



L-Università  
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IEEE  
Malta Section



VALLETTA, MALTA / OCTOBER 7-9, 2024

2024 IEEE INTERNATIONAL CONFERENCE ON  
**METROLOGY FOR ARCHAEOLOGY  
AND CULTURAL HERITAGE**



CONFERENCE  
**PROGRAM**

For further information, visit the website

[www.metroarcheo.com](http://www.metroarcheo.com)

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## Welcome Message from the General Chairs

On behalf of the Organizing Committee, we wish to welcome you to the *2024 IEEE International Conference on Metrology for Archaeology and Cultural Heritage - MetroArchaeo2024*.

Following the positive experience of the past editions held in Benevento (2015), Turin (2016), Lecce (2017), Cassino (2018), Florence (2019), Trento - virtual way (2020), Milan (2021), Cosenza (2022), Rome (2023) this year MetroArchaeo has been organized in Valletta (Malta). This year we celebrate the 10<sup>th</sup> anniversary of *MetroArchaeo*. Celebrating the 10th anniversary of our Congress is a momentous occasion that reflects a decade of dedication, collaboration, and progress. Over the past ten years, we have united diverse voices, championed meaningful activities, and fostered a spirit of community that transcends borders. Together, we have faced challenges and embraced opportunities, always striving for a brighter future. As we honor our achievements, let us also look forward to the work that lies ahead. With renewed energy and commitment, we will continue to advocate for change, inspire innovation, and empower individuals. Here's to another decade of impact and success!

*MetroArchaeo2024* is hosted by University of Malta in the astonishing Valletta campus. Valletta Campus acts as a vibrant hub of learning and culture located in the historic capital city of Malta. Nestled within beautifully restored buildings, the campus seamlessly blends modern education with rich heritage. Valletta Campus fosters a dynamic community, encouraging collaboration and innovation. With its unique atmosphere, it not only enriches students' educational experiences but also deepens their appreciation for Malta's history and culture and this makes it the perfect location for the activities of the congress and the numerous delegates that are attending this event. The city of Valletta, the capital of Malta, is a UNESCO World Heritage Site renowned for its rich history and architectural grandeur. Established by the Knights of St. John in the 16th century, the city showcases a unique blend of Baroque and Renaissance influences. Its fortified walls, stunning churches, and palaces, such as St. John's Co-Cathedral, reflect the city's strategic importance and cultural significance. The meticulously preserved streets and historic buildings tell the story of a vibrant past, while the magnificent views of the Grand Harbour enhance its allure. Valletta stands as a testament to Malta's heritage, attracting visitors eager to explore its timeless beauty.

*MetroArchaeo 2024* strives to promote interdisciplinary works between researchers belonging to different scientific sectors as well as aims at showing and sharing the latest innovations in the field of measurements applied to cultural heritage.

The success of *MetroArchaeo2024* is testified by its numbers and it is the place where more than 150 participants meet to discuss scientific applications in the context of cultural heritage. MetroArchaeo brings together researchers and operators in the enhancement, characterization and preservation of archaeological and cultural heritage with the main objective of discussing production, interpretation and reliability of measurements and data. Measurements deriving from the large number of analytical methodologies and tools, molecular and elemental spectroscopic techniques, chemometrics, chemical reactivity and modeling, etc., nowadays

available are of interest for the conference. Data on the impacts of natural and anthropogenic environmental stressors, the decaying pathways of the different materials in the surrounding environment, the development of new remediation processes as cleaning, consolidation, rehabilitation, etc., based on the chemical knowledge can be considered. This year over 100 papers will be presented and awards will be assigned to a number of outstanding papers and posters.

The program includes three keynote lectures, which will be delivered by **Deodato Tapete** Italian Space Agency - ASI, Italy; **Matija Strlič** University of Ljubljana, Slovenia and University College London, UK; **Zaki Aslan**, Dubai, United Arab Emirate. One Tutorial will be held on the use of high-frequency GPR by **Maurizio Gabriele Porcu**. Finally, a roundtable has been organized by **Rosangela Faieta**, **Daniel Micallef** and **Reuben Grima**, University of Malta, and **MariaElena Zammit**, Heritage Malta. The conference also welcome the presentation by **Col. Giuseppe Marseglia**, Carabinieri Command for the Protection of Cultural Heritage on "Remote Sensing Technologies and AI for the Conservation of Cultural Heritage"

We are very grateful to all the members of the MetroArchaeo 2024 Committee for their outstanding work, as well as to the reviewers who have contributed to guarantee the quality of the scientific program. A special thanks goes to the Local Organizing Committee who worked with sense of commitments and dedication in order to guarantee a memorable event. We also wish to thank the public and private organizations, which have kindly accepted to support the meeting in different ways.

We wish you a successful *MetroArchaeo2024* and enjoy your stay in Malta.

**On behalf of the Organizing Committee**

*Sebastiano D'Amico*

*Pasquale Daponte*

## MetroArchaeo 2024 Committee

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## MetroArcheo 2024 Keynote Speakers

Plenary Session - Monday October 7 - H 13:45



### Earth Observation for cultural heritage: from research to operational use in archaeology and conservation

**Deodato Tapete**

*Italian Space Agency - ASI, Italy*

#### **ABSTRACT**

Satellite remote sensing based either on optical or Synthetic Aperture Radar (SAR) sensors has a long history of use in archaeological and cultural heritage applications. Decades of experiments and scientific research have made it reach a good level of maturity, to the point that current operational missions (e.g. European Commission Copernicus Sentinels and national constellations such as Italy's COSMO-SkyMed) are increasingly used in the field of archaeological studies and heritage conservation, and support application services delivered by commercial providers.

Satellite imagery nowadays allows cultural heritage experts and practitioners to carry out a wide variety of measurements and observations to address purposes that can be categorised according to the following main domain applications: i) archaeological prospection and site discovery; ii) site recording and surveying; iii) multi-temporal monitoring for condition assessment; and iv) damage assessment during natural hazard events and crisis. While reviewing all these domains, particular discussion will be dedicated to highlight the most recent advances and achievements.

With regard to archaeological prospection, although SAR sensors operating in shorter wavelengths (e.g. X-band) are expected to penetrate the soil less than longer wavelengths (e.g. L-band), the most recent observations undertaken with very high resolution COSMO-SkyMed imagery over the province of Rome, Italy, provided surprising results in unveiling cropmarks and soilmarks in vegetated areas. Furthermore, the integration with Sentinel-2 multispectral time series can help in targeting the best seasons for in situ surveys.

With regard to site recording and surveying, the integration of stereophotogrammetric optical and interferometric SAR Digital Elevation Models (DEMs) can improve the detection rate of archaeological mounds (tells) and support accurate morphometric studies. For example, in Iraq,

the combination of COSMO-SkyMed and CartoSat-1 DEMs led to an improvement in the number of detected tells of approximately 10 times compared to the publicly available databases, as well as the retrieval of accurate volume estimates of lost tells.

With regard to condition assessment in both ordinary and crisis times, multi-sensor and multi-frequency satellite remote sensing is an established mean to highlight impacts on conservation due to natural and anthropogenic (e.g. agricultural activities, land cover land use transitions, urban development, infrastructures, conflicts) hazards. Regional and site-specific exercises undertaken in Syria, Iraq and Libya showcase the exceptional contribution that Earth Observation can bring when the areas to survey are either remote or inaccessible due to security concerns.

### **SPEAKER BIOGRAPHY**

**Deodato Tapete**, Researcher in Earth Observation and data analytics at the Italian Space Agency (ASI). He is in charge of research and development projects based on satellite remote sensing by means of Synthetic Aperture Radar (SAR) and optical multi-/hyperspectral sensors to address: environmental applications; characterization of natural (e.g. landslides, floods, volcanic eruptions, hurricanes) and anthropogenic hazards (e.g. subsidence, water/air pollution, urban heat island); disaster risk reduction; sustainable use of natural resources: archaeological studies; monitoring and conservation of cultural heritage. With regard to the latter scientific disciplines, he has developed several methods based on SAR data processing to address issues of heritage conservation, including but not limited to structural stability, impacts of infrastructure construction, weathering and deterioration, looting, intentional destruction. He has worked on several national and international projects across different geographic areas, from Italy to Middle East and North Africa, United Kingdom, Latin America. He has recently cooperated with the Archaeological Park of Colosseum and is currently involved in the Extraordinary Plan of Monitoring and Conservation of Immovable Cultural Heritage led by the Italian Ministry of Culture. He is member of the Computer Applications and Quantitative Methods in Archaeology (CAA) Scientific Committee, and member of the Aerial Archaeology Research Group and European Association of Archaeologists (EAA). He has published more than 200 publications, some thematic books and dictionaries on diagnostic investigations and remote sensing techniques applied to the study and conservation of cultural heritage.

Plenary Session - Tuesday October 8 - H 11:15

## How can effective design of protective structures enhance archaeological preservation in situ?

**Zaki Aslan**

*American University of Sharjah*

### **ABSTRACT**

This presentation highlights the importance of assessing the efficacy and performance of protective structures at archaeological sites based on heritage management criteria. While assessments can begin during the design phase, many structures are evaluated post-installation, allowing for modifications or replacements to enhance protection for archaeological remains. Current designs often neglect a holistic approach to conservation, presentation, and site values, underscoring the need for comprehensive understanding throughout the entire design process. Viewing protective structures merely as construction projects can lead to ineffective interventions.

The presentation discusses various design aspects and intervention phases, aiming to identify practical planning guidelines for architects, conservators, archaeologists, and site managers. Key topics include the principles of design for heritage conservation, examples of existing protective structures worldwide, and technical considerations in conservation and climate-responsive architectural design.

Design criteria must address site conservation and presentation needs, focusing on architectural responses to environmental conditions. Selected case studies will illustrate how to evaluate and implement design options that consider diverse climatic, cultural, and management contexts, emphasizing the role of shelters as defenses against weather.

The conclusion references international conservation bodies' efforts to create planning and design guidelines based on field research insights. It also highlights the use of computer-based environmental simulation tools, which, despite their limitations, can guide design processes and inform the conservation effectiveness of protective structures. Additionally, the presentation refers to a recent study on the role of expert consultations in shaping climatic-conscious design briefs, enhancing decision-making for preservation practices at archaeological sites.

### **SPEAKER BIOGRAPHY**

**Zaki Aslan** is Professor of Practice at the American University of Sharjah (College of Architecture, Art and Design) and an architect, planner, educator & advisor in the cultural & heritage fields. He served for 21 years as the founding director of ICCROM-Sharjah Regional Conservation Centre, UAE, where he led programs for the Arab Region, from Rome, Italy (2003-2011) & later from Sharjah, UAE (2012-2023). He managed projects & offered technical guidance on heritage conservation/ management, national planning/ policies, World Heritage,

field projects (including public outreach, capacity building & curricula development), with UNESCO, EU, GCI, British Council, GIZ, USAID, ICOMOS and other institutions. Aslan is also a member of the editorial board of the "Journal of Conservation and Management of Archaeological Sites", and member in several advisory capacities and steering committees (ASOR, EAMENA, UAE-funded Mosul Project, TERRA 2022, ALIPH, PWC, Welfare Association, Saudi Government & others). He holds a Ph.D. in Heritage Conservation and Management from University College London (UCL) and an MSc in Conservation of the Built Environment from the University of Montreal, Canada.

## Plenary Session - Wednesday October 9 - H 11:00



# From smells of objects to collections of smells

**Matija Strlič**

*University of Ljubljana, Slovenia  
University College London, UK*

### ABSTRACT

Although the experience of heritage is often limited to the visual, many objects in collections are inherently linked to specific smells that carry their own significance. Visitors and users of heritage often highlight the importance of the olfactory dimension of objects, yet emissions of volatiles from heritage materials are often seen predominantly as a conservation risk. This may not be justified, as studies have shown that at concentrations that are required to engage visitors, organic volatiles are already normally present in the environment.

Understanding and characterising the olfactory information requires approaches that include sensory evaluation of both the individual volatiles and the mixture representing the smell, in addition to the analytical information obtained using chromatography. To document and perhaps archive olfactory heritage, we thus need chemical and sensory information as well as assessment of the olfactory significance.

