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## Welcome Message from the General Chairs

On behalf of the Organizing Committee, we wish to welcome you to the *2023 IMEKO International Conference on Metrology for Archaeology and Cultural Heritage - MetroArcheo2023*.

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) and Cosenza (2022) this year MetroArcheo has been organized in Rome.

The city, with its vast artistic and archeological heritage spanning thirty centuries of history, is home to research centers whose researchers have learned to approach the study of cultural heritage with a multidisciplinary approach.

Knowledge of tangible cultural heritage is deepened through the study of execution techniques, materials used and their state of conservation. The use of highly accurate measuring methods based on chemical, physical, biological and mechanical technique, performed lead to the characterization of materials and to the suggest of conservation and valorization activities which are in turn safe for the work under investigation. Nowadays, the advent of new digital technologies and information technology opens new frontiers for science with very interesting new implications in the metrology applications for heritage science.

*MetroArcheo 2023*, organized by the Roma Tre University and the Institute of Heritage Science of the National Research Council of Italy is conceived as a meeting place aimed both at promoting interdisciplinary works between researchers belonging to different scientific sectors and at showing and sharing the latest innovations in the field of measurements applied to cultural heritage. *MetroArcheo2023* is also an opportunity for intersectoral exchange between researchers and professionals coming both from public structures such museums, galleries, libraries, archives and small and medium-sized enterprises.

The Roma Tre University with its three Departments active in the cultural heritage sector (Science, Mathematics and Physics, Industrial Engineering, Electronics and Mechanics) is the headquarter of *MetroArcheo 2023*. The Congress then has the fundamental support of important Roman and Latium cultural institutions such as the *Colosseum Archaeological Park*, the *National Etruscan Museum of Villa Giulia*, the *Vulci Foundation*, the *National Roman Museum*, *Palazzo Altemps* and the *École Française de Rome*.

The success of *MetroArcheo2023* is testified by its numbers: 31 requests of special sessions, 26 oral subdivided in 6 scientific tracks, 255 original submissions, poster and demo sessions aiming to give a complete and multidisciplinary picture of the applications of metrology to the characterization, safeguard and restoration of archaeological, artistic and historic heritage. Awards will be assigned to a number of outstanding papers and posters.



The program includes three keynote lectures, which will be delivered by **Yong-jae Chung**, *Korea National University of Cultural Heritage, Korea*; **Haida Liang**, *Nottingham Trent University, UK*; **Andrea Babbi**, *Institute of Heritage Science of the National Research Council of Italy*.

One Tutorial will be held on “*Kontur 3D-Radar tutorial: let's play with step-frequency GPR array*” by **Maurizio Gabriele Porcu**.

We are very grateful to all the members of the *MetroArchaeo 2023* Committee for their outstanding work, as well as to the reviewers who have contributed to guarantee the quality of the scientific program. We also wish to thank the public and private organizations, which have kindly accepted to support the meeting in different ways.

On behalf of the Organizing Committee  
Pasquale Daponte  
Fabio Leccese  
Costanza Miliani

## MetroArchaeo 2023 Committee

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José Antonio Barrera Vera, University of Seville, Spain

# MetroArchaeo 2023 Keynote Speakers

Plenary Session - Thursday October 19 - H 15:00



## Challenges in Moving toward Green Conservation: Efforts to Protect the Cultural Heritage from Biological Degradation

**Yong-jae Chung**

*Korea National University of Cultural Heritage, Korea*

### ABSTRACT

Cultural heritage has been affected by a variety of external environmental factors. Among them, biodegradation is one of the main causes to threaten the cultural heritage in Korea, which has the environmental characteristics with hot and humid summer from June to the end of August. In particular, wooden architecture buildings and organic cultural heritage such as papers and textiles have a high risk of biological damage because they have been exposed to the outer environment and acts as a source of nutrition. It also recently reported that stone has been suffered damage on the biofilm by lichen and biodegradation caused by microorganisms was observed on the surface of mural paintings in ancient tombs. I investigated the distribution of microorganism and reported the risk according to environmental conditions on Tripitaka Korean in Haeinsa Temple in the 13th century and both Ancient Mural Painting in Songsan-ri Tomb(Gongju) and Neungsan-ri Tombe(Buyeo) in the 5th to 6th centuries. In this process, culture methods were used to isolate microorganisms and sequencing of DNA for their identification. Biochemical screening tests were also performed to assess the detrimental potential of isolates. Moreover, I developed the green bio-control technique from the biodegradation using natural essential oil(EO) to replace traditional chemical control method. The composition of EO were analyzed by GC-MS and stabilities were also evaluated when applied it to mural painting through emulsifiers.

How should we regulate and control microorganisms with an eco-friendly way in near future? Climate change is the biggest issue in the world so various researches and policies are being carried out to reduce carbon. In order to predict and respond to the biological damage of cultural heritage due to climate change, we are required to find new ways to reduce energy

consumption, reduce chemical use, and avoid environmental pollutants. In order to protect the earth beyond preserving cultural heritage, we all must move toward the green conservation and I would like to give some answers from traditional techniques.

### **SPEAKER BIOGRAPHY**

Yong-jae Chung received a PhD majoring in biology at the Chung-Ang University in Korea. He had worked as a researcher and project leader in a field of researching conservation of organic materials at the National Research Institute of Cultural Heritage (NRICH) of Korea from 2000 to 2008. For now, He is a professor in the Department of Conservation Science and the Graduate School of Conservation and Restoration and a head of Institute of Preventive Conservation for Cultural Property (IPCC). Also, he has worked on various activities and policy establishment for the conservation and restoration of traditional cultural heritage as a ICCROM council member from Korea.

He is a dedicated researcher with a focus on the control of biological damage in cultural heritage, the conservation of mural paintings in tombs, and the investigation of traditional organic materials. With a strong interdisciplinary background in cultural history, organic chemistry, and microbiology, In recent years, his major research subjects are about the control techniques of biological damage, conservation environment of mural paintings within tomb and also characteristics investigation of the traditional organic materials. In this context, He is now conducting researches on the evaluation of alternative fumigant, application of gamma ray, low oxygen and heat treatment to prevent biological damage eco-environmentally from the organic material. he is well-equipped to tackle the challenges facing the conservation of cultural heritage.



## Plenary Session - Thursday October 19 - H 16:00



# Ground based remote imaging and sensing for cultural heritage

**Haida Liang**

*Nottingham Trent University, UK*

### ABSTRACT

Borrowing ideas from Astronomy, ISAAC Lab first designed the PRISMS remote stand-off spectral imaging system in 2007 to image wall and ceiling paintings at lofty heights from a fixed position on the ground at distances of tens of metres achieving the same spatial resolution as one would from a one metre distance. Recently, in addition to PRISMS, we have developed a full suite of stand-off remote imaging and sensing instruments that operates at distances of order 10m including remote stand-off Raman spectroscopy, LIBS, LIF hyperspectral imaging system and expanded the spectral range and spectral resolution of the remote spectral imaging system. Automated spectral imaging of large wall paintings and entire architectural interiors has increased the data capture rate and necessitates new data science methods based on machine learning and new MOLAB workflows. New applications in heritage science, art history and conservation will be demonstrated including examples from some of the recent IPERION HS MOLAB campaigns.

### SPEAKER BIOGRAPHY

Haida Liang is Distinguished Professor of Physics at Nottingham Trent University, Head of Imaging and Sensing for Archaeology, Art history and Conservation (ISAAC) Lab, and Director of Imaging, Materials and Engineering Centre (IMEC). She studied Physics at University of Sydney followed by a PhD in Astrophysics at Australian National University. She continued her research in astrophysics at CEA and IAS in France and at the University of Bristol before changing her research career to heritage science after a brief period at the National Gallery in London. ISAAC Lab specialises in the development and application of advanced optical imaging, spectroscopy, remote sensing and data science methods to art conservation, art history and archaeology, which led to the recent Queen's Anniversary Prize for Advancing Cultural Heritage Science. She has a keen interest on historical global connections through interdisciplinary research.

## Plenary Session - Thursday October 19 - H 17:00



„Le seul véritable voyage [...], ce ne serait pas d’aller vers de nouveaux paysages, mais d’avoir d’autres yeux, [...]“. Toward a holistic perception of antiquity thanks to transdisciplinary scientific networks

### **Andrea Babbi**

*National Research Council, Italy*

#### **ABSTRACT**

Over the past few years, the archaeological sciences have undergone an awareness strongly advocated by what used to be the new generation of scholars. This has happened, on the one hand, due to the natural evolution of a discipline eager to keep up with the state of the art of research, and, on the other hand, because of stimuli driven at the same time by far-reaching socio-cultural phenomena and important theoretical advancements in the field of outlining interpretative paradigms of complex realities. The reference is respectively to the point of synthesis of the global- local polarisation represented by the focus on the globalisation processes, and to overcoming the centre-semiperiphery-periphery tripartition of the World-System-Theory through the network theory. Archaeological sciences have therefore realised the importance of a multi-scalar approach, i.e., both diachronic/generalising and synchronic/particularising, and have internalised the necessity and usefulness of overcoming outdated academic hierarchies. Today, it is only through forms of interdisciplinarity and transdisciplinarity between scientific ‘weak’ nodes that we can hope to outline a broad and as complete a view of ancient reality as possible.

#### **SPEAKER BIOGRAPHY**

Dr Andrea Babbi 2005 got the PhD (Etruscology) at ‘La Sapienza’ University of Rome. 2007-2019 he kept researching thanks to prizes, grants and contracts in Italy (CNR, University of Molise, DAI Rom), Greece (SAIA, INSTAP), and Germany (DAAD, SPK, Humboldt, Henkel, DFG, JGU Mainz, Thyssen, LEIZA Mainz). Since 2019 Babbi holds a permanent post as a Researcher at the Institute of Heritage Science of the National Research Council of Italy (ISPC-CNR) and is a visiting scholar at the Leibniz-Zentrum für Archäologie in Mainz (LEIZA). Dr Babbi is a member of the Istituto Nazionale di Studi Etruschi ed Italici, Istituto Italiano di Preistoria e Protostoria, Deutscher



Archäologen-Verband e.V., Archaeological Institute of America, Associazione Internazionale di Archeologia Classica. Since 2014 Dr Babbi has been lecturing and/or tutoring at Italian, German, and Austrian Universities. Since 2018 he is the director of the international research project on Bisenzio (Viterbo).

# MetroArchaeo 2023 Tutorial

Tutorial Session - Thursday October 19 - H 18:00



## Kontur 3D-Radar tutorial: let's play with step-frequency GPR array

**Maurizio Gabriele Porcu**

*CODEVINTEC, Italy*

### ABSTRACT

GPR is a non destructive method can image the subsoil using electromagnetic waves. According to the theory he higher the frequency, the higher the resolution, but the lower the depth and vice versa. What changes with the step-frequency technique? This tutorial will illustrate the Kontur 3D-Radar technology and some case studies about archeological application. Kontur 3D-Radar is step frequency gpr array with wide frequency range (from 200 MHz up to 3 GHz). Gpr surveys will be carried out with 20 channels ground coupled array. The tutorial will show the entire workflow and you can be take part of it: from setup to survey, from real-time processing to interpretation.

### 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.



## MetroArchaeo 2023 Venue

**MetroArchaeo 2023** will be held at **Roma Tre University** in the following buildings.  
Please refer to the map below.

