interventions	787
<i>Andrea Bergomi, Paola Fermo, Chiara Lombardi, Michela Pirovano, Antonino Fiorentino, Mattia Borelli, Mario Colella, Valeria Comite</i>	

Author Index