A number of case studies have been assessed so far, from historic paper and libraries to paintings and archaeological heritage. While the developed olfactory experiences engage visitors, the obtained chemical information often also reveals new information about object composition and state of degradation and is thus fast becoming part of the standard toolkit of a heritage scientist.

### SPEAKER BIOGRAPHY

**Matija Strlič** is Professor of Analytical Chemistry at University of Ljubljana and Honorary Professor of Heritage Science at University College London. His main research interests are the development of heritage science infrastructure, as well as modelling of heritage materials, environments, values and decision making. He has published more than 160 peer-reviewed papers and is Editorial Board Member of *Heritage Science*, *Polymer Degradation and Stability* and *Studies in Conservation*. He is a Fellow of the Royal Society of Chemistry and of the International Institute for Conservation. In 2015, he received the Ambassador of Science of the Republic of Slovenia Award for the outstanding achievements in science and international collaboration.

# MetroArchaeo 2024 Round Table

Round Table - Tuesday October 8 - H 11:15

## Evaluating the performance of protective shelters: challenges and future directions

### **ORGANIZED BY**

Rosangela Faieta and Reuben Grima, *University of Malta*, and MariaElena Zammit, *Heritage Malta*

### **CHAired BY**

Reuben Grima, *University of Malta*

The number of protective shelters implemented on archaeological sites has proliferated in recent decades. The assessment of their performance has progressed rather more unevenly. As increasingly sophisticated tools for environmental assessment and conservation science are developed and become more widely available, new opportunities to make better informed assessments of the performance of protective shelters are opening up. On the other hand, innovative applications and interdisciplinary approaches in the context of evaluating and monitoring shelter performance continue to be developed and disseminated.

This round table session will provide a forum to share recent experiences in the evaluation of the performance of archaeological shelters, while also posing questions about possible future directions. What kinds of legacy data gathered before the implementation of a shelter were the most helpful? Which other data do we wish had been gathered at that stage? Are there blind spots in our current assessment programmes, and can they be addressed?

### **General structure of the Round Table**

- Introduction
- Keynote Lecture by Zaki Aslan
- Presentations
- Question time
- Final round

## MetroArchaeo 2024 Tutorial

Tutorial Session - Tuesday October 8 - H 16:30



### GPR tutorial: let's play with the high frequencies

**Maurizio Gabriele Porcu**

*Codevintec Italiana, Italy*

#### ABSTRACT

GPR is a non destructive method can image the subsoil using electromagnetic waves. This tutorial will give a quick introduction to the gpr technique. Specific case studies about archeological application will be presented. After the introduction all attendees can take part of the Gpr demo. Gpr surveys will be carried out with GSSI Flex NX system. The brand new handheld high frequency system.

You can be take part of survey: let's play with Flex NX.

#### SPEAKER BIOGRAPHY

**Maurizio Gabriele Porcu**, Codevintec Italiana srl. Master of degrees in Telecommunication engineer at Polytechnic University of Milan. Researcher fellow at Polytechnic University of Milan, member of technical committee of IATT (Italian Association Trenchless Technology), Product specialist for land geophysical equipment at Codevintec Italiana srl. His research are carried out in GPR technology, especially in polarization and stacking effect on gpr data.

# MetroArcheo 2024 Venue

**MetroArcheo 2024** will be held at the  
**University of Malta - Valletta Campus - St Paul Street, Valletta**



**ADDRESS**  
St Paul Street  
Valletta

Use the QRCode to open the location on **Google Maps**





## MetroArchaeo 2024 Social Events

### WELCOME PARTY

Monday October 7 - H 18:30

The Welcome Party will be held at the **University of Malta - Valletta Campus (St Paul Street)** on **Monday, October 7 - 18:30**.

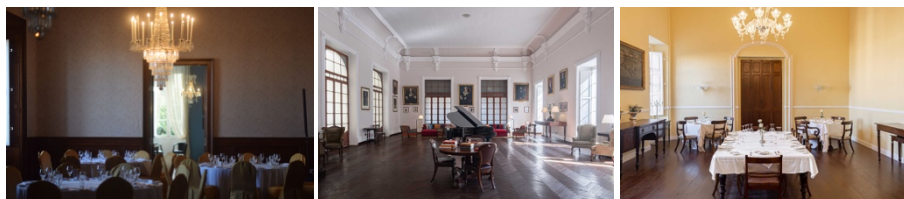
### GALA DINNER

Tuesday October 8 - H 20:00

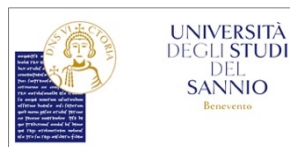
The Gala Dinner will be held at **Casino Maltese** on **Tuesday, October 8 - 20:00**.

**ADDRESS** - 247 Republic St, Valletta

The Casino Maltese is a private members' club in Valletta. The Club is sited in a historic building with sumptuous architectural features, in the centre of Valletta with balconies enjoying views over both St George's Square and Republic Square.



## MetroArcheo 2024 Patronages



## MetroArcheo 2024 Sponsors



## Program Schedule - Monday, October 7

MONDAY, OCTOBER 7 2024				
10:30 - 11:30	Opening Ceremony & Welcome Coffee			
11:30 - 12:45	S1.1 - General Track	S1.2 - SS16 - Information management in HBIM systems for Cultural Heritage	S1.3 - SS1 P1 - Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage: From research to preservation - PART I	S1.4 - General Track
12:45 - 13:45	Lunch			
13:45 - 15:00	Keynote Session Earth Observation for cultural heritage: from research to operational use in archaeology and conservation Deodato Tapete - Italian Space Agency - ASI, Italy			
15:00 - 16:15	S2.1 - SS5 - Non-destructive imaging and interferometric techniques for cultural heritage diagnostics and metrology	S2.2 - SS15 P1 - Archaeometry For Archaeology and Conservation Sciences: Provenancing, Technology And Conservation Of Cultural Heritage Materials From Sites And Museums - PART I	S2.3 - SS1 P2 - Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage: From research to preservation - PART II	S2.4 - SS9 - Innovative sensors and smart procedures in preventive conservation
16:15 - 16:45	Coffee Break			
16:45 - 17:45	S3.1 - SS25 - Genius Loci: Methods and Code for Measuring Historical Phenomena, Ancient Landscape Dynamics, and Mechanisms through it Heritage Methodologies	S3.2 - SS15 P2 - Archaeometry For Archaeology and Conservation Sciences: Provenancing, Technology And Conservation Of Cultural Heritage Materials From Sites And Museums - PART II		
18:30 - 20:00	Welcome Party			

## Program Schedule - Tuesday, October 8

TUESDAY, OCTOBER 8 2024				
09:00 - 10:30	S4.1 - SS22 - Geomatics for Cultural Heritage: multi-source and multi-scale data integration and processing in research and applications	S4.2 - SS13 - Vibroacoustic metrological characterization for archaeology and cultural heritage	S4.3 - SS6 - Time through colors: past present and future of pigments and paintings, exploring diagnostics, dating and conservation in cultural heritage	S4.4 - SS28 P1 - Non-invasive methods for analysis and diagnostic in the field of cultural heritage - PART I
10:30 - 11:15	Coffee break / Poster Session #1			
11:15 - 12:30	Round Table "Evaluating the performance of protective shelters: challenges and future directions" Keynote Session - How can effective design of protective structures enhance archaeological preservation in situ? Zaki Aslan, American University of Sharjah			
12:30 - 14:00	Lunch / Poster Session #1 (same posters from the Poster Session #1 10:30 - 11:15)			
14:00 - 15:15	S5.1 - SS2 - Damage and Radiological Risk Assessment: Diagnosis and Monitoring for the Restoration, Preventive Conservation, Usability and Maintenance of Cultural Heritage	S5.2 - SS21 P1 - Integrated Methods, Theories and Applications for Structural Health Monitoring and Assessment of Ancient Constructions - PART I	S5.3 - SS3 - Engineering the Future, Honoring the Past: Cultural Heritage in Civil Engineering	S5.4 - SS28 P2 - Non-invasive methods for analysis and diagnostic in the field of cultural heritage - PART II
15:15 - 15:45	Coffee break			
15:45 - 16:45	S6.1 - SS12 - Building Materials and Decay Assessment for On-Land and Underwater Cultural Heritage (CH)	S6.2 - SS4 - Cutting-edge approaches and innovations in Terahertz applications for Cultural Heritage	S6.3A - SS21 P1 - Integrated Methods, Theories and Applications for Structural Health Monitoring and Assessment of Ancient Constructions - PART I  S6.3B - SS23 - Advancements in Chromatographic and Mass Spectrometric Techniques for Cultural Heritage Studies	
16:30	Tutorial Use of High-Frequency GPR in Cultural Heritage Applications Maurizio Porcu - CODEVINTEC			
20:00	Gala Dinner			

## Program Schedule - Wednesday, October 9

<b>WEDNESDAY, OCTOBER 9 2024</b>			
09:00 - 10:15	S7.1 - SS17 - Tracing Time's Tapestry: Remote Sensing, 3D Imaging, and Mapping as Keys to Malta's Archaeological and Cultural Heritage	S7.2 - SS 30 - How To Preserve Outdoor Cultural Heritage: State-Of-Art, Challenges And New Perspectives	S7.3 - General Track
10:15 - 11:00	Coffee Break / Poster Session #2		
11:00 - 11:45	<p>Keynote Session #2</p> <p>From smells of objects to collections of smells</p> <p>Matija Strlič, University of Ljubljana, Slovenia, University College London, UK</p>		
11:45 - 12:45	S8.1 - SS8 - Traditional and Remote Sensing Methods for Cultural Heritage Buildings Monitoring	S8.2 - SS29 - Artificial Intelligence, Metrology, and Cultural Heritage: Integrating Disciplines for Preservation and Innovation	
12:45 - 13:15	Closing and Award Ceremony		

## Technical Program - Monday, October 7

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10:00 - 10:30 *University of Malta - Valletta Campus*  
**REGISTRATIONS - WELCOME COFFEE**

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10:30 - 11:30 *Room: Aula Magna*  
**OPENING CEREMONY**

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11:30 - 12:45 *Room: Aula Magna*  
**Session 1.1 - General Track PART I**  
**Chairs: Alfred Micallef, Emanuele Colica**

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**11:30 Landscape archeology, itinerary sources and topographical measures along sector of the Egnatia roman road between Peqin and Prrenjes (Albania)**

Maurizio Lazzari (CNR ISPC, Italy), Chiara Manieri (Freelance archeologist, Italy) and Pasquale Merola (CNR ISPC, Italy)

**11:45 Measuring the speed of life. A comparative study of enamel growth rates variations in archaeological and modern deciduous teeth**

Alessia Galbusera (Sapienza University of Rome), Martina Trocchi (Sapienza University of Rome), Owen Alexander Higgins (Sapienza University of Rome), Stefano Magri (University of Bologna), Beatrice Peripoli (Sapienza University of Rome), Michael Allen Beck de Lotto (University of Padua), Simone Anna Maria Lemmers (Elettra-Sincrotrone Trieste S.C.p.A., Italy), Stefano Benazzi (University of Bologna), Luca Bondioli (University of Padua) and Alessia Nava (Sapienza University of Rome)

**12:00 Documenting and narrating Tangible Cultural Heritage: strategies and methods applied to the case study of S. Lorenzo in Miranda and Atrium Vestae (Rome)**

Francesca Porfiri (Sapienza University of Rome, Italy), Niccolò Cecconi (Sapienza University of Rome, Italy), Francesco De Stefano (Sapienza University of Rome, Italy), Marika Griffo (Sapienza University of Rome, Italy), Mattia Ippoliti (Sapienza University of Rome, Italy), Claudia Moricca (Sapienza University of Rome, Italy), Davide Pavia (Sapienza University of Rome, Italy) and Francesca Perrone (Sapienza University of Rome, Italy)

**12:15 Wooden Closets in the Spezieria of St. Maria della Scala. Iconographic studies of the decorative motives based on a Multimedia Reconstruction**

Beatrice Calosso (ENEA), Marialuisa Mongelli (ENEA) and Samuele Pierattini (ENEA)

**12:30 Gaming the Castle: A Serious Game for the Valorization and Fruition of Norman Castle**

Giorgio Guardo (University of Catania), Simone Scionti (University of Catania), Myriam Vaccaro (University of Catania), Dario Allegra (University of Catania), Eleonora Pappalardo (University of Catania) and Filippo Stanco (University of Catania)