### Thursday, October 19

#### **Rectorate - Via Ostiense 133**

Registrations - Torre A

Plenary Sessions / Tutorial - Aula Magna (2<sup>nd</sup> Floor)

### Friday, October 20

#### **Department of Engineering DIIEM - Sala Conferenze - Via Volterra 62**

Registrations

Technical Sessions S1.1 - S2.1 - S3.1 - S4.1

Poster Session #1

Lunch - Coffee Breaks

#### **Department of Mathematics and Physics - Via della Vasca Navale 84**

Aula B - Technical Sessions S1.2 - S2.2 - S3.2 - S4.2

Aula C - Technical Sessions S1.3 - S2.3 - S3.3 - S4.3

#### **Department of Science - Viale Guglielmo Marconi 446**

Aula 1 - Technical Sessions S3.4 - S4.4

Aula 2 - Technical Sessions S3.5 - S4.5

### Saturday, October 21

#### **Department of Science - Viale Guglielmo Marconi 446**

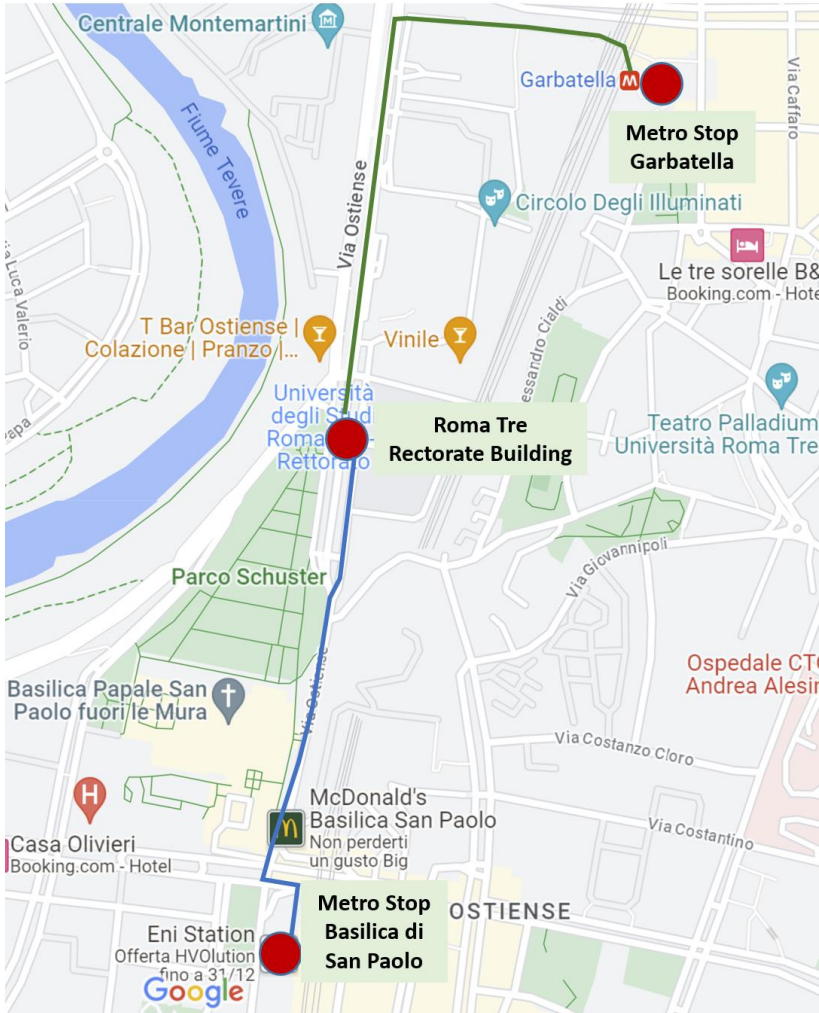
Registrations

Technical Sessions - Aula 1, Aula 3, Aula 4, Aula 6, Aula 7

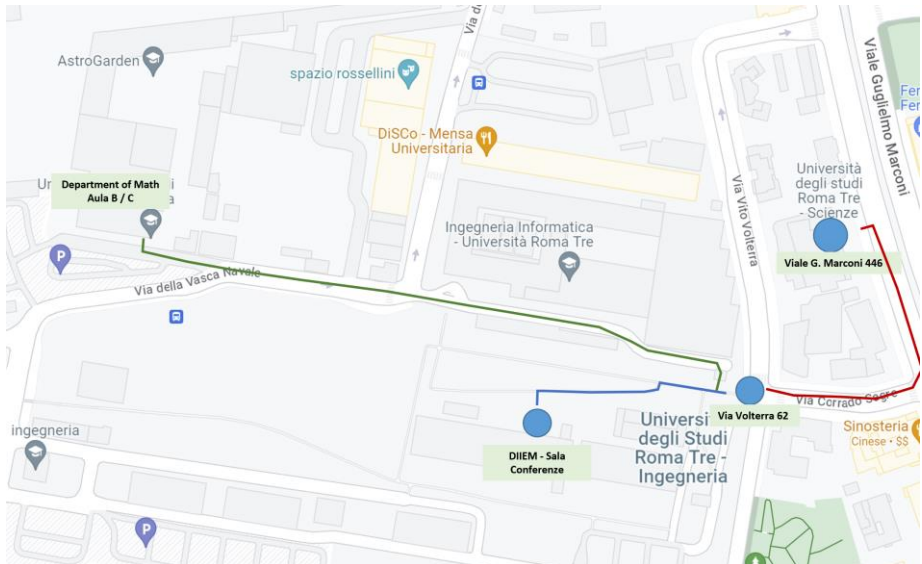
Poster Session #2

Lunch - Coffee Break

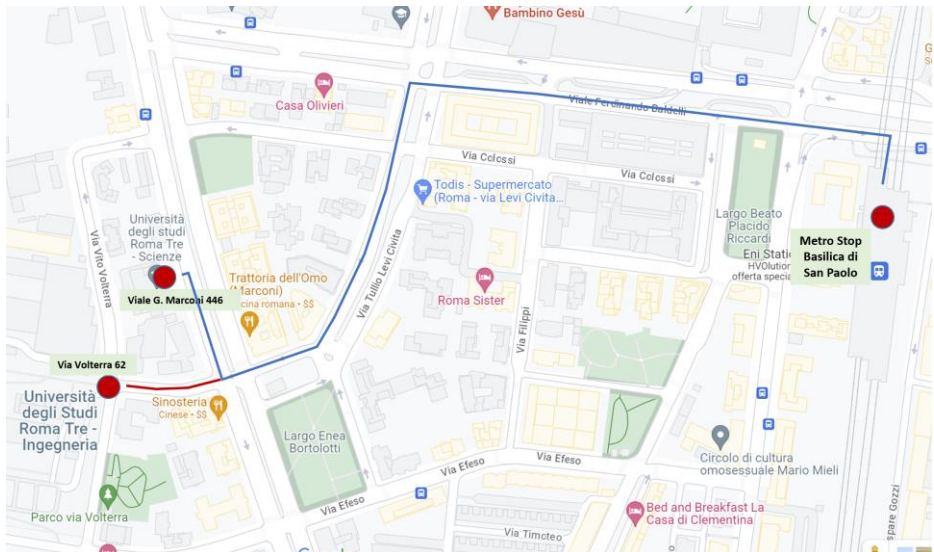
**Venue - Map 1 - How to reach Rectorate Building from Metro Stop Garbatella and Metro Stop Basilica di San Paolo.**



### Venue - Map 2 - Friday 20, Technical Sessions Rooms.



### Venue - Map 3 - How to reach venue from Basilica di San Paolo Metro Stop.



# MetroArchaeo 2023 Social Events

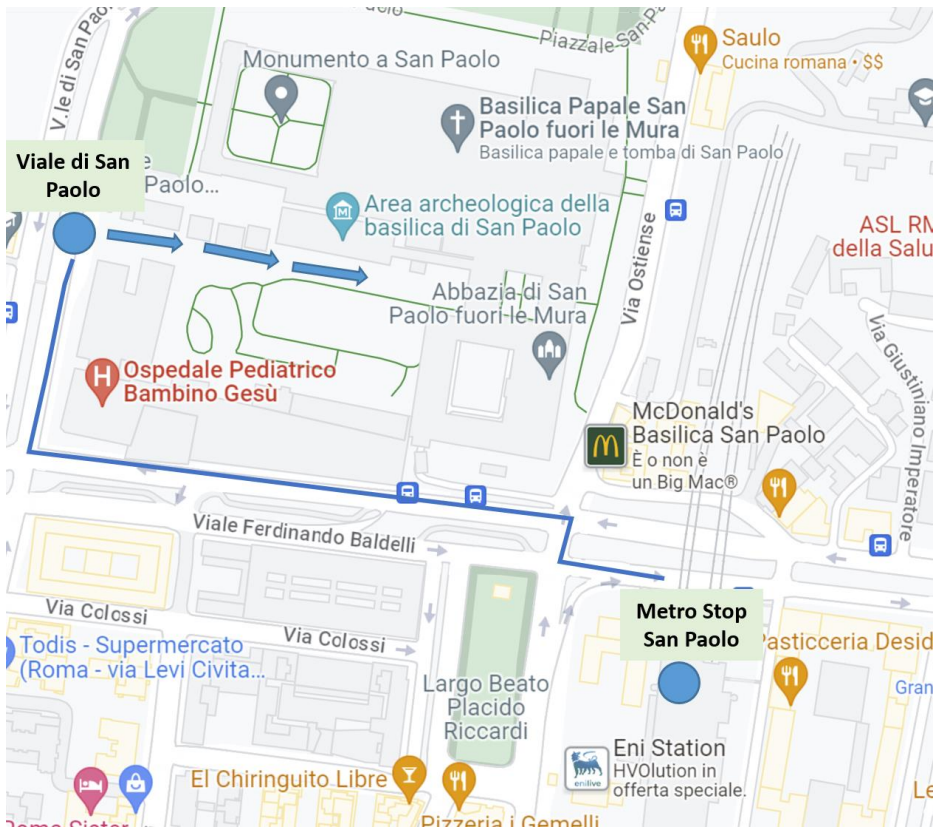
## WELCOME PARTY

Thursday October 19 - H 19:30

The Welcome Party will be held at the **Basilica of Saint Paul Outside the Walls - San Paolo Fuori le Mura** on **Thursday, October 19 - 19.30**.

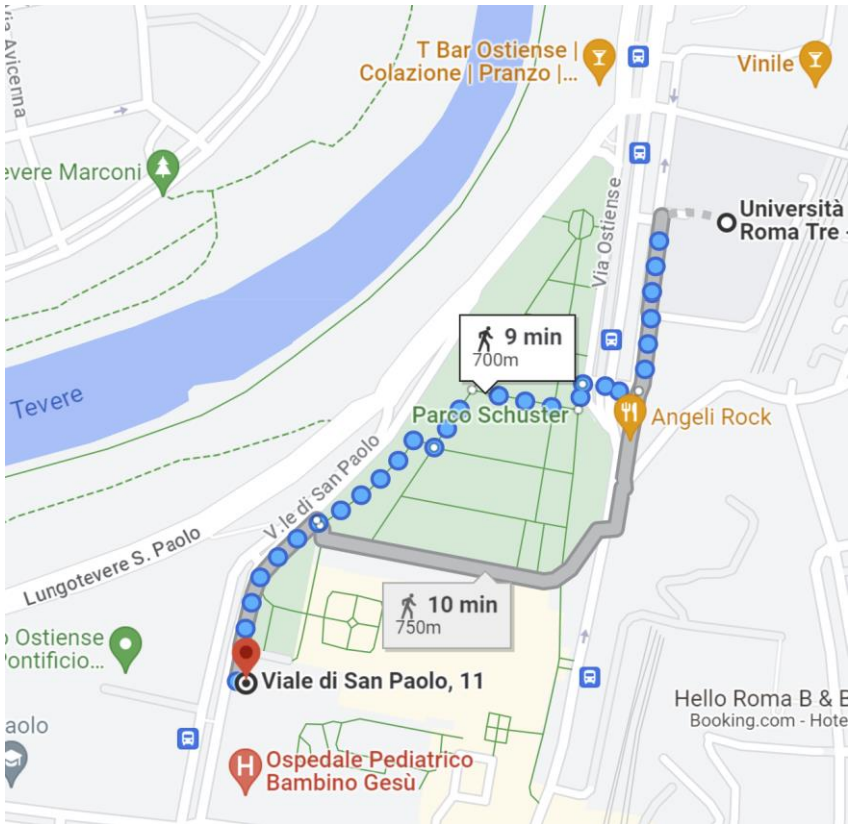
### ADDRESS

Entrance from Viale di San Paolo (see map below)





### How to reach Basilica di San Paolo from Rectorate Building.



## GALA DINNER

Friday October 20 - H 19:00

The Gala Dinner will be held at **Stadium of Domitian - Stadio Domiziano** on Friday, October 20.