**11:30 - 12:15**      *Room: Meeting Room 101*  
**Session 1.2 - Information management in HBIM systems for Cultural Heritage**  
**Chair: Barbara Scala**

**11:30      HBIM methodology for a constructive critical survey: the romanesque composite pillar of San Michele Maggiore in Pavia**

Barbara Fazion (Politecnico di Milano), Luigi Fregonese (Politecnico di Milano) and Nora Lombardini (Politecnico di Milano)

**11:45      Digital Architecture Archives: A Comparison between BIM and OMEKA C for the Documentation and Valorization of Architectural Heritage. The Sanctuary of Madonna di Garufo**

Caterina Ciccotti (UniMc)

**12:00      From Dicearchia to Puteoli to Pozzuoli: Continuity of Urban Design and Analysis of Architectural Presences through the Tools of Digital Urban History**

Luisa Del Giudice (Sapienza, Università di Roma)

**11:30 - 12:45**      *Room: Meeting Room 102*  
**Session 1.3 - Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage: From research to preservation - PART I**  
**Chairs: Giovanni Leucci, Sebastiano D'Amico, Lara De Giorgi**

**11:30      3D modeling for enhanced subsurface GPR surveys**

Marco Vincenzo Majani (Università degli studi di Palermo), Patrizia Capizzi (Università degli studi di Palermo), Alessandra Carollo (Università degli studi di Palermo) and Raffaele Martorana (Università degli studi di Palermo)

**11:45      Enhancing the knowledge of underground sites in the archeological area of Rome: a case study from the Palatine Hill**

Iolanda Gaudiosi (Istituto di Geologia Ambientale e Geoingegneria, Consiglio Nazionale delle Ricerche), Michele Livani (Istituto di Geologia Ambientale e Geoingegneria, Consiglio Nazionale delle Ricerche, Italy), Salvatore Piro (Istituto di Scienze del Patrimonio Culturale, Consiglio Nazionale delle Ricerche, Italy), Simonato Maurizio (Istituto di Geologia Ambientale e Geoingegneria, Consiglio Nazionale delle Ricerche, Italy), Marco Mancini (Istituto di Geologia Ambientale e Geoingegneria, Consiglio Nazionale delle Ricerche, Italy), Daniel Tentori (Istituto di Geologia Ambientale e Geoingegneria, Consiglio Nazionale delle Ricerche, Italy), Francesco Stigliano (Istituto di Geologia Ambientale e Geoingegneria, Consiglio Nazionale delle Ricerche, Italy) and Massimiliano Moscatelli (Istituto di Geologia Ambientale e Geoingegneria, Consiglio Nazionale delle Ricerche, Italy)

**12:00      Various scenarios of measurements using a smartphone with a Li-dar sensor in the context of integration with the TLS point cloud**

Wioleta Błaszczak-Bąk (University of Warmia and Mazury in Olsztyn) and Joanna Janicka (University of Warmia and Mazury in Olsztyn)

**12:15 Electrical Resistivity Imaging of Roman archaeological structures: a multidisciplinary survey at the archaeological park of Nora, Sardinia, Italy**

Luca Piroddi (University of Malta - University of Cagliari), Sergio Vincenzo Calcina (University of Cagliari), Marilena Cozzolino (University of Molise), Gian Piero Deidda (University of Cagliari), Antonio Trogu (University of Cagliari), Romina Carboni (University of Cagliari), Emiliano Cruccas (University of Cagliari), Marco Giuman (University of Cagliari), Luca Lanteri (University of Tuscia) and Gaetano Ranieri (University of Cagliari)

**12:30 Design and Manufacture of a Device for Non-Destructive in-situ Corrosion Assessment**

Jacob Bezzina (University of Malta), Pierre Vella (University of Malta), Daniel A. Vella (University of Malta), Timmy Gambin (University of Malta) and Martin Muscat (University of Malta)

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11:30 - 12:15 *Room: Meeting Room 103*  
**Session 1.4 - General Track PART II**  
**Chair:** Daniel Vella

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**11:30 The multidisciplinary studies of the Megalithic Temples of Malta leading to their sheltering, and beyond**

Rosangela Faieta (University of Malta, Msida, Malta), Joann Cassar (University of Malta, Msida, Malta), Mantas Valantinavičius (University of Malta, Msida, Malta), Daniel Micallef (Dept. of Environmental Design, Faculty for the Built Environment, University of Malta, Msida, Malta) and Mariaelena Zammit (Prehistoric Sites (North) Department, Heritage Malta, Bighi, Kalkara, Malta)

**11:45 A new Approach for Rooftop Characterization using VHR Satellite and UAV data**

Alexandra Bojor (SISTEMA GmbH), Stefano Natali (SISTEMA GmbH), Charles Galdies (University of Malta), Joann Cassar (University of Malta) and Elizabeth Muscat Azzopardi (University of Malta)

**12:00 Tales of Colours - Latest Results of the Archaeometrical Examinations Carried out on Murals in Syrian Crusader Castles**

Béla Török (University of Miskolc) and Zsófia Márk (Pázmány Péter Catholic University)

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12:45 - 13:45 *University of Malta - Valletta Campus*  
**LUNCH**

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13:45 - 14:30 *Aula Magna*  
**PLENARY SESSION - KEYNOTE SPEAKER**  
**Chair:** Sebastiano D'Amico  
**Welcome address** by H.E. Fabrizio Romano, *Ambassador of Italy to Malta*

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**Earth Observation for cultural heritage: from research to operational use in archaeology and conservation**

Deodato Tapete, *Italian Space Agency - ASI, Italy*



14:30 - 15:00

*Aula Magna*  
**INVITED TALK**

**Remote Sensing Technologies and AI for the Conservation of Cultural Heritage**

Col. Giuseppe Marseglia, *Carabinieri Command for the Protection of Cultural Heritage*

15:00 - 16:00

*Room: Aula Magna*  
**Session 2.1 - Non-destructive imaging and interferometric techniques for cultural heritage diagnostics and metrology**  
**Chair:** Vito Pagliarulo

**15:00 The role of infrared imaging to support art historical interpretation of Giacomo Ceruti's paintings**

Nicole de Manincor (University of Verona), Paola Artoni (University of Verona), Giulia Adami (University of Verona), Razvan Stefan Manole (University of Verona) and Monica Molteni (University of Verona)

**15:15 The use of pseudo-noise pulse compression thermography for inspecting of masonry wall**

Rocco Zito (University of Calabria), Stefano Laureti (University of Calabria), Giovanni Ferrarini (CNR-ITC), Paolo Bison (CNR-ITC) and Marco Ricci (University of Calabria)

**15:30 3D model to assist technicians with restoration, fruition, and preservation strategies. The case study of the Mithra of Carminiello ai Mannesi in Naples, Italy**

Chiara Saltarelli (Institute of Applied Sciences and Intelligent Systems "E. Caianiello" of CNR), Vito Pagliarulo (Institute of Applied Sciences and Intelligent Systems "E. Caianiello" of CNR), Massimo Rippa (Institute of Applied Sciences and Intelligent Systems "E. Caianiello" of CNR), Barbara Balbi (Superintendence of Archaeology, Fine Arts and Landscape for the Municipality of Naples) and Melania Paturzo (Institute of Applied Sciences and Intelligent Systems "E. Caianiello" of CNR)

**15:45 Digital Iconometry: Utilising Autodesk AutoCAD and LiDAR Technology to Investigate the Badami Chalukyan and Hoysala Sculptural Art**

Poorva Salvi (Indian Institute of Technology Gandhinagar)

15:00 - 16:00

*Room: Meeting Room 101*  
**Session 2.2 - Archaeometry For Archaeology and Conservation Sciences: Provenancing, Technology And Conservation Of Cultural Heritage Materials From Sites And Museums - PART I**  
**Chairs:** Fabrizio Antonelli, Domenico Miriello

**15:00 Timeless Treasures: Exploring the Network of Non-Timber Forest Raw Materials and Products**

Maria Perla Colombini (University of Pisa), Jeannette Jacqueline Lucejko (University of Pisa), Erika Ribechini (università di pisa), Jarub Brózdowski (Poznań University of Life Sciences), Katja Tikka (University of Helsinki), Jacob Starlander (Bern University), Oliver Nelle (Landesamt für Denkmalpflege im Regierungspräsidium Stuttgart), Johannes Tintner (EY denkstatt GmbH, Austria), Jiří Woitsch (Czech Academy of Sciences), Rodica-Mariana Ion (National Institute of Research and Development for Chemistry and Petrochemistry), Koen

Deforce (Ghent University), Peter Szabo (Czech Academy of Sciences), Elena Badea (University of Craiova) and Magdalena Zborowska (Poznań University of Life Sciences).

**15:15 Preliminary Study on the Effectiveness of Sodium Alginate for Stabilizing Waterlogged Archeological Wood**

Elisa Villani (Sapienza University of Rome), Magdalena Broda (Poznan University of Life Sciences), Valeria Stagno (Sapienza University of Rome) and Silvia Capuani (CNR-ISC)

**15:30 Application of XRF and EXAFS to the characterization and study of ink on manuscript fragments found in the Santi Quattro Coronati complex (Rome, Italy)**

Martina Franchi (Sapienza University of Rome)

**15:45 How Pots Will Travel: Trace elemental characterization of Maltese Temple Period and Bronze Age ceramics**

Frederick Pirone (New College of Florida)

15:00 - 16:15

*Room: Meeting Room 102*

**Session 2.3 - Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage: From research to preservation - PART II**

**Chairs:** Giovanni Leucci, Sebastiano D'Amico, Lara De Giorgi

**15:00 GPR survey at the Hypogean Crypt of Sant'Antonio Abate in Nardò**

Dora Francesca Barbolla (CNR-ISPC), Francesco Giuri (CNR-ISPC), Alessandro Giuri (External Collaborator), Lara De Giorgi (CNR-ISPC), Chiara Torre (University of Catania), Ivan Ferrari (CNR-ISPC) and Giovanni Leucci (CNR-ISPC)

**15:15 Geophysical Survey at the Prehistoric Site in South Salento (Italy)**

Chiara Torre (University of Catania), Lara De Giorgi (ISPC-CNR), Dora Francesca Barbolla (ISPC-CNR) and Giovanni Leucci (ISPC-CNR)

**15:30 3D GPR model for mapping underfloor burials**

Patrizia Capizzi (University of Palermo), Calogero Pirrera (Independent Researcher), Marco Majani (University of Palermo), Roberta Giurio (CMR LAB srl), Francesco Rizzi (CMR LAB srl), Bartolomeo Figuccio (Soprintendenza per i Beni Culturali e Ambientali di Trapani), Girolama Fontana (Soprintendenza per i Beni Culturali e Ambientali di Trapani), Valentina Piovan (Donadello & Partners STP srl, WEI'N Venice srl, Italy) and Eugenio Vassallo (Independent research)

**15:45 The Roman Villa at Gerace: first results of geophysical investigations**

Antonina Arena (Università di Catania), Lara De Giorgi (ISPC-CNR), Chiara Torre (Università di Catania), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR) and Giovanni Leucci (ISPC-CNR)

**16:00 High Resolution GPR survey in the mud brick architecture of Chan Chan site (Perù)**

Salvatore Piro (National Research Council CNR ISPC), Francesca Colosi (National Research Council CNR ISPC), Blanca Sanchez Camones (Proyecto Especial Complejo Arqueologico Chan Chan, Trujillo, Perù), David Llancari (Proyecto Especial Complejo Arqueologico Chan Chan, Trujillo, Perù) and Roberto Orazi (National Research Council CNR ISPC)

15:00 - 16:15

*Room: Meeting Room 103*

**Session 2.4 - Innovative sensors and smart procedures in preventive conservation**

**Chairs:** Carlo Trigona, Anna M. Gueli

**15:00 Design and testing of a controlled release antimicrobial system for fungal and bacterial suppression in indoor her-itage environments**

Anna Laura Tassi (University of Milan), Vittoria Guglielmi (University of Milan), Paola Fermo (University of Milan), Alessia Santiglia (University of Milan), Maria del Pilar Bosch Roig (Instituto Universitario de Restauración del Patrimonio, Universitat Politècnica de València), Andrea Bernardos Bau (Dpto.de Química, Universitat Politècnica de València), Daniela Pinna (Università di Bologna) and Maria Cebriá-Mendoza (Universitat Politècnica de València)

**15:15 AIN-Based MEMS Device for Illuminance Microclimate Monitoring: Preliminary Results**

Carlo Trigona (University of Catania), Salvatore Baglio (University of Catania), Sergio Terrazzino (University of Catania) and Anna M. Gueli (University of Catania)

**15:30 Synergy of Cultural Heritage Preservation and Tech-nology: Microclimate Control and Mitigation Of Indoor Air Pollution**

Stefania Porcu (Physics department University of Cagliari), Riccardo Lodo (University of Cagliari), Pier Carlo Ricci (Physics department University of Cagliari), Carlo Maria Carbonaro (Physics department University of Cagliari) and Daniele Chiriu (Physics department University of Cagliari)

**15:45 Sub-GHz Resonators for Non-Invasive Moisture Monitoring in Cultural Heritage Applications**

Giovanni Gugliandolo (University of Messina), Laura Arruzzoli (University of Messina), Mariangela Latino (CNR-IPCF), Giovanni Crupi (University of Messina) and Nicola Donato (University of Messina)

**16:00 Leveraging Multi-View Images and Neural Networks for Colour Specification**

Giuseppe Furnari (University of), Dario Allegra (University of Catani), Anna Gueli (University of Catania) and Filippo Stanco (University of Catania)

16:15 - 16:45

*University of Malta - Valletta Campus*

**COFFEE BREAK**

16:45 - 17:45

*Room: Aula Magna*

**Session 3.1 - Genius Loci: Methods and Code for Measuring Historical Phenomena, Ancient Landscape Dynamics, and Mechanisms through it Heritage Methodologies**

**Chair:** Filippo Fantini

**16:45 3D models and metrological analysis: the Neonian Baptistery in Ravenna**

Gianna Bertacchi (University of Bologna) and Luca Cipriani (University of Bologna)

**17:00 Quantitative analysis of mediaeval urban planning: identifying measurement units and plot divisions with cosine quantogram**

Maria Legut-Pintal (University of Wrocław), Anna Kubicka-Sowińska (Wrocław University of Science and Technology) and Mikołaj Groseł (Wrocław University of Science and Technology)

**17:15 Design analysis of the Temple of Venus in Baiae: preliminary results**

Enrico Gallochio (Parco Archeologico dei Campi Flegrei), Elena Eramo (Università degli Studi di Roma Tor Vergata), Silvia Bertacchi (Università degli Studi della Campania Luigi Vanvitelli) and Filippo Fantini (Alma Mater Studiorum-Università di Bologna)

**17:30 Listening wall: a preliminary investigation on the acoustic performance of an early warning system for aircraft in WWII**

Antonino Quattrocchi (University of Messina), Alessia Chillemi (University of Messina), Giovanni Gugliandolo (University of Messina), Giuseppina Salvo (University of Messina), Mariangela Latino (CNR-IPCF), Nicola Donato (University of Messina), Fabio Todesco (University of Messina) and Alessio Altadonna (University of Messina)

16:45 - 17:45

Room: Meeting Room 101

**Session 3.2 - Archaeometry For Archaeology and Conservation Sciences: Provenancing, Technology And Conservation Of Cultural Heritage Materials From Sites And Museums - PART II**  
**Chairs:** Fabrizio Antonelli, Domenico Miriello

**16:45 PUTTING THE PEACES TOGETHER. A STUDY OF BRONZE FRAGMENTS FROM THE NECROPOLIS OF TREBENISHTE**

Danijela Jovanovic (National Museum of Serbia) and Petya Penkova (National Archaeological Institute with Museum Bulgarian Academy of Science)

**17:00 Unveiling the Holy Sepulchre's Past: A Multidisciplinary Approach to Characterise Mortars and Wood Remains**

Alessia Masi (Sapienza University of Rome), Eleonora Cerafogli (Università La Sapienza), Melania Di Fazio (Università La Sapienza), Laura Sadori (Università La Sapienza), Francesca R. Stasolla (Università La Sapienza) and Laura Medeghini (Sapienza University of Rome)

**17:15 Surface Enrichment and Deterioration Patterns of Two Silver Punch-Marked Coins from Tekttha, Naogaon, Bangladesh: An X-Ray Diffraction Analysis**

Sabikun Naher (Associate Professor, Department of Archaeology, Jahangirnagar University, Savar, Dhaka, Bangladesh)

**17:30 Multi-analytical archaeometric investigations on Chalcolithic and Iron age pottery from Yumuktepe (Mersin, Turkey): preliminary results**

Antonella Privitera (Dipartimento di Scienze, Università degli Studi Roma Tre), Isabella Caneva (Dipartimento di Beni Culturali, Università del Salento), Armida Sodo (Università degli Studi Roma Tre), Paola Molin (Università degli Studi Roma Tre) and Giancarlo Della Ventura (Università degli Studi Roma Tre)

18:30 - 20:00

University of Malta - Valletta Campus

**WELCOME RECEPTION**

## Technical Program - Tuesday, October 8

08:30 - 16:00 *University of Malta - Valletta Campus*  
**REGISTRATIONS**

09:00 - 10:45 *Room: Aula Magna*  
**Session 4.1 - Geomatics for Cultural Heritage: multi-source and multi-scale data integration and processing in research and applications**  
**Chairs:** Maria Grazia D'Urso, Gabriele Bitelli

**09:00 New Light on a Bologna Wax Tablet through High-detail 3D Surveying**

Anna Forte (University of Bologna), Fabian Lothar Walter Reiter (University of Bologna) and Gabriele Bitelli (University of Bologna)

**09:15 On the digital reconstruction of a coastal environment from historical analogic images**

Maria Grazia D'Urso (University of Bergamo), Constantino Luis Marino (International Photographic Surveyance), Barbara Marana (University of Bergamo) and Joel Aldrighettoni (University of Bergamo)

**09:30 As above, so below: painting an integrated LiDAR legacy**

Saviour Formosa (University of Malta), Janice Formosa Pace (University of Malta), Tram Tn Nguyen (University of Malta) and Fabrizio Cali (University of Malta)

**09:45 360 photogrammetry for 3D reconstruction of a complex and narrow cultural heritage site**

Giuseppina Vacca (University of Cagliari), Enrica Vecchi (University of Cagliari) and Andrea Dessì (University of Cagliari)

**10:00 Documentation for the preservation and valorisation of bell towers with polychrome ceramic spires in Sicily using geospatial database and GIS technology**

Gloria Russo (University of Catania), Mariateresa Galizia (University of Catania) and Michele Mangiameli (University of Catania)

**10:15 Digital survey and virtual reconstructions: the case of the church of Santa Sofia in Benevento**

Enrico Babilio (DiSt, University of Naples "Federico II") and Silvana Rapuano (DiLBeC, University of Campania "Luigi Vanvitelli")

**10:30 Assessing 3D modeling technologies in archaeology: a comparative study of documentation techniques**

Luca Cusimano (Torvergata University), Valerio Baiocchi (Sapienza University of Rome), Giovanni Alberto Della Sala (Torvergata University), Paolo Masci (Torvergata University), Simone Satriano (Tor Vergata University), Angelica Fiorillo (Tor Vergata University) and Luca Alessandri (Sapienza University of Rome)

09:00 - 10:45

Room: Meeting Room 101

**Session 4.2 - Vibroacoustic metrological characterization for archaeology and cultural heritage**

**Chairs:** Fabrizio Barone, Marco Casazza

**09:00 Background vibroacoustic landscape characterization of San Pietro a Corte archaeological site, Salerno (Italy)**

Marco Casazza (Università degli Studi di Salerno), Rosa Fiorillo (Università degli Studi di Salerno), Armando Di Maio (Studio di Architettura Di Maio), Salvatore Antonio Fornaro (Studio di Architettura Fornaro) and Fabrizio Barone (University of Salerno)

**09:15 The bell sound as a vibro-acoustic mean of communication among Medieval monasteries in the areas of Salerno and Avellino (S Italy)**

Rosa Fiorillo (Università degli Studi di Salerno), Marco Casazza (Università degli Studi di Salerno) and Fabrizio Barone (Università degli Studi di Salerno)

**09:30 Vibroacoustic structural interaction between a bell sound source and a historic bell tower**

Elide Natri (University of Salerno) and Paolo Todisco (University of Salerno)

**09:45 Tuning temperament comparison between two medieval bells in Salerno (Italy)**

Marco Casazza (University of Salerno), Antonio Donnarumma (University of Salerno), Rosa Fiorillo (University of Salerno) and Fabrizio Barone (University of Salerno)

**10:00 A geometrical physics interpretative model for the vibroacoustic intangible heritage of Doric temples**

Fabrizio Barone (University of Salerno) and Marco Casazza (Università degli Studi di Salerno)

**10:15 Medieval vibro-acoustic landscape as a cohesive element for the Susa valley (NW Italy) borderland along the via Francigena**

Marco Casazza (Università degli Studi di Salerno), Claudio Caserta (Università degli Studi di Salerno), Rosa Fiorillo (Università degli Studi di Salerno) and Fabrizio Barone (Università degli Studi di Salerno)

**10:30 Improved feature detection in laser Doppler vibrometer scans of frescoes using k space filtering: application at the Senate Reception Room in the US Capitol**

Barbara Marchetti (Università degli Studi eCampus), Amelia V. Ware (Naval Research Laboratory Washington DC), Joseph Vignola (Catholic University of America), Diego Turo (Catholic University of America), Nicholas Delucia (Catholic University of America), Nicholas Cangemi (Catholic University of America), Jason Davison (Catholic University of America) and Francesco Corvaro (Università Politecnica delle Marche)

09:00 - 10:30

Room: Meeting Room 102

**Session 4.3 - Time through colors: past present and future of pigments and paintings, exploring diagnostics, dating and conservation in cultural heritage**

**Chairs:** Stefania Porcu, Daniele Chiriu

**09:00 The shades in the frescos of Volsinii: study of ancient blue pigments by Fiber Optic Reflectance Spectroscopy**

Danilo Dini (Sapienza University of Rome), Alessandro Ciccola (Sapienza University of Rome), Alessandro Nucara (Sapienza University of Rome) and Paolo Binaco (Museo territoriale Lago di Bolsena)

**09:15 A fuzzy model for predicting kinetic decay of earthen painted plasters in cultural heritage**

Marta Cappai (University of Cagliari) and Giorgio Pia (University of Cagliari)

**09:30 Painting techniques on volcanic stone in Neolithic-Enolithic times (IV-III millennia BC): petrographic features of rock-substrate and composition of pigments**

Stefano Columbu (University of Cagliari), Nicola Norio (University of Cagliari), Giovanni Brodu (University of Cagliari), Silvio Ferrero (University of Cagliari), Daniele Chiriu (University of Cagliari), Stefania Porcu (University of Cagliari) and Anna Depalmas (University of Sassari)

**09:45 Methodologies for diagnostics and conservation in the Catacombs of Saint Antiochus (Sant'Antioco-Sardinia)**

Rossana Martorelli (University of Cagliari (Italy)), Antonio Francesco Vacca (Trowel Società cooperativa. Lavori archeologici e monumentali) and Valentina Notari (Tecnico del restauro).