**ADDRESS** - Via di Tor Sanguigna, 3, Roma

The Gala Dinner will be a wonderful evening experience in the basement of Piazza Navona, with a guided tour and aperitif within the walls of ancient Rome, a cultural lounge to meet in the heart of the city.

The remains of the Stadium of Domitian (UNESCO heritage) are located under Piazza Navona about 4.50 meters from the road level; the archaeological area is what remains of the first and only example of a masonry stadium known to date in Rome.

The Stadium of Domitian can be reached by a pleasant walk through the main historical buildings of Rome. Starting from Colosseo Metro Stop, a 40-minute walk will take you to imperial Rome, from the Colosseum, the Roman Forum, passing along Via dei Fori Imperiali.

From Barberini Metro Stop, in a 30-minute walk you will see the world-renowned Trevi Fountain and admire the millennia-old Pantheon.

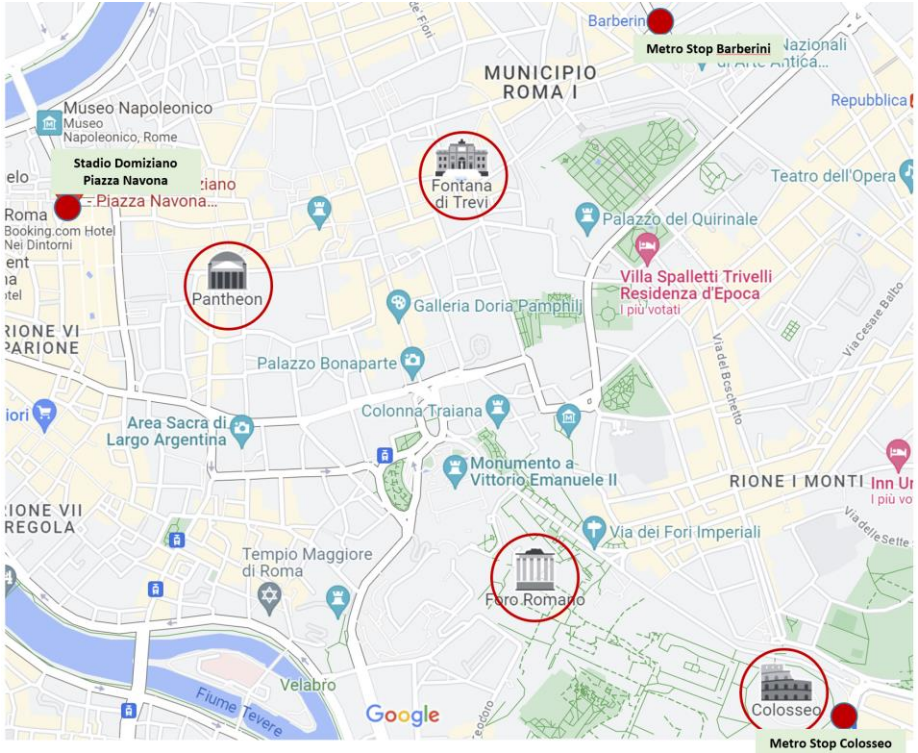
See the map in the next page for further details.

### **EVENING PROGRAM**

**19:00** - Arrival / Aperitif

**19:45** - Guided Tour of the Stadium

**21:00** - Dinner



## Program Schedule - Thursday, October 19

THURSDAY, OCTOBER 19	
14:00 - 15:00	Opening Ceremony - Welcome Addresses Rectorate Building - Aula Magna
15:00 - 16:00	Plenary Session - Keynote Speaker #1 Yong-jae Chung, Korea National University of Cultural Heritage, Korea Rectorate Building - Aula Magna
16:00 - 17:00	Plenary Session - Keynote Speaker #2 Haida Liang, Nottingham Trent University, UK Rectorate Building - Aula Magna
17:00 - 18:00	Plenary Session - Keynote Speaker #3 Andrea Bacci, Institute of Heritage Science - National Research Council, Italy Rectorate Building - Aula Magna
18:00 - 19:00	Tutorial Maurizio Gabriele Porcu, CODEVITEC, Italy Rectorate Building - Aula Magna
19:30 - 21:30	Welcome Reception Basilica of Saint Paul Outside the Walls - San Paolo Fuori le Mura

## Program Schedule - Friday, October 20

FRIDAY, OCTOBER 20			
	DIEM - Sala Conferenze	Dept of Maths - Aula B S1.2 - Symposium II - Diagnostic SS8 / SS24	Dept of Maths - Aula C S1.3 - Symposium VII - Geomatics SS1
09:00 - 11:00	S1.1 - Symposium I - Digital SS15		
11:00 - 11:20	COFFEE BREAK		
	DIEM - Sala Conferenze	Dept of Maths - Aula B S2.2 - Symposium II - Diagnostic SS12 - SS14	Dept of Maths - Aula C S2.3 - Symposium VII - Geomatics SS1
11:20 - 13:00	S2.1 - Symposium I - Digital SS15 / SS16		
13:00 - 14:20	LUNCH - Poster Session #1		
	DIEM - Sala Conferenze	Dept of Maths - Aula B S3.2 - Symposium II - Diagnostic SS13	Dept of Maths - Aula C S3.3 - Symposium VII - Geomatics SS11
14:20 - 16:20	S3.1 - Symposium I - Digital SS20		Dept of Sciences - Aula 2 S3.5 - Symposium IV - Sensors SS7
16:20 - 16:40	COFFEE BREAK		
	DIEM - Sala Conferenze	Dept of Maths - Aula B S4.2 - Symposium II - Diagnostic SS31	Dept of Sciences - Aula 1 S4.4 - Symposium III - Materials SS9
16:40 - 18:10	S4.1 - Symposium I - Digital SS18		Dept of Sciences - Aula 2 S4.5 - Symposium IV - Sensors SS25
19:00 - 23:00	GALA DINNER Stadium of Domiziano - Piazza Navona		

# Program Schedule - Saturday, October 21

SATURDAY, OCTOBER 21					
	Dept of Sciences - Aula 1	Dept of Sciences - Aula 3	Dept of Sciences - Aula 4	Dept of Sciences - Aula 6	Dept of Sciences - Aula 7
09:00 - 11:00	S5.1 - Symposium I - Digital SS27	S5.2 - Symposium II - Diagnostic SS6	S5.3 - Symposium II - Diagnostic SS23	S5.4 - Symposium VI - Underwater SS30	S5.5 - Symposium IV - Sensors SS26 / SS2
11:00 - 11:20	COFFEE BREAK				
	Dept of Sciences - Aula 1	Dept of Sciences - Aula 3	Dept of Sciences - Aula 4	Dept of Sciences - Aula 6	Dept of Sciences - Aula 7
11:20 - 13:20	S6.1 - Symposium I - Digital SS19 / SS22	S6.2 - Symposium II - Diagnostic SS6 / SS23 / SS28	S6.3 - Symposium II - Diagnostic SS10	S6.4 - Symposium VI - Underwater SS21	S6.5 - Symposium V - Historical Gardens SS5
13:20 - 14:20	LUNCH / POSTER SESSION #2				
14:20 - 15:00	CLOSING AND AWARD CEREMONY				



## Technical Program - Thursday, October 19

13:00 - 18:00 *Roma Tre University - Rectorate Building - Torre A*  
**REGISTRATIONS**

14:00 - 15:00 *Roma Tre University - Rectorate Building - Aula Magna (2<sup>nd</sup> Floor)*  
**OPENING CEREMONY - WELCOME ADDRESSES**

15:00 - 16:00 *Roma Tre University - Rectorate Building - Aula Magna (2<sup>nd</sup> Floor)*  
**PLENARY SESSION - KEYNOTE SPEAKER**  
**Chair:** Giulia Caneva, *University of Roma Tre, Italy*

**Challenges in Moving toward Green Conservation:  
Efforts to Protect the Cultural Heritage from Biological Degradation**

*Yong-jae Chung, Korea National University of Cultural Heritage, Korea*

16:00 - 17:00 *Roma Tre University - Rectorate Building - Aula Magna (2<sup>nd</sup> Floor)*  
**PLENARY SESSION - KEYNOTE SPEAKER**  
**Chair:** Costanza Miliani, *National Research Council, Italy*

**Ground based remote imaging and sensing for cultural heritage**

*Haida Liang, Nottingham Trent University, UK*

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17:00 - 18:00 *Roma Tre University - Rectorate Building - Aula Magna (2<sup>nd</sup> Floor)*  
**PLENARY SESSION - KEYNOTE SPEAKER**  
**Chair:** Giulia Germinario, *National Research Council, Italy*

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**„Le seul véritable voyage [...], ce ne serait pas d’aller vers de nouveaux paysages, mais d’avoir d’autres yeux, [...]“. Toward a holistic perception of antiquity thanks to transdisciplinary scientific networks**

*Andrea Bacci, Institute of Heritage Science - National Research Council, Italy*

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18:00 - 19:00 *Roma Tre University - Rectorate Building - Aula Magna (2<sup>nd</sup> Floor)*  
**PLENARY SESSION - TUTORIAL**  
**Chair:** Giovanni Leucci, *National Research Council, Italy*

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**Kontur 3D-Radar tutorial: let's play with step-frequency GPR array**

*Maurizio Gabriele Porcu, CODEVINTEC, Italy*

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19:30 - 21:30 *Basilica of Saint Paul Outside the Walls - San Paolo Fuori le Mura*  
**WELCOME PARTY**

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## Technical Program - Friday, October 20

08:30 - 17:00 *Department of Engineering DIIEM - Sala Conferenze*  
**REGISTRATION**

09:00 - 11:00 *Room: Department of Engineering DIIEM - Sala Conferenze*  
**Symposium I - Digital**  
**Session 1.1 - Digital tools in Cultural Heritage: 3D modelling and metaverse**  
**Chairs:** Sofia Ceccarelli, Roberta Manzollino

**09:00 [867] ArchoVerso: a cultural metaverse for enhancement, technologies, communities, services**

Saverio Giulio Malatesta (Sapienza Università di Roma), Laura Leopardi (Sapienza Università di Roma), Marco Raoul Marini (Sapienza Università di Roma) and Paolo Rosati (Sapienza Università di Roma)

**09:17 [2625] Realverso Lucanum: a metaverse for innovative didactic and digital tourism**  
Diego Sinitò (ilInformativa Srl), Giulio Setzu (ilInformativa Srl), Alessandro Verderame (ilInformativa Srl), Antonio Ruoto (ilInformativa Srl) and Vito Santarcangelo (ilInformativa Srl)

**09:34 [3747] XRM imaging for non-destructive age at death estimation of the incinerated teeth from the Motya Tophet**

Martina Trocchi (Department of Earth Science, Sapienza University of Rome), Luciano Fattore (Center for Research and Services Saperi&Co, Sapienza University of Rome), Flavio Cognigni (Department of Basic and Applied Sciences for Engineering, Sapienza University of Rome), Federico Cappella (Department "Italian Institute of Oriental Studies", Sapienza University of Rome), Marco Rossi (Research Center of Nanotechnologies for Engineering, Sapienza University of Rome), Giorgio Manzi (Department of Environmental Biology, Sapienza University of Rome) and Lorenzo Nigro (Department "Italian Institute of Oriental Studies", Sapienza University of Rome)

**09:51 [3911] Perceiving Ancient Landscape in Digital Simulation. Preliminary Consideration on the Case of the Missing Auser River in Pisa (Tuscany, IT)**

Alberto Caroti (Università di Roma "La Sapienza")

**10:08 [5039] Finite Element analysis of Vittoriano building based on InSAR data**

Hamed Dabiri (Department of Earth Sciences, Sapienza University of Rome & CERI Research Center), Jessica Clementi (Department of Earth Sciences, Sapienza University of Rome & CERI Research Center), Roberta Marini (Natural Hazards Control and Assessment (N HAZCA srl.)), Paolo Mazzanti (Department of Earth Sciences, Sapienza University of Rome & CERI Research Center), Gabriele Scarascia Mugnozza (Department of Earth Sciences, Sapienza University of Rome & CERI Research Center), Francesca Bozzano (Department of Earth Sciences, Sapienza University of Rome & CERI Research Center) and Dan Bompà (School of Sustainability, Civil and Environmental Engineering, University of Surrey, UK)

**10:25 [3673] Digital Technologies and 3D Printing for the Communication of Archaeological Discovery: The case of the early-archaic wreck of the strait of Otranto**

Vincenzo Ria (Soprintendenza Nazionale per il patrimonio culturale subacqueo) and Barbara Davidde (Soprintendenza Nazionale per il patrimonio culturale subacqueo)

09:00 - 11:00

*Room: Aula B - Department of Mathematics and Physics*

**Symposium II - Diagnostic**

**Session 1.2 - Diagnostic for Cultural Heritage: contribution of Raman spectroscopy and other non-destructive techniques to the investigation of art objects - Cultural heritage at synchrotrons**

**Chairs:** Armida Sodo, Vittoria Guglielmi, Ilaria Carlomagno

**09:00 [2727] Analytical investigations on polychrome artworks from the wooden ceiling of “ex-Ospedale San Matteo” in Pavia**

Giacomo Fiocco (Arvedi Laboratory of Non-Invasive Diagnostics, CISRIC, Università di Pavia), Francesca Volpi (Arvedi Laboratory of Non-Invasive Diagnostics, CISRIC, Università di Pavia), Tommaso Rovetta (Arvedi Laboratory of Non-Invasive Diagnostics, CISRIC, Università di Pavia), Chaeheon Lee (Arvedi Laboratory of Non-Invasive Diagnostics, CISRIC, Università di Pavia), Michela Albano (Arvedi Laboratory of Non-Invasive Diagnostics, CISRIC, Università di Pavia), Chiara Delle Donne (Arvedi Laboratory of Non-Invasive Diagnostics, CISRIC, Università di Pavia), Maduka L. Weththimuni (Department of Chemistry, University of Pavia), Mario Colella (Centro Studio e Conservazione Piccolo Chiostro), Anna Letizia Magrassi Matricardi (Museo di Archeologia del Sistema Museale d'Ateneo di Pavia), Curzio Merlo (Laboratorio di Diagnostica applicata ai Beni Culturali, Scuola di Restauro Cr.Forma), Marco Malagodi (Arvedi Laboratory of Non-Invasive Diagnostics, CISRIC, Università di Pavia) and Maurizio Licchelli (Department of Chemistry, University of Pavia)

**09:17 [3178] Raman and X-ray fluorescence spectroscopy analysis of decorative ceramic tiles manufactured by Niculoso Pisano from the church of Flores de Ávila (Ávila, Spain)**

Oscar Fadon (Archaeological and Historical Materials (AHMAT) , University of Valladolid (Spain)), Violeta Hurtado-García (Archaeological and Historical Materials (AHMAT) , University of Valladolid (Spain)), Cristian Berga-Celma (Museo de Ávila. Junta de Castilla y León en Ávila. Ávila (Spain)), Carlos Sanz-Velasco (Archaeological and Historical Materials (AHMAT) , University of Valladolid (Spain)), Javier Pinto (University of Valladolid) and Suset Barroso-Solares (Archaeological and Historical Materials (AHMAT) , University of Valladolid (Spain))

**09:34 [4113] Analysis of Roman Era archaeological finds from Museo Territoriale del Lago di Bolsena with non-destructive investigation techniques**

Valentina Alemanno (Dept. SBAI, Sapienza University of Rome), Pierfrancesco Atanasio (Dept. SBAI, Sapienza University of Rome), Giancarlo La Penna (Dept. SBAI, Sapienza University of Rome), Chiara Mancini (Dept. SBAI, Sapienza University of Rome), Flavio Cognigni (Dept. SBAI, Sapienza University of Rome), Serena Silvestri (Dept. SBAI, Sapienza University of Rome), Anacleto Proietti (Dept. SBAI, Sapienza University of Rome), Marco Rossi (Dept. SBAI, Sapienza University of Rome), Alessandro Ciccola (Dept. of Chemistry, Sapienza University of Rome), Alessandro Nucara (Dept. of Physics, Sapienza University of Rome), Barbara



Barbaro (Soprintendenza archeologia belle arti e paesaggio Viterbo e Etruria Meridionale), Paolo Binaco (Museo territoriale Lago di Bolsena) and Danilo Dini (Sapienza University of Rome, Dept. of Chemistry)

**09:51 [6903] Non-invasive diagnostic techniques for studying the Coronation of the Virgin altarpiece by Michele di Matteo**

Chiara Andrea Lombardi (Università degli Studi di Milano), Valeria Comite (Università degli Studi di Milano), Andrea Bergomi (Università degli Studi di Milano), Mattia Borelli (Università degli Studi di Milano), Gianluca Carabelli (Università degli Studi di Milano), Valentina Verzoni (Scuola di Restauro Botticino - Valore Italia), Mario Colella (Centro studio e conservazione Piccolo Chiostro) and Paola Fermo (Università degli Studi di Milano)

**10:08 [8127] Inorganic, organic and biochemical characterization of wall paintings from a Roman domus**

Leila Birolo (Dept. Chemical Sciences, University of Naples Federico II), Manuela Rossi (Dept. Earth Sciences, Environment and Resources, University of Naples Federico II), Miriam Alberico (Dipartimento di Scienze dell'Antichità, Università la Sapienza), Nunzia De Riso (Dept. Chemical Sciences, University of Naples Federico II), Georgia Ntasi (Dept. Chemical Sciences, University of Naples Federico II), Antonella Tomeo (Soprintendenza Archeologia Belle Arti e Paesaggio per le Province di Caserta e Benevento) and Alessandro Vergara (Dept. Chemical Sciences, University of Naples Federico II)

**10:25 [9409] Synchrotron X-ray for Archaeometry: state-of-the-art and future perspectives**

Ilaria Carlomagno (Elettra Sincrotrone Trieste), Giuliana Aquilanti (Elettra - Sincrotrone Trieste) and Gangadhar Das (Elettra - Sincrotrone Trieste)

09:00 - 11:00

*Aula C - Department of Mathematics and Physics*

**Symposium VII - Geomatics**

**Session 1.3 - Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage: From research to preservation**

**Chairs:** Giovanni Leucci, Salvatore Piro, Nicola Masini

**09:00 [327] Rome and its infrastructure in the mining areas of the Conventus Cordubensis: a logistical perspective of the landscape through remote sensing**

José Luis Domínguez Jiménez (Universidad de Córdoba (UCO))

**09:17 [565] Geophysical investigation at “Villa del Casale” Piazza Armerina (EN)**

Isabella Baldini (Università di Bologna), Carla Sfameni (ISPC-CNR), Lara De Giorgi (ISPC-CNR), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR), Chiara Torre (Università di Catania) and Giovanni Leucci (ISPC-CNR)

**09:34 [1254] Ground-penetrating Radar survey at the Basilica of Santa Caterina D’Alessandria (Galatina-Italy)**

Giancarlo De Pascalis (Università di Roma la Sapienza), Lara De Giorgi (ISPC-CNR), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR), Dora Francesca Barbolla (ISPC-CNR), Lucrezia Longhitano (University of Catania), Chiara Torre (University of Catania) and Giovanni Leucci (ISPC-CNR)

**09:51 [1262] Ground Penetrating Radar investigation at Roman Villas of Sabina Tiberina: the case of the villas of Montebuono and Cottanello (Rieti, Italy)**

Daniela Tarallo (National Research Council – Institute of Heritage Science, Naples), Michele Punzo (National Research Council – Institute of Heritage Science, Naples), Vincenzo Di Fiore (National Research Council – Institute of Heritage Science, Naples), Carla Sfameni (National Research Council – Institute of Heritage Science, Rome), Francesca Colosi (National Research Council – Institute of Heritage Science, Rome), Anna De Meo (National Research Council – Institute of Heritage Science, Rome), Tommaso Leti Messina (National Research Council – Institute of Heritage Science, Rome) and Daniele Verrecchia (National Research Council – Institute of Heritage Science, Rome)

**10:08 [3872] Multimodal 3D digitization of the megalithic complex of Borg in-Nadur (Malta): an archaeoastronomical perspective**

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

**10:25 [3909] Multiple GPR surveys in urban area. The case of S. Giovanni in Laterano and S. Croce in Gerusalemme, as part of ERC Rome Transformed Project**

Salvatore Piro (ISPC CNR Institute of Heritage Sciences, Italy), Daniela Zamuner (ISPC CNR Institute of Heritage Sciences, Italy), Daniele Verrecchia (National Research Council CNR ISPC) and Tommaso Leti Messina (ISPC CNR Institute of Heritage Sciences, Italy)

**10:42 [4710] Satellite automatic extraction and characterization of looting features in the Peruvian desert**

Alessia Brucato (University of Bari Aldo Moro, Institute of Heritage Science CNR), Rosa Lasaponara (Institute of Methodologies for Environmental Analysis CNR) and Nicola Masini (Institute of Heritage Science CNR)

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*11:00 - 11:20 Room: Department of Engineering DIEM - Sala Conferenze*  
**COFFEE BREAK**

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*11:20 - 13:00 Room: Department of Engineering DIEM - Sala Conferenze*  
**Symposium I - Digital**  
**Session 2.1 - Digital tools in Cultural Heritage: 3D modelling and metaverse - Semantic enrichment of 3D models for the knowledge representation of archaeology and built heritage: Strategies for documentation, conservation and management**  
**Chairs: Sofia Ceccarelli, Roberta Manzollino, Michele Calvano**

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**11:20 [6643] 3D virtual restoration: from photogrammetric and 3D modeling techniques to integration with scientific documentation in a GIS environment**