**10:00 Influences of vine black on optical response of pigments mixtures**

Salvatore Gallo (University of Catania), Giuseppe Stella (University of Catania) and Anna Maria Gueli (University of Catania)

**10:15 Effect of UV-A and UV-B radiation on silicate-based paints: fresco and nano-silica-based mock-ups**

Daniel Jiménez Desmond (University of Vigo), José Santiago Pozo-Antonio (University of Vigo) and Anna Arizzi (University of Granada)

09:00 - 10:30

Room: Meeting Room 103

**Session 4.4 - Non-invasive methods for analysis and diagnostic in the field of cultural heritage - PART I**

**Chairs:** Paola Fermo, Giuseppe Politi

**09:00 Analysis of Byzantine gold coins**

Kasper Mayntz Paasch (University of Southern Denmark)

**09:15 Effect of ambient light on Raman spectra**

Anna Maria Gueli (University of Catania), Simone Cerruto (University of Catania), Francesco Fiorino (University of Catania), Rosaria Galvagno (University of Catania), Salvatore Gallo (University of Catania), Giuseppe Politi (University of Catania) and Giuseppe Stella (University of Catania)

**09:30 Non-destructive imaging techniques for the characterisation of carbonised Herculaneum papyri**

Sofia Ceccarelli (Istituto di Scienze del Patrimonio Culturale, CNR, Italy), Sabrina Samela (Istituto di Scienze del Patrimonio Culturale, CNR, Italy; Politecnico di Milano, Italy), Teresa Cacace (Istituto di Scienze del Patrimonio Culturale, CNR, Italy), Sveva Longo (Istituto di Scienze del Patrimonio Culturale, CNR, Italy), Claudia Caliri (Istituto di Scienze del Patrimonio Culturale, CNR, Italy), Danilo Paolo Pavone (Istituto di

Scienze del Patrimonio Culturale, CNR, Italy), Francesca Rosi (Istituto di Scienze e Tecnologie Chimiche, CNR, Italy), Florence Liggins (ISAAC, Nottingham Trent University, United Kingdom), Patrick Atkinson (ISAAC, Nottingham Trent University, United Kingdom), Chi Shing Cheung (ISAAC, Nottingham Trent University, United Kingdom), Haida Liang (ISAAC, Nottingham Trent University, United Kingdom), Francesco Paolo Romano (Istituto di Scienze del Patrimonio Culturale, CNR, Italy), Costanza Miliani (Istituto di Scienze del Patrimonio Culturale, CNR, Italy) and Graziano Ranocchia (Università di Pisa; Ist. Scienze del Patrimonio Culturale, CNR, Italy)

#### **09:45 Pulsed thermography for the analysis of the bronze statue “Il Togato”.**

Giovanni Caruso (Institute for Heritage Science - Italian National Research Council), Marco Ferretti (Institute for Heritage Science - Italian National Research Council), Loredana Luvidi (Institute for Heritage Science - Italian National Research Council), Annalaura Casanova Muncicchia (Institute for Heritage Science - Italian National Research Council), Eleni Kostantakopoulou (Aristotle University of Thessaloniki) and Noemi Orazi (University of Rome Tor Vergata)

#### **10:00 On-site Computed Tomography analysis of Mesoamerican turquoise mosaics at Museo delle Civiltà (Rome)**

Nayyab Amjad (University of Bologna), Maria Pia Morigi (University of Bologna), Cecilia Riccardizi (University of Bologna), Matteo Bettuzzi (University of Bologna), Rosa Brancaccio (University of Bologna), Marco Seracini (University of Bologna), Yiran Lu (University of Bologna), Davide Domenici (University of Bologna) and Loretta Paderni (Museo delle Civiltà)

#### **10:15 The meteoritic origin of iron artifacts from the High Atlas - Morocco**

Lahcen Ouknine (University Ibn Zohr, Agadir), Abderrahmane Ibhi (University Ibn Zohr, Agadir), Hassan Nachit (University Ibn Zohr, Agadir), Fouad Khiri (University Ibn Zohr, Agadir), Olga De Pascale (CNR - Istituto per la Scienza e Tecnologia dei Plasmi (ISTP)) and Giorgio Senesi (CNR - Istituto per la Scienza e Tecnologia dei Plasmi (ISTP))

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10:30 - 11:15 *University of Malta - Valletta Campus*

**COFFEE BREAK - POSTER SESSION #1**

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#### **PS1-1 Preventive Geophysical Surveys in an Urban Area**

Lara De Giorgi (ISPC-CNR), Chiara Torre (University of Catania), Dora Francesca Barbolla (ISPC-CNR) and Giovanni Leucci (ISPC-CNR)

#### **PS1-2 The “Grotta della Poesia” (Lecce, Italy): Study the conservation degree using geophysical methods**

Lara De Giorgi (ISPC-CNR), Dora Francesca Barbolla (ISPC-CNR), Chiara Torre (University of Catania), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR) and Giovanni Leucci (ISPC - CNR)

#### **PS1-3 Micro-Geophysical Investigations for Structural Diagnostics**

Lara De Giorgi (ISPC-CNR), Chiara Torre (University of Catania), Dora Francesca Barbolla (ISPC-CNR) and Giovanni Leucci (ISPC-CNR)

#### **PS1-4 Ground Penetrating Radar Surveys on Frescoes**

Vincenzo Di Fiore (ISPC-CNR), Michele Punzo (ISPC-CNR), Daniela Tarallo (ISPC-CNR), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR) and Giovanni Leucci (ISPC-CNR)

#### **PS1-5 Geophysical surveys to improve the knowledge of the S. Salvatore fortress structure (Messina, Italy)**



Fabio Giannino (IDS Georadar), Lara De Giorgi (ISPC-CNR), Chiara Torre (University of Catania), Dora Francesca Barbolla (ISPC-CNR) and Giovanni Leucci (ISPC-CNR)

**PS1-6 Safeguard of Submerged Cultural Heritage: An Overview of SOUTH project and first set-up of laboratory trial**

Michela Ricca (University of Calabria), Felice Sfravara (University of Messina), Mauro Francesco La Russa (University of Calabria), Elvira Brunelli (University of Calabria), Fabio Bruno (University of Calabria), Maria Alberghina (University of Calabria), Giuseppe Montana (University of Palermo), Valentina Catania (University of Palermo) and Luciana Randazzo (University of Palermo)

**PS1-7 The submerged remains of the ancient port of Egnatia (Apulia, South Italy): preliminary data from construction materials and decay assessment**

Chiara Torre (University of Catania), Michela Ricca (University of Calabria), Luciana Randazzo (University of Palermo), Barbara Davide Petriaggi (Istituto Centrale per il Restauro (ICR)) and Mauro Francesco La Russa (University of Calabria)

**PS1-8 A simulation-based approach for optimizing underwater manipulation using augmented reality and stereovision**

Michele Calabria (University of Calabria), Vincenzo Rino (University of Calabria), Luigi Scarfone (University of Calabria), Umberto Severino (University of Calabria), Antonio Lagudi (University of Calabria), Fabio Bruno (University of Calabria) and Loris Barbieri (University of Calabria)

**PS1-9 Wall and floor paintings in the Sasanian city of Ardaxšir Khwarrah, near Firuzabad (southern Iran): executive technique and conservation issues**

Maria Letizia Amadori (University of Urbino), Valeria Mengacci (University of Urbino), Alireza Askari Chaverdi (Shiraz University), Pierfrancesco Callieri (University of Bologna), Alessia Andreotti (University of Pisa), Yoshifumi Maekawa (Tokyo National Research Institute for Cultural Properties) and Parviz Holakoei (Art University of Isfahan)

**PS1-10 Bridging Gaps in Blue Expertise through a Triple Transition Training Model for the UCH field: new challenges in uBlueTec project**

Loris Barbieri (University of Calabria), Michela Ricca (University of Calabria), Fabio Bruno (University of Calabria), Mauro La Russa (University of Calabria), Kalliopi Baika (Aix-Marseille University, CCJ), Fausto Ferreira (Laboratory for Underwater Systems and Technologies (LABUST), Faculty of Electrical Engineering and Computing), Polyvios Raxis (ATLANTIS Consulting), Catia Nunes (Associacao Natureza Portugal (ANP) | World Wide Fund (WWF)), Madalin Silion (BEIA Consult International) and Wendy Lenarduzzi (Maritime Technology Cluster FVG (mareFVG))

**PS1-11 Vibroacoustic fingerprint of a Catholic sanctuary: the case of Santa Maria di Monserrato in Vallelonga (Italy)**

Fabrizio Barone (University of Salerno), Armando Di Maio (Studio di Architettura Di Maio, Napoli) and Marco Casazza (Università degli Studi di Salerno)

**PS1-12 Archaeo-vibroacoustic survey of a medieval cave church with low-cost sensors**

Marco Casazza (Università degli Studi di Salerno) and Fabrizio Barone (University of Salerno)

**PS1-13 Reconstructive study of the fortified site of Monte Crocchia (Basilicata, Italy)**

Maurizio Delli Santi (ISPC-CNR) and Massimiliano Passarelli (Università degli Studi di Foggia)

#### **PS1-14 Multi-scale diagnostic observation for buildings of conservation: a project idea**

Monia Vadrucchi (Italian Space Agency), Enrico Trogu (Archivio di Stato di Cagliari), Giulia Doni (Archivio di Stato di Cagliari), Stochino (Soprintendenza Archeologia, Belle Arti e Paesaggio Citta' Metropolitana di Cagliari province Oristano Sud Sardegna), Tapete (Italian Space Agency), Virelli (Italian Space Agency) and Cicero (University of Rome, Tor Vergata)

#### **PS1-15 Statistical processing of IR data for the definition of an integrated protocol in the analysis of geomaterials**

Laura Medeghini (Sapienza University of Rome), Melania Di Fazio (Sapienza University of Rome), Laura Calzolari (Sapienza University of Rome), Carla Rea (Sapienza University of Rome), Sara Capriotti (Sapienza University of Rome) and Silvano Mignardi (Sapienza University of Rome)

#### **PS1-16 Comparison of the Radon Exhalation Rate of building materials of particular historical and artistic interest: preliminary results on Ignimbrite Campana, Modica stone and Mendicino stone.**

Francesco Caridi (University of Messina), Daniele Chiriu (University of Cagliari), Stefania Da Pelo (Università degli Studi di Cagliari), Giuliana Faggio (DIIES, Università "Mediterranea" Calabria), Michele Guida (DIEM, Università degli Studi di Salerno), Domenico Majolino (Università degli Studi di Messina), Giacomo Messina (DIIES, Università "Mediterranea" Calabria), Maurizio Ponte ((DiBEST), Università della Calabria), Silvestro Antonio Ruffolo ((DiBEST), Università della Calabria) and Valentina Venuti (Università degli Studi di Messina)

#### **PS1-17 Non-invasive integrated diagnostics for the conservation of wall paintings at the Complex of Santa Maria la Nova in Naples**

Alessandra Rocco (CNR- istituto Nazionale di Ottica), Valentina Di Sarno (National Institute of Optics, National Research Council (INO-CNR), Pozzuoli, Italy), Maria Rosaria Vigorito (University Suor Orsola Benincasa of Naples, Italy), Monica Sederino (University Suor Orsola Benincasa of Naples, Italy), Emanuela Lanzara (University Suor Orsola Benincasa of Naples, Italy), Paola Cennamo (University Suor Orsola Benincasa of Naples, Italy), Giorgio Trojsi (University Suor Orsola Benincasa of Naples, Italy), Andrea Carpentieri (Federico II University, Italy), Raffaella Fontana (National Research Council — National Institute of Optics (CNR-INO)), Giuseppe Reale (Università Telematica Pegaso) and Pasquale Rossi (University Suor Orsola Benincasa of Naples, Italy)

#### **PS1-18 Employing Gaussian Splatting on Local Devices for Surveying and Documenting Cultural Heritage**

Maurizio Peticarini (Università degli Studi di Padova), Stefano Zaggia (Università degli Studi di Padova) and Andrea Giordano (Università degli Studi di Padova)

#### **PS1-19 Assessing the reliability of a multianalytical approach for the characterisation of ancient pigments in malacofaunal containers**

Chiara Andrea Lombardi (Università degli Studi di Milano), Andrea Zerboni (Università degli Studi di Milano), Andrea Bergomi (Università degli Studi di Milano), Valeria Comite (Università degli Studi di Milano), Mattia Borelli (Università degli Studi di Milano), Michele Degli Esposti (Institute of Mediterranean and Oriental cultures, Polish Academy of Sciences), Paolo Lotti (Università degli Studi di Milano), Davide Comboni (Università degli Studi di Milano), Gaia Crippa (Università degli Studi di Milano), Paula Carmona-Quiroga (Instituto de Química Física Blas Cabrera, IQF-CSIC), Laura Maestro-Guijarro (Instituto de Química Física Blas Cabrera, IQF-CSIC), Mohamed Oujja (Instituto de Química Física Blas Cabrera, IQF-CSIC), Ana Crespo (Instituto de Estructura de la Materia, IEM-CSIC), Santiago Sanchez-Cortes (Instituto de Estructura de la Materia, IEM-CSIC), Marta Castillejo (Instituto de Química Física Blas Cabrera, IQF-CSIC) and Paola Fermo (Università degli Studi di Milano)