Luca Lucchetti (Università degli Studi della Tuscia)



**11:37 [7267] Dimensional assessment in bioarchaeology applications: a preliminary study on quality controls in 3D printing of human skulls**

Marta Cecchitelli (University of Roma Tre), Giorgia Fiori (University of Roma Tre), Gabriele Bocchetta (University of Roma Tre), Federico Filippi (University of Roma Tre), Fabio Leccese (University of Roma Tre), Jan Galo (IRCCS Children Hospital Bambino Gesù), Salvatore Andrea Sciuto (University of Roma Tre) and Andrea Scorza (University of Roma Tre)

**11:54 [9315] Dynamic 3D model for decoding archaeological complexity of funerary contexts**

Francesca Adesso (Università degli studi di Padova), Emanuela Faresin (Università degli studi di Padova) and Giuseppe Salemi (Università degli studi di Padova)

**12:11 [9500] HBIM for restoration project and data management of a religious complex**  
Ilaria Trizio (Institute for Construction Technologies of Italian National Research Council), Federica Miconi (Institute for Construction Technologies of Italian National Research Council), Augusto Ciciotti (Ministry of Culture Regional Secretariat of Abruzzo) and Francesca Savini (Institute for Construction Technologies of Italian National Research Council)

**12:28 [5615] Extended BIM: a proposed workflow for the integration of the HBIM and EM approaches**

Ariane Galeano (Department of Civil Engineering, University of Salerno), Anna Sanseverino (Department of Civil Engineering and Architecture, University of Pavia), Simone Berto (Institute of Heritage Science, National Research Council), Emanuel Demetrescu (Institute of Heritage Science, National Research Council) and Marco Limongiello (Department of Civil Engineering, University of Salerno)

**12:45 [4925] Metaverse(s) and Cultural Heritage: overview and perspectives of the Italian scenario**

Augusto Palombini (CNR ISPC)

11:20 - 13:00

*Aula B - Department of Mathematics and Physics*

**Symposium II - Diagnostic**

**Session 2.2 - Colours and coloured materials: non-invasive and micro-invasive approaches for Cultural Heritage studies - Advances in Imaging Techniques for Discovery, Monitoring and Diagnosis of the State of Conservation of Archaeological Discoveries and Historic Sites**

**Chair:** Rita Deiana, Rosario Morello

**11:20 [2814] Analyzing an Ancient City: Non-invasive Studies of Ostia Antica Archeological Park' s Wall Paintings**

Eleonora Del Federico (Pratt Institute), Paolo Tomassini (UC Louvain), Bernhard Blümich (RWTH Aachen University), Costanza Cucci (IFAC-CNR), Marcello Picollo (IFAC-CNR), Domenico Miriello (University of Calabria), Giacomo Chiari (Getty Conservation Institute (retired)), Hilary Becker (Binghamton University), Jan Bader (Universität Stuttgart), Daniel Krueger (Universität Stuttgart), Jen Anders (Universität Stuttgart) and Jurgen Frick (Materialprüfungsanstalt Stuttgart)

**11:37 [5717] Traces of Polychromies in Roman sculpture: a multi-analytical approach**

Sara Lenzi (Università di Pisa), Marta Novello (Direzione Regionale Musei Friuli Venezia Giulia), Monica Salvadori (Università degli Studi di Padova, Dipartimento dei beni Culturali), Ivana Angelini (Università degli Studi di Padova, Dipartimento dei Beni Culturali), Alfonso Zoleo (Università degli Studi di Padova, Dipartimento di Scienze Chimiche) and Rita Deiana (Università degli Studi di Padova, Dipartimento dei Beni Culturali)

**11:54 [6399] An improved methodology for extending the applicability of Reflectance Transformation Imaging to confined sites**

Federico Di Iorio (Department of Applied Science and Technology (DISAT) - Politecnico di Torino, Turin), Leila Es Sebar (Department of Applied Science and Technology (DISAT) - Politecnico di Torino, Turin), Luca Lombardo (Department of Applied Science and Technology (DISAT) - Politecnico di Torino, Turin), Amina Vietti (Department of Applied Science and Technology (DISAT) - Politecnico di Torino, Turin), Sara Aicardi (Museo Egizio, Turin), Federica Pozzi (Centro di Conservazione e Restauro Beni Culturali "La Venaria Reale", Venaria Reale) and Sabrina Grassini (Department of Applied Science and Technology (DISAT) - Politecnico di Torino, Turin)

**12:11 [4309] Change Detection analysis of Cultural and Landscape Heritage based on Multispectral and Hyperspectral remote sensing data and algorithm: the case of Appia Antica Park**

Andrea Massi (Department of Physics of "La Sapienza" University of Rome), Antonio Cosentino (Department of Earth Sciences, Sapienza University of Rome), Paolo Mazzanti (Department of Earth Sciences, Sapienza University of Rome), Michele Ortolani (Department of Physics of "La Sapienza" University of Rome) and Jessica Clementi (Department of Earth Sciences, Sapienza University of Rome)

**12:28 [2016] Limited technology and unlimited results from National Museum of Ras Al Khaimah collection and its sustainability for future generations accessibility**

Nagmeldeen Hamza (National Museum of Ras Al Khaimah)

11:20 - 13:00

*Aula C - Department of Mathematics and Physics*

**Symposium VII - Geomatics**

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

**Chairs:** Salvatore Piro, Nicola Masini, Sebastiano D'Amico

**11:20 [3951] FEM-based models of real-time dynamic structural behavior in archaeology and monumental heritage: the case of ancient Greek colonnades**

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

**11:37 [4647] Discrete Wavelet Transform to reduce surface scattering in GPR sections**

Dora Francesca Barbolla (National Research Council –Institute of Heritage Science), Lara De Giorgi (National Research Council –Institute of Heritage Science) and Giovanni Leucci (National Research Council)



**11:54 [6057] Broadband vibroacoustic fingerprint of a historic building chamber concert room in Napoli (Italy)**

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

**12:11 [6201] An art-historical and scientific investigation into two Early Cinquecento Renaissance Polyptychs by Antonio de Saliba (1466/7 – c. 1535) on Sicily and Malta**

Andrea Luca Bartolo (University of Malta) and Charlene Vella (University of Malta)

**12:28 [7041] An innovative heuristic strategy for the management of buried scenarios with strong discontinuities**

Raffaele Persico (DIAM-University of Calabria), Gianfranco Morelli (Geostudi Astier s.r.l.), Giuseppe Esposito (IREA-CNR) and Ilaria Catapano (IREA-CNR)

**12:45 [7843] From Space to Tree: multisensor and multiscale remote sensing based approach for monitoring monumental trees. The case of archaeological park of Colosseum in Rome. Preliminary results**

Nicola Masini (CNR-Istituto di Scienze del Patrimonio Culturale), Gabriella Strano (Ministero della Cultura - Colosseum Archaeological Park), Costanza Fiorentino (UniBas), Domenico Conte (Digimat srl), Nicodemo Abate (Consiglio Nazionale delle Ricerche - ISPC), Antonio Loperte (National Research Council – Institute of Methodologies for Environmental Analysis), Antonio Minervino Amodio (National Research Council – Institute of Heritage Science), Alfonsina Russo (Ministero della Cultura - Colosseum Archaeological Park), Angelo Donvito (Digimat srl) and Rosa Lasaponara (CNR - IMAA)

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*13:00 - 14:20 Room: Department of Engineering DIEM - Sala Conferenze*  
**LUNCH**

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*13:00 - 14:20 Room: Department of Engineering DIEM - Sala Conferenze*  
**POSTER SESSION #1**  
**Chairs:** Mariagrazia Leccisi, Giorgia Fiori, Gabriele Bocchetta

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**PS1-01 [6392] High-resolution geophysical investigation at Banditaccia Necropolis (Cerveteri) by means GPR and magnetic surveys**

Michele Punzo (Institute of Heritage Sciences (ISPC-CNR)), Daniela Tarallo (Institute of Heritage Sciences (ISPC-CNR)), Vincenzo Di Fiore (Institute of Heritage Sciences (ISPC-CNR)), Vincenzo Beelli (Ministry of Culture – Cerveteri and Tarquinia Archaeological Park), Carmelo Rizzo (Ministry of Culture – Cerveteri and Tarquinia Archaeological Park), Alberto Villari (Ministry of Culture – Cerveteri and Tarquinia Archaeological Park), Carla Sfameni (Institute of Heritage Sciences (ISPC-CNR)) and Marco Arizza (Institute of Heritage Sciences (ISPC-CNR))

**PS1-02 [834] Characterization of Mortars from the Roman Cryptoporticus of Lisbon (Portugal)**

Amira Souliman (University of Évora), Eva Leitão (Lisbon City Council), Cristina Nozes (Lisbon City Council), Patrícia Moita (Évora University | HERCULES Laboratory) and Cristina Galacho (Évora University | HERCULES Laboratory)

**PS1-03 [6934] AI-assisted Reconstruction of Archaeological Pottery from digital 3D mesh models**

Eleonora Marconi (Istituto Nazionale di Fisica Nucleare (INFN)), Antonio Budano (Istituto Nazionale di Fisica Nucleare (INFN)), Giancarlo Della Ventura (Università di Roma Tre), Federico Fina (Università di Roma Tre), Alberto Botti (ARAKNE), Sandro Tassa (ARAKNE), Ottavia Palacino (ARAKNE), Lorenzo Conte (Sovrintendenza Capitolina ai Beni Culturali (SCBC)), Marianna Franco (Sovrintendenza Capitolina ai Beni Culturali (SCBC)), Francesco Pacetti (Sovrintendenza Capitolina ai Beni Culturali (SCBC)), Caterina Coletti (archeologa), Armida Sodo (Università di Roma Tre) and Luca Tortora (Università di Roma Tre)

**PS1-04 [2703] Comparison of design formulas for torsion based catapults**

Kasper Mayntz Paasch (University of Southern Denmark) and Alexander Petersen Paasch (Aarhus University)

**PS1-05 [6987] Wide-area thickness evaluation of thin metal layers on paintings availing of MA-XRF**

Sergio Lins (La Sapienza Università di Roma), Giovanni E. Gigante (La Sapienza Università di Roma), Roberto Cesareo (Università degli Studi di Sassari) and Stefano Ridolfi (Ars Mensurae Rome)

**PS1-06 [8671] Study of wood samples positioning on two microwave planar coupled ring resonators for water content measurements**

Livio D'Alvia (Università Sapienza - DIMA), Ludovica Apa (Università Sapienza - DIMA), Emanuele Rizzuto (Università Sapienza - DIMA) and Zaccaria Del Prete (Università Sapienza - DIMA)

**PS1-07 [8971] Microwave reflectometry system for non-invasive wood moisture content monitoring**

Andrea Cataldo (University of Salento), Antonio Masciullo (University of Salento), Emanuele Piuzy (University of Rome Sapienza) and Raissa Schiavoni (University of Salento)

**PS1-08 [3491] From landscape to excavation: using new smart tools for multiscale archaeological investigations**

Emanuele Brienza (Università Telematica Internazionale Uninettuno)

**PS1-09 [799] System design for precision weeding in secondary archaeological sites**

Mariagrazia Leccisi (Dipartimento di Scienze - Università degli Studi "Roma Tre"), Giuseppe Schirripa Spagnolo (Università Roma Tre - Dipartimento di Matematica e Fisica) and Fabio Leccese (Università degli Studi "Roma Tre")

**PS1-10 [757] Influence of environmental data on the degradation processes on the wall paints of the Archeological Site of Baia (Italy)**

Paola Cennamo (Department of Humanities, University of Naples Suor Orsola Benincasa), Roberta Scielzo (Department of Humanities, University of Naples Suor Orsola Benincasa), Giorgio Trojsi (Department of Humanities, University of Naples Suor Orsola Benincasa) and Elena Chianese (Department of Science and Technology, Parthenope, University of Naples,)

**PS1-11 [4528] Protecting Archaeological Collection: The Importance of Microclimatic Monitoring and Diagnostic Investigations in the Preservation of the "Sala delle Madri"**

Antonio Spagnuolo (Energrenup srl), Carmela Vetromile (Energrenup srl), Antonio Masiello (Energrenup srl), Maria Francesca Alberghina (S.T.Art-Test di S. Schiavone & C.), Salvatore Schiavone (S.T.Art-Test di S.





Schiavone & C.), Noemi Mantile (Dipartimento Scienze Ambientali Biologiche e Farmaceutiche Università Campania "L. Vanvitelli"), Giovanni Solino (Territorial planning, environment and ecology sector, local authority Province of Caserta) and Carmine Lubritto (Dipartimento Scienze Ambientali Biologiche e Farmaceutiche Università Campania "L. Vanvitelli")

**PS1-12 [1908] A multidisciplinary investigation of an ancient kiln excavated at Costigliole Saluzzo: new archaeometric and archaeomagnetic results**

Yuri Leite Santos (Chemistry department, University of Turin), Evdokia Tema (Earth Sciences Department, University of Turin. ALP-CIMaN Alpine Palaeomagnetic Laboratory), Patrizia Davit (Chemistry department, University of Turin), Diego Elia (Historical Studies Department, University of Turin), Valeria Meirano (Historical Studies Department, University of Turin), Fulvio Fantino (TTA- Turin Thermoluminescence Analysis) and Monica Gulmini (Chemistry department, University of Turin)

**PS1-13 [6395] Noravank Monastery in Armenia. Multidisciplinary surveying**

Marco Carpiceci (Sapienza Università di Roma, DiSDRA), Fabio Colonnese (Sapienza Università di Roma, DiSDRA), Antonio Schiavo (Sapienza Università di Roma, DiSDRA) and Rachele Zanone (Independent Researcher)

**PS1-14 [8002] The X-ray irradiation as disinfection treatment: the state-of-the-art**

Cristina Cicero (University of Rome "Tor Vergata"), Monia Vadrucci (Agenzia Spaziale Italiana), Claudia Mazzuca (University of Rome "Tor Vergata"), Leonardo Severini (University of Rome "Tor Vergata"), Fulvio Mercuri (University of Rome "Tor Vergata"), Ugo Zammit (University of Rome "Tor Vergata") and Noemi Orazi (University of Rome "Tor Vergata")

**PS1-15 [2657] Wireless Sensing of Permittivity for Cultural Heritage Monitoring Using a Passive SRR**

Erika Pittella (Sapienza University of Rome), Andrea Cataldo (University of Salento), Marta Cavagnaro (Sapienza University of Rome), Livio D'Alvia (Sapienza University of Rome), Francesco Fabbrocino (Pegaso University) and Emanuele Piuze (Sapienza University of Rome)

**PS1-16 [8876] Preliminary multi-spectral imaging investigation on items from the Aga Khan III necropolis, Aswan (Egypt)**

Vittoria Guglielmi (Università degli Studi di Milano), Patrizia Piacentini (University of Milan), Chiara Andrea Lombardi (Università degli Studi di Milano, Università Roma La Sapienza), Valeria Comite (Università degli Studi di Milano), Andrea Bergomi (Università di Milano), Mattia Borelli (Università degli Studi di Milano), Gianluca Carabelli (Università degli Studi di Milano), Alfonsina D'Amato (Università degli Studi di Milano), Paola Fermo (Università degli Studi di Milano) and Alice Tomaino (Università di Milano)

**PS1-17 [9055] Research Information System for Cultural Heritage Impact Assessment**

Nunzia Maria Mangialardi (University of Foggia) and Alessandra Pierucci (University of Foggia)

**PS1-18 [8500] GPR and ERT surveys in the "Giardino dell'Annunziata" in Cammarata (Sicily)**

Raffaele Martorana (Dipartimento di Scienze della Terra e del Mare, Università degli Studi di Palermo, 90123 Palermo, Italy), Patrizia Capizzi (Dipartimento di Scienze della Terra e del Mare, Università degli Studi di Palermo, 90123 Palermo, Italy), Calogero Giambrone (I.I.S.S. Archimede, Cammarata (AG), Italy), Valeria Genco (I.I.S.S. Archimede, Cammarata (AG), Italy) and Lisa Simonello (I.C. Giovanni XXIII, Cammarata (AG), Italy)

**PS1-19 [1292] Multi-spectral investigation on a sheet with dedication and drawing by Giorgio de Chirico (1929)**

Paola Fermo (Dipartimento di Chimica, Università di Milano), Paolo Baldacci (Archivio dell'Arte Metafisica), Davide Manzini (Madatec srl), Valeria Cornite (Dipartimento di Chimica, Università di Milano), Chiara Andrea Lombardi (Dipartimento di Chimica, Università di Milano), Andrea Bergomi (Dipartimento di Chimica, Università di Milano), Mattia Borelli (Dipartimento di Chimica, Università di Milano) and Vittoria Guglielmi (Dipartimento di Chimica, Università degli Studi di Milano)

**PS1-20 [7514] Relief integrated techniques for historical architectures: first results for Santa Maria della Croce in Casaranello, south of Italy**

Laura Fabbiano (Polytechnic of Bari, University), Alessandro De Marco (Archeo APS EPS Association), Manuela Incert (University of Ferrara), Anna Castellano (Polytechnic of Bari, University), Gaetano Vacca (Polytechnic of Bari, University) and Rosario Morello (University Mediterranea of Reggio Calabria)

**PS1-21 [1943] A Technique to Support the Restoration Activities of Archaeological Discoveries**

Rosario Morello (Dept. DIIES, University Mediterranea of Reggio Calabria, Italy), Claudio De Capua (Dept. DIIES, University Mediterranea of Reggio Calabria, Italy), Andrea Maria Gennaro (SABAP-RC, Archaeological Superintendence of Reggio Calabria, Italy) and Laura Fabbiano (Dept. DMMM, Politecnico di Bari, Bari, Italy)

**PS1-22 [3458] Electromagnetic survey to detect a section of the Messapian city walls in Ugento (Lecce)**

Dora Francesca Barbolla (ISPC-CNR), Lara De Giorgi (ISPC-CNR), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR), Ilaria Miccoli (ISPC-CNR), Giuseppe Scardozi (ISPC-CNR), Chiara Torre (Università di Catania) and Giovanni Leucci (ISPC-CNR)

**PS1-23 [5334] A new Matrix for the Architectural Stratigraphic Diagram**

Roberto Villalobos (Sapienza University of Rome, Department of History, Restoration and Representation of Architecture)

**PS1-24 [5869] Significant data and information in complex analysis of the architectural heritage, the Republican Museum of Itu, Brazil**

Maisa Almeida (Postdoctoral Fellow USP), Marcela Sousa (Postdoctoral Fellow UNICAMP) and Gustavo Vanini (Faculdade de Arquitetura e Urbanismo - Universidade de São Paulo)

**PS1-25 [1155] Geophysical investigation at the Cathedral of Nardò (Lecce, Italy)**

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

**PS1-26 [1253] The study of Limes Arabicus using aerial and satellite remote sensing documentation. The case of Umm ar-Rasas (Amman, Jordan)**

Francesca Di Palma (University of Bari 'Aldo Moro' / National Research Council – Institute of Heritage Science, Lecce), Roberto Gabrielli (National Research Council – Institute of Heritage Science, Rome), Ilaria Miccoli (National Research Council – Institute of Heritage Science, Lecce) and Giuseppe Scardozi (National Research Council – Institute of Heritage Science, Lecce)

**PS1-27 [1342] Multitemporal analysis of remote sensing data for the study of the ancient city of Venusia (Venosa, Basilicata)**



Ilaria Miccoli (National Research Council –Institute of Heritage Science), Immacolata Ditaranto (National Research Council –Institute of Heritage Science), Pasquale Merola (National Research Council –Institute of Heritage Science) and Giuseppe Scardozzi (National Research Council –Institute of Heritage Science)

**PS1-28 [2985] Integrated use of aerial and ground-based close-range remote sensing techniques to support preventive archaeology: the case study of Ascoli Satriano (FG)**

Nicodemo Abate (Consiglio Nazionale delle Ricerche - ISPC), Italo Maria Muntoni (Soprintendenza Archeologia Belle Arti e Paesaggio delle province di Barletta-Andria-Trani e Foggia), Maria Sileo (CNR - ISPC), Luigi Capozzoli (CNR - IMAA), Gregory de Martino (CNR - IMAA), Rosa Lasaponara (CNR - IMAA) and Nicola Masini (CNR - ISPC)

**PS1-29 [3104] High resolution GPR survey to investigate the urban centres: the case of XX Settembre square of Fano (Fano, Italy)**

Salvatore Piro (ISPC CNR Institute of Heritage Sciences, Italy), Laura Cerri (Freelance archaeologist) and Oscar Mei (University of Urbino (Urbino, Italy))

**PS1-30 [3148] Geoarchaeological and geophysical investigation in Venusia (Basilicata, southern Italy): the test site of roman amphitheater**

Lara De Giorgi (ISPC-CNR), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR), Maurizio Lazzari (ISPC-CNR) and Giovanni Leucci (ISPC-CNR)

**PS1-31 [8923] Scientific Examination for the Investigation of the Painting Technique of Contemporary Mural Paintings: “The Angry Christ” by Alfonso Ossorio in Victorias, Negros Occidental, Philippines**

Jem Erika Nique (Alma Mater Studiorum - Università di Bologna), Emilio Catelli (Alma Mater Studiorum - Università di Bologna), Zohreh Chahardoli (Alma Mater Studiorum - Università di Bologna) and Rocco Mazzeo (Alma Mater Studiorum - Università di Bologna)

**PS1-32 [1827] ERT AND MAGNETIC SURVEYING: THE CASE STUDY OF KHAYRABADTEPA SATTELMENT (SOUTHERN UZBEKISTAN)**

Azamat Zakirov (Center for Advanced Technologies), Ilyas Yanbukhtin (Center for Advanced Technologies), Timur Mamarozikov (Center for Advanced Technologies), Ilkhom Alimukhamedov (Center for Advanced Technologies), Farangiz Omonova (Center for Advanced Technologies), Ulugbek Musaeu (Center for Advanced Technologies) and Otabek Aripjanov (Institute of Art Studies)

**PS1-33 [9382] From excavation to digital use, reconstructing and returning the past to small communities: the case of the medieval fortress of Cervara di Roma**

Giulia Chellini (DigiLab Sapienza University of Rome), Saverio Giulio Malatesta (DigiLab Sapienza University of Rome), Mariflora Caruso (DigiLab Sapienza University of Rome), Paola La Torre (DigiLab Sapienza University of Rome), Paolo Rosati (DigiLab Sapienza University of Rome) and Roberta Manzollino (DigiLab Sapienza University of Rome)

**PS1-34 [9913] Fading devotion: the case of the Late Medieval cave-church of San Niklaw (ca. 1398 - 1436) in Mellieha, Malta**

Michael Zammit, Charlene Vella, Keith Buhajar, Sebastiano D'Amico, Emanuele Colica, Luca Piroddi, Luciano Galone