11:15 - 12:30

*Aula Magna*

**PLENARY SESSION - KEYNOTE SPEAKER**

**Chair:** Reuben Grima, *University of Malta*

## **How can effective design of protective structures enhance archaeological preservation in situ?**

*Zaki Aslan, American University of Sharjah*

11:15 - 12:30

*Aula Magna*

**ROUND TABLE**

**Chair:** Reuben Grima, *University of Malta*

## **Evaluating the performance of protective shelters: challenges and future directions**

12:30 - 14:00

*University of Malta - Valletta Campus*

**LUNCH - POSTER SESSION #1 (CONT.)**

14:00 - 15:15

*Room: Aula Magna*

**Session 5.1 - Damage and Radiological Risk Assessment: Diagnosis and Monitoring for the Restoration, Preventive Conservation, Usability and Maintenance of Cultural Heritage**

**Chairs:** Francesco Caridi, Simona Mancini

### **14:00 Natural radioactivity content in the “Pietra di Modica” stone and radiological health risk assessment: a case study**

Francesco Caridi (University of Messina), Daniele Chiriu (University of Cagliari), Stefania Da Pelo (University of Cagliari), Giuliana Faggio ("Mediterranean" University of Reggio Calabria), Michele Guida (University of Salerno), Domenico Majolino (University of Messina), Giacomo Messina ("Mediterranean" University of Reggio Calabria), Maurizio Ponte (University of Calabria), Silvestro Antonio Ruffolo (University of Calabria) and Valentina Venuti (University of Messina)

### **14:15 Monitoring protocol for preliminary indoor radon surveys in cultural heritage sites. A case study**

Simona Mancini (University of salerno), Francesca Morello (Laboratory Ambients and Radiations (AmbRa)), Albina Cuomo (C.U.G.RI), Domenico Guida (university of Salerno), Serpil Aközcan Pehlivanoglu (Kirkklareli University), Nataša Todorovic (university of Novi Sad) and Michele Guida (university of salerno)

### **14:30 Comprehensive Analysis of Lecce and Modica Stones Using X-Ray Diffraction and Raman Spectroscopy**

Giuliana Faggio (Università Mediterranea), Giacomo Messina (Università Mediterranea), Daniele Chiriu (Università di Cagliari), Stefania Da Pelo (Università di Cagliari), Michele Guida (Università di Salerno), Domenico Majolino (Università di Messina), Maurizio Ponte (Università della Calabria), Silvestro Antonio Ruffolo (Università della Calabria), Valentina Venuti (Università di Messina) and Francesco Caridi (Università di Messina)

#### **14:45 Radiological and structural analysis of materials used in cultural heritage in the Campania region, Southern Italy**

Serpil Akozcan Pehlivanoglu (Kirkklareli University), Simona Mancini (University of Salerno), Michele Guida (University of Salerno), Natasa Todorovic (University of Novi Sad), Jovana Nikolov (University of Novi Sad), Andrej Vraničar (University of Novi Sad) and Bojan Miljevic (University of Novi Sad)

#### **15:00 PRIN 2022 PNRR ATHENA-meeting among project partners**

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*14:00 - 15:15*      *Room: Meeting Room 101*  
**Session 5.2 - Engineering the Future, Honoring the Past: Cultural Heritage in Civil Engineering**  
**Chairs:** Alessio Cascardi, Salvatore Verre

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#### **14:00 Seismic assessment of an existing R.C. irregular building by Non-Linear Static Analysis Extended**

Fabrizio Comodini (eCampus University), Riccardo Panico (eCampus University) and Salvatore Verre (eCampus University)

#### **14:15 In-Plane Seismic Behavior of Historic Masonry Façades: Modeling Tie-Rods with EFM and Rigid Block Approaches**

Generoso Vaiano (Pegaso University), Isabella Elia (University of Bari), Raimondo Luciano (Parthenope University of Naples) and Francesco Fabbrocino (Pegaso University)

#### **14:30 Strengthening of ceramic tubules-based vault: exploring CRM stiffening technique**

Alessio Cascardi (University of Calabria), Salvatore Verre (University eCampus) and Francesco Micelli (University of Salento)

#### **14:45 A kinematic-aimed solution for the instability of masonry bell-tower: from design to application**

Fabrizio Comodini (eCampus University), Riccardo Panico (eCampus University), Alessio Cascardi (University of Calabria) and Salvatore Verre (eCampus University)

#### **15:00 Enhancing Seismic Resilience of RC Columns using Geopolymer-based Textile Reinforced Mortar**

Shaikh K John (College of Engineering Trivandrum, Thiruvananthapuram), Alessio Cascardi (University of Calabria, Cosenza), Salvatore Verre (University eCampus, Novedrate) and Yashida Nadir (College of Engineering Trivandrum, Thiruvananthapuram)

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*14:00 - 15:15*      *Room: Meeting Room 102*  
**Session 5.3 - Integrated Methods, Theories and Applications for Structural Health Monitoring and Assessment of Ancient Constructions - PART I**  
**Chairs:** Pietro Meriggi, Vittorio Paris

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**14:00 Analysis of Motion Magnified videos for the damage assessment of a rubble masonry building under shaking table testing**

Vincenzo Fioriti (ENEA), Antonino Cataldo (ENEA), Chiara Ormando (ENEA), Alessandro Colucci (ENEA), Pietro Meriggi (University of Roma Tre), Stefano De Santis (University of Roma Tre), Domenico Liberatore (University of Rome La Sapienza), Gianmarco de Felice (University of Roma Tre), Alessandro Vari (Edil Cam Sistemi s.r.l.) and Ivan Roselli (ENEA)

**14:15 Dynamic assessment of damage in FRCM reinforced masonry vaulted structures**

Anna Castellano (Polytechnic University of Bari), Aguinardo Fraddosio (Polytechnic University of Bari), Nataliia Pinchuk (Polytechnic University of Bari), Giovanni Santoro (Polytechnic University of Bari) and Mario Daniele Piccioni (Polytechnic University of Bari)

**14:30 Searching for the undeformed geometry of the San Tomè Rotunda dome**

Vittorio Paris (University of Bergamo), Virna Maria Nannei (University of Bergamo), Giuseppe Ruscica (University of Bergamo), Davide Prati (University of Bergamo) and Giulio Mirabella Roberti (University of Bergamo)

**14:45 An interdisciplinary multi-sensor survey approach for the structural analysis of ancient constructions: the case study of the Circus of Maxentius in Rome**

Pietro Meriggi (Roma Tre University), Luca Bianchini Ciampoli (Roma Tre) and Roberta Santarelli (Sapienza University of Rome)

**15:00 The Virtual Reconstruction of Archaeological Architecture: the Case Study of Circus of Maxentius in Rome**

Roberta Santarelli (Sapienza Università di Roma), Alessandra Ten (Sapienza Università di Roma) and Maria Ersilia Loreti (Sovrintendenza Capitolina ai Beni Culturali)

14:00 - 15:15

*Room: Meeting Room 103*

**Session 5.4 - Non-invasive methods for analysis and diagnostic in the field of cultural heritage - PART II**

**Chairs:** Paola Fermo, Giuseppe Politi

**14:00 Insights into early life of a child in Late Bronze Age Cyprus (1630-1150 BC) through Virtual Histology based on microfocus 3D X-ray imaging**

Simone Lemmers (Elettra-Sincrotrone Trieste SCpA), Martina Trocchi (Sapienza University of Rome, Italy), Alessia Nava (Sapienza University of Rome, Italy), Peter Fischer (University of Gothenburg, Sweden), Bianca Casa (The Cyprus Institute, Cyprus), Natalie Branca (The Cyprus Institute, Cyprus), Kirsi Lorentz (The Cyprus Institute, Cyprus), Davorka Radovčić (Croatian Natural History Museum, Croatia), Luca Bondioli (University of Padua, Italy), Diego Dreossi (Elettra-Sincrotrone Trieste SCpA) and Lucia Mancini (ZAG - Slovenian National Building and Civil Engineering Institute, Slovenia)

**14:15 Preliminary study of Parchment, inks and lead seals of ancient PAPal BuLLs from the historical archive of Santuario della Beata Vergine di Saronno (APPALLA project)**

Paola Fermo (University of Milan), Anna Gueli (University of Catania), Sabrina Grassini (Politecnico di Torino), Leila Es Sebar (Politecnico di Torino), Federico Di Iorio (Politecnico di Torino), Giuseppe Politi (University of Catania), Q Lemassond (Centre de Recherche et de Restauration des Musées de France), B Moignard (Centre

de Recherche et de Restauration des Musées de France), C Pacheco (Pacheco) and L Pichon (Centre de Recherche et de Restauration des Musées de France)

#### **14:30 Experimental Evaluation of a Microwave Tomography System for on-site measurements in archeological sites**

Emanuela Proietti (Consiglio nazionale delle Ricerche-Istituto per la Microelettronica e Microsistemi), Giovanni Capoccia (Consiglio nazionale delle Ricerche-Istituto per la Microelettronica e Microsistemi), Elisa Fontana (Università degli studi di Roma Tor Vergata), Barbara Caponera (Istituto VA-VE Villa Adriana e Villa d'Este) and Romolo Marcelli (Consiglio nazionale delle Ricerche-Istituto per la Microelettronica e Microsistemi)

#### **14:45 Portable X-ray CT system for on-site Cultural Heritage analysis: the case study of the cornetto**

Cecilia Riccardizi (University of Bologna), Matteo Bettuzzi (University of Bologna), Nayyab Amjad (University of Bologna), Zahra Beidaghi (University of Bologna), Rosa Brancaccio (University of Bologna), Maria Pia Morigi (University of Bologna), Paolo Ferrari (ENEA, Radiation Protection Institute), Pietro Modesti (B. Maderna-G.Lettimi State Music Conservatory) and Claudio Canevari (University of Pavia)

#### **15:00 Monitoring of thermal and colorimetric changes in outdoor ex-posed acrylic and alkyd paints: influence of environment, paint composition and wall orientation**

Raquel Pérez Orozco (Universidade de Vigo), José Santiago Pozo-Antonio (Universidade de Vigo), Moises Cordeiro Costas (Universidade de Vigo), Javier López Bértolo (Universidade de Vigo), Pablo Eguía Oller (Universidade de Vigo) and Teresa Rivas Brea (Universidade de Vigo)

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15:15 - 15:45 *University of Malta - Valletta Campus*  
**COFFEE BREAK**

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15:45 - 17:00 *Room: Aula Magna*  
**Session 6.1 - Building Materials and Decay Assessment for On-Land and Underwater Cultural Heritage (CH)**  
**Chairs:** Natalia Rovella, Michela Ricca, Luciana Randazzo

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#### **15:45 Bacterial communities of three distinctively damaged mosaics from the coastal Calabrian area and evaluation of their biotechno-logical potential for restoration**

Costanza Diliberto Cascio (University of Calabria), Silvestro Ruffolo (University of Calabria), Andrea Macchia (University of Calabria), Valentina Catania (University of Palermo) and Mauro Francesco La Russa (University of Calabria)

#### **16:00 Assessing the use of Laser Induced Breakdown Spectroscopy for the stratigraphic analysis of black crusts**

Andrea Bergomi (Università degli Studi di Milano), Valeria Comite (Università degli Studi di Milano), Christian Conforti (Università degli Studi di Milano), Paula Maria Carmona Quiroga (Instituto de Quimica Fisica Blas Cabrera IQF-CSIC), Laura Maestro-Guijarro (Instituto de Quimica Fisica Blas Cabrera IQF-CSIC), Mohamed Oujja (Instituto de Quimica Fisica Blas Cabrera IQF-CSIC), Ana Crespo (Instituto de Estructura de la Materia IEM-CSIC), Santiago Sanchez-Cortes (Instituto de Estructura de la Materia IEM-CSIC), Chiara Andrea Lombardi (Università degli Studi di Milano), Mattia Borelli (Università degli Studi di Milano), Marta Castillejo (Instituto de Quimica Fisica Blas Cabrera IQF-CSIC) and Paola Fermo (Università degli Studi di Milano)

**16:15 Characterization of the stone tesserae from the Four Petal Flowers Mosaic in the Roman Villa at Palazzi di Casignana (Reggio Calabria, Italy)**

Maria Antonietta Zicarelli (University of Calabria), Donatella Barca (University of Calabria), Mauro Francesco La Russa (University of Calabria), Marianna Musella (University of Calabria), Luciana Randazzo (University of Palermo), Michela Ricca (University of Calabria) and Natalia Rovella (University of Calabria)

**16:30 Smart buoy solutions for monitoring environmental conditions in Underwater Cultural Heritage sites**

Santina Fortuna (University of Calabria), Christian Sollazzo (University of Calabria), Luigi Scarfone (University of Calabria), Maurizio Muzzupappa (University of Calabria), Filippo Cucinotta (University of Messina) and Loris Barbieri (University of Calabria)

**16:45 A comparison of different modulation strategies for inspecting fresco paintings using thermography**

Rocco Zito (DIMES Dept. - University of Calabria), Stefano Laureti (DIMES Dept. - University of Calabria), Maria Antonietta Zicarelli (DIBEST Dept. - University of Calabria), Mauro Francesco La Russa (DIBEST Dept. - University of Calabria) and Marco Ricci (DIMES Dept. - University of Calabria)

15:45 - 16:30

*Room: Meeting Room 101*

**Session 6.2 - Cutting-edge approaches and innovations in Terahertz applications for Cultural Heritage**

**Chairs:** Massimo Petrarca, Anna Candida Felici

**15:45 Terahertz time domain spectroscopy (THz-TDS): dataset development and applications for the discrimination of painting materials**

Candida Moffa (Sapienza, University of Rome, Italy), Camilla Merola (Sapienza, University of Rome, Italy), Giuseppe Zollo (Sapienza, University of Rome, Italy), Luigi Palumbo (Sapienza, University of Rome, Italy), Anna Candida Felici (Sapienza, University of Rome, Italy) and Massimo Petrarca (Sapienza, University of Rome, Italy)

**16:00 Pigments, minerals, and copper-corrosion products: Terahertz continuous wave (THz-CW) spectroscopic characterization of antlerite and atacamite**

Camilla Merola (Sapienza, University of Rome), Candida Moffa (Sapienza, University of Rome), Fernando Junior Piamonte Magboo (Sapienza, University of Rome), Enrica Chiadroni (Sapienza, University of Rome), Lucia Giuliano (Sapienza, University of Rome), Alessandro Curcio (National Laboratory of Frascati - LNF-INFN), Luigi Palumbo (Sapienza, University of Rome), Anna Candida Felici (Sapienza, University of Rome) and Massimo Petrarca (Sapienza, University of Rome)

**16:15 THz Time-Domain transmission and reflection imaging for art material analysis: preliminary results @E-RIHS.it**

Valentina Di Sarno (INO-CNR (Pozzuoli)), Sonia Zappia (IREA-CNR), Emma Vannini (INO-CNR (Firenze)), Alice Dal Fovo (INO-CNR (Firenze)), Alessandra Rocco (INO-CNR (Pozzuoli)), Pasquale Maddaloni (INO-CNR (Pozzuoli)), Raffaella Fontana (INO-CNR (Firenze)) and Ilaria Catapano (IREA-CNR)

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15:45 - 16:15 *Room: Meeting Room 102*  
**Session 6.3 A - Integrated Methods, Theories and Applications for Structural Health Monitoring and Assessment of Ancient Constructions - PART II**  
**Chairs:** Pietro Meriggi, Vittorio Paris

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**15:45 A new approach for the identification of mode shapes of slender masonry constructions**

Domenico Camassa (Polytechnic University of Bari), Anna Castellano (Polytechnic University of Bari), Aginaldo Fraddosio (Polytechnic University of Bari) and Mario Daniele Piccioni (Polytechnic University of Bari)

**16:00 Shear bond tests on a novel integrated reinforcement-monitoring system for architectural heritage**

Giovanni Moretti (Roma Tre University, Italy), Michele Arturo Caponero (ENEA, Frascati Research Centre, Italy), Sara Fares (Roma Tre University, Italy), Cristina Mazzotta (ENEA, Frascati Research Centre, Italy), Diego Dell'Erba (Ingegneria Integrata srl) and Stefano De Santis (Roma Tre University, Italy)

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16:30 - 17:00 *Room: Meeting Room 102*  
**Session 6.3 B - Advancements in Chromatographic and Mass Spectrometric Techniques for Cultural Heritage Studies**  
**Chair:** Maria Perla Colombini

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**16:30 Unveiling the Secrets of Ancient Technologies: A Multianalytical Approach for the Comprehensive Characterization of Resinous Substances Employed as Adhesives in Archaeological Finds**

Irene Bertelli (Università la Sapienza di Roma) and Erika Ribechini (Università di Pisa)

**16:45 The violet shades of logwood-based inks: investigating the influence of inorganic salts by spectroscopy and mass spectrometry**

Adele Ferretti (University of Pisa, Italy), Eva Vermeersch (Ghent University, Belgium), Francesca Sabatini (University of Milano-Bicocca, Italy), Peter Vandenabeele (Ghent University, Belgium) and Ilaria Degano (University of Pisa, Italy)

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16:30 *University of Malta - Valletta Campus*  
**TUTORIAL - GPR Tutorial: Let's play with the high frequencies**  
Maurizio Gabriele Porcu, CODEVINTEC

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20:00 *Casino Maltese*  
**GALA DINNER**

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## Technical Program - Wednesday, October 9

08:30 - 12:00 *University of Malta - Valletta Campus*  
**REGISTRATIONS**

09:00 - 10:00 *Room: Aula Magna*  
**Session 7.1 - Tracing Time's Tapestry: Remote Sensing, 3D Imaging, and Mapping as Keys to Malta's Archaeological and Cultural Heritage**  
**Chair:** Davide Tanasi

**09:00 3D Digitization and Archaeoastronomical Exploration: Preserving Megalithic Heritage in the Maltese Archipelago**

Dario Calderone (Ludwig Maximilians Universität, Munich), Paolino Trapani (University of Catania), Frederick Pirone (New College of Florida), Katya Stroud (Heritage Malta), David Cardona (Heritage Malta) and Davide Tanasi (University of South Florida)

**09:15 Illuminating the Past: Integrative 3D Mapping and Chemical Analysis of Prehistoric Cave Art in Sicily and Malta**

Davide Tanasi (University of South Florida), Andrea Vianello (University of South Florida), Gianpiero Di Maida (CCEHN – Lower Saxony State Office for Cultural Heritage), Robert Tykot (University of South Florida), Dario Calderone (LMU Munich), Paolino Trapani (University of Catania), Stephan Hassam (University of South Florida), Nicholas Vella (University of Malta), Eleanor Scerri (Max Planck Institute of Geoanthropology), Ritienne Gauci (University of Malta) and Huw Groucutt (University of Malta)

**09:30 Remembering the Oublette: Digital Works in Prisons in Malta and Sicily by the Central Mediterranean Penal Heritage Project (CMPHP)**

Alexander Anthony (Syracuse University), Stephan Hassam (Randolph-Macon College) and Davide Tanasi (University of South Florida)

**09:45 Remote Sensing and 3D Surveying in Endangered Sites. Strategies for monitoring, preservation and fruition of the Sanctuary of Ras il-Wardija, Gozo (Malta)**

Federica Spagnoli (Sapienza University of Rome), Giuliana Bonanno (Sapienza University of Rome), Kevin Borda (Superintendence of Cultural Heritage), David Cardona (Heritage Malta), Noline Sagona (Heritage Malta), Sebastiano D'Amico (University of Malta) and Emanuele Colica (University of Malta)

09:00 - 10:30 *Room: Meeting Room 101*  
**Session 7.2 - How To Preserve Outdoor Cultural Heritage: State-Of-Art, Challenges And New Perspectives**  
**Chairs:** Valentina Venuti, Paola Cardiano

**09:00 Combined XRF and  $\mu$ -Raman diagnostic analysis of a XVII century Immacolata Concezione painting (Messina, Italy)**

Giuseppe Paladini (Università degli Studi di Messina, Italy), Francesco Caridi (Università degli Studi di Messina, Italy), Luigi Giacobbe (Soprintendenza per i Beni Culturali e Ambientali di Messina, Italy), Sergio

Agresta (Libero professionista, Messina, Italy), Domenico Majolino (Università degli Studi di Messina, Italy) and Valentina Venuti (Università degli Studi di Messina, Italy)

**09:15  $\mu$ -Raman Analysis of Roman Age mosaic tesserae from the Insula IV of the archaeological area of Tindari (Sicily, Southern Italy)**

Giuseppe Paladini (Università degli Studi di Messina, Italy), Francesco Caridi (Università degli Studi di Messina, Italy), Domenico Majolino (Università degli Studi di Messina, Italy), Sebastiano D'Amico (Università di Malta, Malta), Maria Grazia Murabito (Assessorato Beni Culturali e dell'Identità Siciliana - Parco Archeologico di Tindari, Messina, Italy), Eleonora Giordano (Assessorato Beni Culturali e dell'Identità Siciliana - Parco Archeologico di Tindari, Messina, Italy) and Valentina Venuti (Università degli Studi di Messina, Italy)

**09:30 New investigations at the Theatre of Tindari: Samothrace Project, methods and preliminary results**

Marco Sfacteria (University of Messina), Stefania Tuccinardi (University of Messina) and Marta Venuti (University of Messina)

**09:45 Hydraulic hardening of low T fired bricks with dolomite addition: sustainability while preserving the built heritage in humid areas**

Elena Mercedes Pérez-Monserrat (CICECO-Aveiro Institute of Materials, University of Aveiro), Marinélia Capela (CICECO-Aveiro Institute of Materials, University of Aveiro), Marco Oliveira (CICECO-Aveiro Institute of Materials, University of Aveiro) and João Labrincha (CICECO-Aveiro Institute of Materials, University of Aveiro)

**10:00 Multi-technique diagnostic analysis of natural and artificial lithic fragments from the theatre of the archaeological area of Tindari (Sicily, Southern Italy)**

Giuseppe Paladini (University of Messina), Francesco Caridi (University of Messina), Domenico Majolino (University of Messina), Marco Sfacteria (University of Messina), Stefania Tuccinardi (University of Messina), Marta Venuti (University of Messina), Gabriele Lando (University of Messina), Paola Cardiano (University of Messina) and Valentina Venuti (University of Messina)

**10:15 Efficacy evaluation of a new nanolime for extensive and eco-sustainable consolidations of architectonic surfaces. The case study of the church of St. Francesco all'Immacolata in Ortigia (Italy)**

Giuliana Taglieri (University of L'Aquila), Orazio Spadaro (SPADAROCALCE1886 SRL), Lorenzo Arrizza (University of L'Aquila), Valentina Maurizio (SNAPTECH SRL), Michele Spadaro (SNAPTECH SRL) and Alessandra Ministeri (Soprintendenza per i Beni Culturali e Ambientali di Siracusa)

09:00 - 10:30

Room: Meeting Room 102

Session 7.3 - General Track - PART III

Chairs: Maria Francesca Sabbà, Charlene Vella

**09:00 Protection of inland national heritage through modern documentation techniques of underwater archeological sites**

Piotr Prejs (Association of Tomorrow's Archaeologists)

**09:15 FEM and DELA3D modelling comparing through the seismic vulnerability assessment of a medieval roman turret in southern Italy**

Davide Ottaviano Palmieri (Polytechnic University of Bari), Fabio Rizzo (Polytechnic University of Bari), Gabriele Milani (Polytechnic University of Milan) and Dora Foti (Polytechnic of Bari; ITC-Construction Technologies Institute, CNR-Italian National Research)

**09:30 The investigation of the seismic history and preservation of structural heritage via HBIM: the study of the Stylite Tower at Umm ar-Rasas (Jordan)**

Elena Eramo (Tor Vergata University of Rome), Claudio Intrigila (Tor Vergata University of Rome; Italian National Research Council), Sara Manarin (Tor Vergata University of Rome), Giovanni Caruso (Italian National Research Council) and Ilaria Giannetti (Tor Vergata University of Rome)

**09:45 Assessment and Conservation of Historic Masonry Bridges: The Role of GIS in Managing Architectural and Structural Dat**

Remo Pavone (Polytechnic University of Bari), Nicola Rossi (Polytechnic University of Bari), Armando La Scala (Politecnico di Bari), Sulyman Mansour (Polytechnic University of Bari), Fabio Rizzo (Polytechnic University of Bari), Maria Francesca Sabbà (Polytechnic University of Bari) and Dora Foti (Polytechnic University of Bari)