**PS1-35 [9383] From TLS data into H-FEM model based on the quad-mesh: the case study of romanian church**

Vincenzo Saverio Alfio (Polytechnic of Bari), Domenica Costantino (Polytechnic of Bari), Sorin Herban (Politehnic University of Timisoara), Massimiliano Pepe (University G. D'Annunzio of Chieti-Pescara) and Alfredo Restuccia Garofalo (Polytechnic of Bari)

14:20 - 16:20

*Room: Department of Engineering DIEM - Sala Conferenze*

**Symposium I - Digital**

**Session 3.1 - GENIUS LOCI: Methods and code for measuring historical phenomena, ancient landscape dynamics, and mechanisms through IT heritage methodologies**

**Chairs:** Paolo Rosati, Augusto Palombini

**14:20 [1739] Archaeological prospection methodology at Teotihuacan (Mexico): study of a neighbourhood in the centre of the city**

Alessandra Pecci (ERAAUB, IAUB, INSA-UB, UNIVERSITAT DE BARCELONA), Luis Barba (Laboratorio de Prospección Arqueológica, IIA, UNAM), Agustín Ortiz Butron (Laboratorio de Prospección Arqueológica, IIA, UNAM), Jorge Blancas (Laboratorio de Prospección Arqueológica, IIA, UNAM), Itzayana Bernal (UNAM) and Natalia Moragas (ERAAUB, IAUB, UNIVERSITAT DE BARCELONA)

**14:37 [2075] Bioclimatic study of Feng Shui principles in the ancient Chinese village of Chuandixia**

Filippo Calcerano (National Research Council), Letizia Martinelli (National Research Council), Elena Verticchio (National Research Council), Luciano Cessari (National Research Council) and Elena Gigliarelli (National Research Council)

**14:54 [2676] Roma and minium: aerial analysis of the Sierra Morena landscape in search of the cinnabar path from Sisapo to the Baetis ships**

Miriam González Nieto (Universidad Nacional de Educación a Distancia (UNED))

**15:11 [4500] Archaeological data and reliability criteria. A GIS measurement proposal for the study of the Mignone Valley**

Federica Vacatello ("Sapienza" Università di Roma)

**15:28 [7640] Digital approaches to ancient metrology: new insights into methods and tools for measuring and designing marble in Late Antiquity**

Giulia Marsili (Department of History and Culture, University of Bologna, Italy) and Claudia Lamanna (University of Bologna, Department of Cultural Heritage)

**15:45 [8611] Design Analysis: Research experiences from Alexandrian manuals to Imperial Architecture**

Silvia Bertacchi (Alma Mater Studiorum University of Bologna), Francisco Juan-Vidal (Universitat Politècnica de València, Instituto Universitario de Restauración del Patrimonio) and Filippo Fantini (Alma Mater Studiorum University of Bologna)

**16:02 [9090] MirrorLAB: narrative patterns between collections of antiquities and urban landscapes**

Lorenzo Fei (Università Roma Tre), Francesco Freddolini (Sapienza Università di Roma), Federica Grigoletto (Sapienza Università di Roma), Vincenzo Maria Lacolla (Università Roma Tre), Laura Leopardi (Sapienza Università di Roma), Saverio Giulio Malatesta (Sapienza Università di Roma), Leonora Marzullo (Università Roma Tre), Maria Onori (Sapienza Università di Roma), Giorgio Ortolani (Università Roma Tre), Antonio Pugliano (Università Roma Tre) and Paolo Rosati (Sapienza Università di Roma)

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*14:20 - 16:20* *Aula B - Department of Mathematics and Physics*  
**Symposium II - Diagnostic**  
**Session 3.2 - Non-destructive Imaging Techniques for the Characterization of Cultural Heritage**  
**Chairs:** Fulvio Mercuri, Eva Pietroni, Noemi Orazi

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**14:20 [603] The Application of Reflectance Transformation Imaging (RTI) and Multispectral analysis on Ancient Egyptian Coffin-lids at the Israel Museum, Jerusalem: a New Analytic Approach to Workshop Identification**

Daniela Galazzo (University of Haifa), Shiry Ben Dor (University of Haifa) and Assaf Yasur-Landau (University of Haifa)

**14:37 [1459] Active infrared thermography for the analysis of ancient books**

Giovanni Caruso (ISPC-CNR), Noemi Orazi (Università di Roma Tor Vergata), Stefano Paoloni (University of Rome "Tor Vergata"), Ugo Zammit (University of Rome "Tor Vergata") and Fulvio Mercuri (University of Rome "Tor Vergata")

**14:54 [2692] Optical NDT supporting the restoration of a marble sculpture on the facade of the Gesù Nuovo church in Naples**

Massimo Rippa (ISASI-CNR), Vito Pagliarulo (ISASI-CNR), Chiara Saltarelli (University Suor Orsola Benincasa), Maria Rosaria Vigorito (University Suor Orsola Benincasa), Gianluca Coda (ISASI-CNR), Pasquale Mormile (ISASI-CNR), Andrea Carpentieri (University Suor Orsola Benincasa, UNINA) and Melania Paturzo (ISASI-CNR)

**15:11 [3634] Development of a Quantitative Multimodal Imaging Technique for In-situ Study of Iron Archaeological Artefacts**

Elodie Granget (Haute Ecole Arc Conservation-Restauration Neuchâtel, HES-SO), Ocsen Reginald Cocen (Haute Ecole Arc Conservation-Restauration Neuchâtel, HES-SO), Mahdieh Shakoorioskooie (Laboratory for Neutron Scattering and Imaging at the Paul Scherrer Institute), Zhan Qianru (Laboratory for Neutron Scattering and Imaging at the Paul Scherrer Institute), Marian Nida Lumongsod-Thompson (Tribology and Interfacial Chemistry (TIC) Group, SCI-STI-SM, Institute of Materials, EPFL), Anders Kaestner (Laboratory for Neutron Scattering and Imaging at the Paul Scherrer Institute), David Mannes (Laboratory for Neutron Scattering and Imaging at the Paul Scherrer Institute) and Laura Brambilla (Haute Ecole Arc Conservation-Restauration Neuchâtel, HES-SO)

**15:28 [4732] Gellan gum hydrogels as such and ionic-liquid doped as modulable micro-invasive tools for cultural heritage studies**

Rocco Cancelliere (Department of Chemical Science and Technologies, University of Rome “Tor Vergata”), Leonardo Severini (Department of Chemical Science and Technologies, University of Rome “Tor Vergata”), Eleonora Kratter Thaler (Department of Chemistry, University of Milan), Claudia Mazzuca (Department of Chemical Science and Technologies, University of Rome “Tor Vergata”), Vittoria Guglielmi (Department of Chemistry, University of Milan), Patrizia Mussini (Patrizia Mussini) and Laura Micheli (Department of Chemical Science and Technologies, University of Rome “Tor Vergata”)

**15:45 [6824] Thermal texturing for ancient codes 4D exploration**

Noemi Orazi (Dip. Ingegneria Industriale, Università di Roma Tor Vergata), Eva Pietroni (ISPC-CNR), Fulvio Mercuri (Dip. Ingegneria Industriale, Università di Roma Tor Vergata), Daniele Ferdani (ISPC-CNR), Enzo D'Annibale (ISPC-CNR), Giovanni Caruso (ISPC-CNR), Diego Ronchi (ISPC-CNR), Stefano Paoloni (Dip. Ingegneria Industriale, Università di Roma Tor Vergata) and Ugo Zammit (Dip. Ingegneria Industriale, Università di Roma Tor Vergata)

**16:02 [8317] Absolute dating of three ancient kilns excavated at Canosa di Puglia through archaeomagnetism**

Evdokia Tema (Dipartimento di Scienze della Terra) and Italo Maria Muntoni (Soprintendenza archeologia, belle arti e paesaggio per le province di Barletta-Andria-Trani e Foggia)

14:20 - 16:20

*Aula C - Department of Mathematics and Physics*

**Symposium VII - Geomatics**

**Session 3.3 - Geomatics for Cultural Heritage by integrating multi-source and multi-scale data**

**Chairs:** Gabriele Bitelli, Maria Grazia D'Urso

**14:20 [3368] 3D metric Survey of the Mezzagnone Arab bath. From point clouds to 2D drawings and parametric model**

Alessandro Spadaro (Postgraduate School of Architectural Heritage and Landscape, Politecnico di Torino), Filiberto Chiabrando (Dep. Architecture and Design, Politecnico di Torino) and Lorenzo Teppati Losé (Dep. Architecture and Design, Politecnico di Torino)

**14:37 [4248] Comparison of two technologies in 3D surveying of Real Estate Assets and Cultural Heritage**

Giulia Fiorini (DICAM Alma Mater Studiorum University of Bologna – Department of Classic Sapienza University of Rome), Maria Alessandra Tini (DICAM Alma Mater Studiorum University of Bologna), Francesco Montelli (Operai dell'Arte APS) and Gabriele Bitelli (DICAM Alma Mater Studiorum University of Bologna)

**14:54 [8452] War-scapes testimonial gradient: a multi-criteria approach as a proactive tool for choosing future practices of enhancement**

Joel Aldrighettoni (Engineer, Architect, PhD), Barbara Marana (University of Bergamo) and Maria Grazia D'Urso (Department of Engineering and Applied Sciences, University of Bergamo)

**15:11 [9649] Unveiling the Hidden Past: exploring the historical evolution of Borbona (Rieti, Italy) through archaeological surveys and geophysical prospections**

Cecilia Giorgi (CNR ISPC), Marilena Cozzolino (Università del Molise), Vincenzo Gentile (Università del Molise) and Paolo Mauriello (Università del Molise)



## 15:28 An amphibious vehicle for archaeological inspections in shallow water

Manuel Greco, Roma Tre University of Rome

14:20 - 16:20 *Aula 1 - Department of Sciences*

### **Symposium III - Materials**

#### **Session 3.4 - Inorganic, organic, and hybrid materials for the conservation and consolidation of cultural heritage**

**Chairs:** Luca Tortora, Angelja K. Surca

### **14:20 [732] Recycled bacterial nanocellulose membranes as novel green gels for the cleaning of cultural heritage surfaces**

Erica Sonaglia (Department of Chemical Engineering Materials and Environment, Sapienza University of Rome, Rome, Italy), Maria Paola Bracciale (Department of Chemical Engineering Materials and Environment, Sapienza University of Rome, Rome, Italy) and Maria Laura Santarelli (Department of Chemical Engineering Materials and Environment, Sapienza University of Rome, Rome, Italy)

### **14:37 [2559] Cellulose ethers and nanoconsolidants: preliminary observations on the suitability of the use of cellulose derivatives in the synthesis of nanolime particles**

Penka Girginova (HERCULES Laboratory, University of Évora) and Cristina Galacho (HERCULES Laboratory & Chemistry and Biochemistry Department of School of Sciences and Technology, University of Évora)

### **14:54 [3718] Electrochemistry and vibrational spectroscopy in investigation of protective coatings for bronze artworks**

Angelja Kjara Surca (National Institute of Chemistry, Hajdrihova 19, 1000 Ljubljana, Slovenia) and Mohor Mihelčič (National Institute of Chemistry, Hajdrihova 19, 1000 Ljubljana, Slovenia)

### **15:11 [3959] Analysis of materials of wax Christ-children from the Monastery of Santa Rosa in Viterbo**

Arianna Ceci (University of Tuscia - DIBAF Dept.), Luca Lanteri (University of Tuscia - DEIM Dept.), Claudia Pelosi (University of Tuscia - DEIM Dept.), Paola Pogliani (University of Tuscia - DIBAF Dept.) and Sabrina Sottile (University of Tuscia - DIBAF Dept.)