**10:00 Analysis on the optimization of the number of accelerometers for dynamic identifications of historic bridges**

Dora Foti (Polytechnic University of Bari), Nicola Ivan Giannoccaro (University of Salento), Armando La Scala (Polytechnic University of Bari), Fabio Rizzo (Polytechnic University of Bari) and Maria Francesca Sabbà (Polytechnic University of Bari)

**10:15 Developing Macro-Raman mapping as a non-invasive method for the analysis of cultural heritage**

Peter Vandenaabeele (Ghent University), Eva Vermeersch (Ghent University), Silvia Bottura Scardina (University of Malta), Sara Valadas (HERCULES Laboratory, University of Evora), António Candeias (HERCULES Laboratory, University of Evora) and Catarina Miguel (HERCULES Laboratory, University of Evora)

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*10:15 - 11:00 University of Malta - Valletta Campus*  
**COFFEE BREAK - POSTER SESSION #2**

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**PS2-1 Historical and EDAX Analysis on a Roman Sestertius**

Giuseppe Schirripa Spagnolo (Università degli Studi Roma Tre), Giancarlo Della Ventura (Università degli Studi Roma Tre) and Fabio Leccese (Università degli Studi "Roma Tre")

**PS2-2 Change detection on land-sea interaction and its effect on coastal heritage**

Tesfaye Tessema (University of West London), Anastasia Sofroniou (University of West London) and Fabio Tosti (University of West London)

**PS2-3 3D imaging methods for tool mark analysis in the Late Medieval wall paintings at Ħal Millieri, Malta**

Jennifer Herrick Porter (University of Malta), Roberta De Angelis (University of Malta), Stephanie Parisi (University of Malta), Emma Fenech Montebello (University of Malta), Michaela Psaila (University of Malta) and Rasha Zammit Cutajar (University of Malta)

**PS2-4 Exploiting historical archival data for Safeguard and valorisation of Modern Urban Heritage: an information management framework for HBIM-GIS**

Ilaria Giannetti (Università degli Studi di Roma Tor Vergata), Francesca D'Uffizi (Università degli Studi di Roma Tor Vergata) and Angelo Bertolazzi (Università di Padova)

**PS2-5 Active Thermography to analyze the state of health of a Mithraic Stucco Relief**

Massimo Rippa (Institute of Applied Sciences and Intelligent Systems “E. Caianiello” of CNR), Chiara Saltarelli (Institute of Applied Sciences and Intelligent Systems “E. Caianiello” of CNR), Vito Pagliarulo (Institute of Applied Sciences and Intelligent Systems “E. Caianiello” of CNR), Melania Paturzo (Institute of Applied Sciences and Intelligent Systems “E. Caianiello” of CNR) and Barbara Balbi (Superintendency Archaeology, Fine Arts and Landscape for the city of Naples)

**PS2-6 “Manuscripts don’t burn.” Optical techniques to acquire information from hidden layer**

Claudia Daffara (University of Verona), Laura Gazzani (University of Verona), Giacomo Marchioro (University of Verona) and Paolo Pellegrini (University of Verona)

**PS2-7 Solar loading infrared thermography and signal processing techniques for the non-invasive inspection of precious artifacts**

Antonio Cicone (Università degli Studi dell'Aquila), Yinuo Ding (Centre for Composite Materials and Structures (CCMS), Harbin Institute of Technology), Reagan Kasonsa Tshiangomba (Università degli Studi dell'Aquila), Enza Pellegrino (Università degli Studi dell'Aquila), Gilda Russo (Università degli Studi dell'Aquila), Hai Zhang (Centre for Composite Materials and Structures (CCMS), Harbin Institute of Technology) and Stefano Sferra (Università degli Studi dell'Aquila)

**PS2-8 Non-invasive techniques for characterizing the pigments applied on wall houses from Roman Apulum (Romania).**

Dumitrita Daniela Filip (“1 Decembrie 1918” University of Alba Iulia), Mihai Gligor (“1 Decembrie 1918” University of Alba Iulia), Ilie Alexandru Lascu (National Museum of Union Alba Iulia, Romania), Cristiana Radulescu (Valahia University of Targoviste, Academy of Romanian Scientists), Ioan Alin Bucurica (Valahia University of Targoviste, Romania), Raluca Maria Stirbescu (Valahia University of Targoviste, Romania) and Ioana Daniela Dulama (Valahia University of Targoviste, Romania)

**PS2-9 A Spectral library to support the Cultural Heritage conservation processes**

Loredana Modanesi (Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy), Massimo Musacchio (Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy), Marco Solinas (Istituto Nazionale di Geofisica e Vulcanologia), Alessia Scalabrini (Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy), Camilla Gentili (Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy), Chiara Anselmi (Istituto di Ricerca sugli Ecosistemi Terrestri CNR-IRET, Italy) and Manuela Vagnini (Università Telematica eCampus, Laboratorio di diagnostica per i beni culturali, Italy)

**PS2-10 Unveiling the Secrets of Historical Manuscripts: Pigment Analysis Using Raman Spectroscopy, Colorimetry, and Multivariate Techniques**

Stefania Porcu (University of Cagliari), Lorenzo Minnai (University of Cagliari), Pier Carlo Ricci (University of Cagliari), Carlo Maria Carbonaro (University of Cagliari) and Daniele Chiriu (University of Cagliari)

**PS2-11 Mineralogical-compositional variations between past and future in plaster mortars and paintings in historic build-ings of 19th century**

Stefano Columbu (University of Cagliari), Giovanni Brodu (University of Cagliari), Dario Fancello (University of Cagliari), Daniele Chiriu (University of Cagliari) and Stefania Porcu (University of Cagliari)

**PS2-12 Timewise registration of Histomorphometric and Biogeochemical Data in Human Dental Mineralized Tissues through LOESS Regression**

Owen Alexander Higgins (Sapienza University of Rome), Federico Lugli (Goethe-Universität Frankfurt, Institut für Geowissenschaften, Frankfurt am Main, Germany), Szymon Mianowski (Sapienza University of

Rome), Alessia Galbusera (Sapienza University of Rome), Robert Anczkiewicz (Polish Academy of Sciences, Institute of Geological Sciences), Stefano Benazzi (University of Bologna), Wolfgang Müller (Goethe-Universität Frankfurt, Institut für Geowissenschaften, Frankfurt am Main, Germany), Alessia Nava (Sapienza University of Rome) and Luca Bondioli (University of Padova)

**PS2-13 Comparing semi-automatic and deep learning-driven segmentation of an archaeological human mandible from Isola Sacra (Fiumicino, Italy, 1st - 3rd century CE)**

Martina Trocchi (Sapienza University of Rome, Italy), Flavio Cognigni (ZEISS), Alessia Galbusera (Sapienza University of Rome, Italy), Marco Rossi (Sapienza University of Rome, Italy), Alessandra Sperduti (Bioarchaeology Service, Museum of Civilizations, Rome, Italy), Marta Mazur (Sapienza University of Rome, Italy), Alessia Nava (Sapienza University of Rome, Italy) and Luca Bondioli (University of Padua, Italy)

**PS2-14 Machine learning analysis of 3D motion markers data of a rubble masonry building prototype under dynamic identification shaking table tests**

Domenico Palumbo (ENEA), Chiara Ormando (ENEA), Alessandro Colucci (ENEA), Flavia Del Grosso (University of Roma Tre), Stefano De Santis (University of Roma Tre), Domenico Liberatore (University of Rome La Sapienza), Gianmarco de Felice (University of Roma Tre), Alessandro Vari (Edil Cam Sistemi s.r.l.) and Ivan Roselli (ENEA)

**PS2-15 Microclimatological and Air Quality Monitoring at Saint Catherine's Church, Valletta, Malta: Some Observations from a Preliminary Campaign**

Alfred Micallef (University of Malta), Sebastiano D'Amico (University of Malta), Serena Rapisarda (University of Catania), Carlo Trigona (University of Catania) and Anna Maria Gueli (University of Catania)

**PS2-16 Science Meets Cultural Heritage at the Giordan Lighthouse, Gozo: Interweaving Science and History, for the Citizen**

Sebastiano D'Amico (University of Malta), Alfred Micallef (University of Malta) and Adam Gauci (University of Malta)

**PS2-17 Geophysical investigation in the around the Messina Cathedral: preliminary results**

D'Amico Sebastiano, Barbara Orecchio, Debora Presti, Cristina Totaro, Silva Scolaro, Domenica De Domenico, Francesco Panzera

**PS2-18 Geophysical and geomatic methods to explore Cultural Heritage sites in cave contexts: the case of San Niklaw Cave in Mellieħa (Malta)**

Michaele Zammit, Keith Buhagiar, Emanuele Colica, Sebastiano D'Amico, Luciano Galone, Peter Iregbeyen, Charlene Vella, and Luca Piroddi

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11:00 - 11:45

*Aula Magna*

**PLENARY SESSION - KEYNOTE SPEAKER**

**Chair:** JoAnn Cassar

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## **From smells of objects to collections of smells**

*Matija Strlič, University of Ljubljana, Slovenia, University College London, UK*

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11:45 - 12:45

*Room: Aula Magna*

**Session 8.1 - Traditional and Remote Sensing Methods for Cultural Heritage Buildings Monitoring**

**Chair:** Jessica Clementi

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### **11:45 New approach to the prediction of the damage in masonry arches**

Anna Castellano (Polytechnic University of Bari), Mariella Diaferio (Polytechnic University of Bari), Aguinardo Fraddosio (Polytechnic University of Bari) and Natalia Pinchuk (Polytechnic University of Bari)

### **12:00 Digital analysis and protection of mountain archaeological heritage: a case study of the Byzantine church of St. George of Pietra Cappa (San Luca, RC)**

Andrea Gennaro (Ministero della Cultura) and Dario Calderone (Ludwig-Maximilians-Universität München Institute for Digital Cultural Heritage Studies)

### **12:15 Uncovering buried archaeological structures and analysing soil moisture using SAOCOM L-band data: The case of Falerii Novi (Italy)**

Divyeshkumar Rana (Sapienza University of Rome & CERI Research Center (Italy)), Jessica Clementi (Sapienza University of Rome & CERI Research Center (Italy)), Fabiana Battistin (University of Tuscia), Stefano De Angeli (University of Tuscia) and Paolo Mazzanti (Sapienza University of Rome & CERI Research Center (Italy))

### **12:30 PhotoMonitoring: a powerful non-invasive tool for Cultural Heritage buildings monitoring**

Jessica Clementi (Sapienza University of Rome & CERI Research Center, Italy), Veronica Sanvito (Sapienza University of Rome & CERI Research Center, Italy), Antonio Molinari (Sapienza University of Rome & CERI Research Center, Italy) and Paolo Mazzanti (Sapienza University of Rome & CERI Research Center, Italy)

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11:45 - 12:30

*Room: Meeting Room 101*

**Session 8.2 - Artificial Intelligence, Metrology, and Cultural Heritage: Integrating Disciplines for Preservation and Innovation**

**Chairs:** Charlie Abela, Charlene Ellul

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### **11:45 Structural Health Monitoring: A Kriging Convolutional Network Approach for Time Series Imputation**

Anna Castellano (Polytechnic University of Bari, Italy), Aguinardo Fraddosio (Polytechnic University of Bari, Italy), Meriame Mohajane (ITC-CNR, Construction Technologies Institute, National Research Council, Napoli, Italy), Mario Daniele Piccioni (Polytechnic University of Bari, Italy) and Antonietta Varasano (Polytechnic University of Bari, Italy)

**12:00 Comparing the Performance of Expert Paleographers and Capsule Networks in Separating Overlapping Greek Characters in Palimpsests**

Baharan Pourahmadi (University of Southern Denmark), Giacomo Marchioro (University of Verona), Mads Toudal Frandsen (University of Southern Denmark) and René Lynge Eriksen (University of Southern Denmark)

**12:15 A Vision Based System for Guided and Collaborative Reconstruction of Fragmented Documents**

Oliver Krumpke (Fraunhofer Institute for Production Systems and Design Technology) and Diana Leo (Fraunhofer Institute for Production Systems and Design Technology)

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12:45 - 13:15

*Aula Magna*

**CLOSING AND AWARD CEREMONY**

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