### **15:28 [4106] Novel, effective and safe coatings for the protection of copper-based artefacts**

Francesca Boccaccini (Sapienza University of Rome)

### **15:45 [9446] Synthesis of titania nanoparticles in W/O microemulsion: moving the production toward a green approach**

Eleonora Marconi (Istituto Nazionale di Fisica Nucleare) and Luca Tortora (Università Roma Tre)

### **16:02 [9846] Monoazo and Isoindoline Yellow reactivity in presence of Pb, Ti, Zn-based white substrates**

Agnese De Carlo (Department of Science, Roma Tre University; National Institute for Nuclear Physics INFN.), Valerio Graziani (National Institute for Nuclear Physics INFN), Paolo Branchini (National Institute for Nuclear Physics INFN) and Luca Tortora (Department of Science, Roma Tre University; National Institute for Nuclear Physics INFN.)

14:20 - 16:00 *Aula 2 - Department of Sciences*

**Symposium IV - Sensors**

**Session 3.5 - Non-Invasive Systems and Techniques for "On-Site" Monitoring and Diagnosis**

**Chairs:** Emanuele Piuze, Livio D'Alvia, Erika Pittella

**14:20 [1301] Handheld laser-induced breakdown spectroscopy, portable energy dispersive X-ray fluorescence spectroscopy and Graph Clustering applied to the identification and inner stratigraphy of archaeological metallic artifacts**

Giorgio Saverio Senesi (CNR - Istituto per la Scienza e Tecnologia dei Plasmi (ISTP) - Sede di Bari), Sara Mattiello (CNR - Istituto per la Scienza e Tecnologia dei Plasmi (ISTP) - Sede di Bari), Vincenzo Palleschi (CNR - Istituto di Chimica dei Composti Organo-Metallici (CNR-ICCOM), U.O.S. di Pisa), Bruno Cocciaro (CNR - Istituto di Chimica dei Composti Organo-Metallici (CNR-ICCOM), U.O.S. di Pisa), Girolamo Fiorentino (Laboratory of Archeobotany and Paleoecology, Department of Cultural Heritage, University of Salento) and Olga De Pascale (CNR - Istituto per la Scienza e Tecnologia dei Plasmi (ISTP) - Sede di Bari)

**14:37 [3258] Digitalization of Bernini's drawing Tondo depicting St. Joseph with the baby Jesus. Increasing knowledge and monitoring surface cracks**

Beatrice Calosso (ENEA), Marialuisa Mongelli (ENEA) and Sara Pettisano (Pisa University)

**14:54 [3885] In situ characterization of prehistoric rock paintings: the Côa Valley (Portugal)**

Jose Santiago Pozo Antonio (Universidade de Vigo), Teresa Rivas (Universidade de Vigo), Pablo Barreiro (Universidade de Vigo), Vera Caetano (University of Coimbra), Fernando Carrera (Rock Art Conservation and Management) and Lara Bacelar Alves (University of Coimbra)

**15:11 [5632] Preventive conservation plan for a group of bronze sculptures from the Gori Art Collection**

Sara Croci (Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy), Leila Es Sebar (Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy), Caterina Gori (Collezione Gori, Fattoria di Celle, Santomato, Pistoia, Italy), Leonardo Iannucci (Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy), Emma Angelini (Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy) and Sabrina Grassini (Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy)

**15:28 [7490] Processing of shaking table test data of a historic masonry structure by graph-based methods**

Vincenzo Fioriti (ENEA), Antonino Cataldo (ENEA), Alessandro Colucci (ENEA), Chiara Ormando (ENEA), Fernando Saitta (ENEA), Domenico Palumbo (ENEA) and Ivan Roselli (ENEA)





16:20 - 16:40

*Room: Department of Engineering DIEM - Sala Conferenze*  
**COFFEE BREAK**

16:40 - 18:10

*Room: Department of Engineering DIEM - Sala Conferenze*

**Symposium I - Digital**

**Session 4.1 - Multiscalar Approaches to Digital Documentation of Archaeology: Challenges, implications, and solutions**

**Chairs:** Alfonso Ippolito, Martina Attenni

**16:40 [154] Phygital sculptures for archaeological dissemination: The head of Sant'Elena**

Michele Russo (History, Representation and Restauration of Architecture, Sapienza University of Rome), Luca James Senatore (History, Representation and Restauration of Architecture, Sapienza University of Rome), Raffaella Giuliani (Pontificia Commissione di Archeologia Sacra) and Rocco Bochicchio (Soprintendenza Speciale Archeologia, Belle Arti e Paesaggio di Roma)

**16:57 [218] Multi-technique approach to unveil the composition, fabrication, and potential provenance of a unique pre-Roman glass collection (IV-I BC)**

Suset Barroso-Solares (University of Valladolid), Estefania Estalayo (Department of Analytical Chemistry, University of the Basque Country (UPV/EHU)), Elvira Rodriguez-Gutierrez (University of Valladolid), Violeta Hurtado-Garcia (University of Valladolid), Ricardo Vicente-Rojas (University of Valladolid), Oscar Fadon (University of Valladolid), Julene Aramendia (Department of Analytical Chemistry, University of the Basque Country (UPV/EHU)), Jose Carlos Coria-Noguera (Centro de Estudios Vacceos "Federico Wattenberg", Faculty of Philosophy and Literature, University of Valladolid), Quentin Lemasson (Centre de Recherche et de Restauration des Musées de France, C2RMF), Claire Pacheco (Centre de Recherche et de Restauration des Musées de France, C2RMF), Angel Carmelo Prieto (University of Valladolid), Carlos Sanz-Minguez (Centro de Estudios Vacceos "Federico Wattenberg", University of Valladolid, Valladolid,), Juan Manuel Madariaga (Department of Analytical Chemistry, University of the Basque Country (UPV/EHU), Bilbao, Spain) and Javier Pinto (University of Valladolid)

**17:14 [1616] The ancient Stone Ship. Integrated investigations on the original morphology of the Tiber Island, between legend and material consistency**

Emanuela Chiavoni (Università Sapienza di Roma), Francesca Porfiri (Università Sapienza di Roma) and Gaia Lisa Tacchi (Università Sapienza di Roma)

**17:31 [2080] Survey and analysis of the Fossanova Abbey**

Roberto Barni (Sapienza Dipartimento di storia disegno e restauro dell'architettura) and Carlo Inglese (Sapienza Dipartimento di storia disegno e restauro dell'architettura)

**17:48 [5091] Integrated survey for the modeling of complex environments. La Grotta di San Michele Arcangelo a Olevano sul Tusciano, Salerno**

Lorena Centarti (Università degli studi di Salerno), Carla Ferreyra (Università degli studi di Salerno), Caterina Gabriella Guida (Università degli studi di Salerno), Marco Limongiello (Università degli studi di Salerno) and Barbara Messina (Università degli studi di Salerno)

16:40 - 18:10

*Aula B - Department of Mathematics and Physics*

**Symposium II - Diagnostic**

**Session 4.2 - Terahertz, millimeter wave and optical techniques applied to cultural heritage**

**Chairs:** Shi Haolian, Manuel Greco

**16:40 [2844] Characterization of Roman Amphora Sherds Using Terahertz Time-of-Flight Tomography**

Min Zhai (International Research Lab 2958 GeorgiaTech - CNRS), Alexandre Locquet (International Research Lab 2958 GeorgiaTech - CNRS), Haolian Shi (International Research Lab 2958 GeorgiaTech - CNRS), Cesar Carreras Monfort (Universitat Atònoma de Barcelona) and D.S Citrin (International Research Lab 2958 GeorgiaTech - CNRS)

**16:57 [4123] Terahertz imaging super-resolution for documental heritage**

Danae Antunez Vazquez (Department of Physics, University Sapienza; ARCHMAT (EMMJD)), Laura Pillozzi (Istituto Sistemi Complessi - CNR; Research Center Enrico Fermi.), Eugenio Del Re (Department of Physics, University Sapienza), Claudio Conti (Department of Physics, University Sapienza; Istituto Sistemi Complessi - CNR; Research Center Enrico Fermi.), Silvia Sotgiu (National Central Library of Rome), Federica Delia (Recto Verso Conservation Studio; Academy of Fine Arts of Rome) and Mauro Missori (Institute for Complex Systems, National Research Council (ISC-CNR), Department of Physics, University Sapienza)

**17:14 [5824] Investigation of natural and synthetic pigments: terahertz continuous-waves spectroscopy (THz-CW) as a reliable high-resolution approach applied to the Cultural Heritage field**

Candida Moffa (Department of Basic and Applied Sciences for Engineering, University of Rome 'Sapienza', Rome, Italy), Fernando Jr. Piamonte Magboo (Department of Basic and Applied Sciences for Engineering, University of Rome 'Sapienza', Rome, Italy), Alessandro Curcio (National Laboratory of Frascati – LNF-INFN, Frascati (RM), Italy), Luigi Palumbo (Department of Basic and Applied Sciences for Engineering, University of Rome 'Sapienza', Rome, Italy), Anna Candida Felici (Department of Basic and Applied Sciences for Engineering, University of Rome 'Sapienza', Rome, Italy) and Massimo Petrarca (Department of Basic and Applied Sciences for Engineering, University of Rome 'Sapienza', Rome, Italy)

**17:31 [6316] Terahertz Identification of Characters Written in Iron-Gall Ink on Stacked Paper**

Haolian Shi (School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, Georgia 20223-0250 USA), Leor Jacobi (Device Spectroscopy Laboratory, Inst. for Nanotechnology and Adv. Materials, Bar-Ilan University, Ramat-Gan 5290002, Israel), Alexandre Locquet (Georgia Tech-CNS UMI2958, Georgia Tech Europe, 2 Rue Marconi, 57070 Metz, France) and David Citrin (School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, Georgia 20223-0250 USA)

**17:48 [9433] A THz Scanner to Detect Moisture on Wood Samples**

Manuel Greco (Università degli Studi "Roma Tre"), Fabio Leccese (Università degli Studi "Roma Tre"), Emilio Giovenale (ENEA, Fusion and Nuclear Dept, Frascati), Luca Senni (ENEA, Fusion and Nuclear Dept, Frascati), Andrea Taschin (ENEA, Fusion and Nuclear Dept, Frascati) and Andrea Doria (ENEA, Fusion and Nuclear Dept, Frascati)

16:40 - 18:10

*Aula C - Department of Mathematics and Physics*

**Session 4.3 - Biodeterioration of cultural heritage: evaluation of damages and new approaches for prevention and control - General Session**

**Chairs:** Flavia Bartoli, Annalaura Casanova Municchia

**16:40 [7964] IAEA fosters the development and applications of accelerator-based analytical techniques for Heritage Science**

Lena Bassel (Division of Physical and Chemical Sciences, International Atomic Energy Agency), Alessandro Migliori (Nuclear Science and Instrumentation Laboratory, International Atomic Energy Agency Laboratories), Roman Padilla Alvarez (Nuclear Science and Instrumentation Laboratory, International Atomic Energy Agency Laboratories) and Aliz Simon (Division of Physical and Chemical Sciences, International Atomic Energy Agency)

**16:57 [4944] Morphological Analysis of the Kheireddine Palace converted into the Museum of Tunis City**

Rym Bouhamed (Ecole Centrale Supérieure Privée Des Lettres, Des Arts Et Des Sciences De La Communication)

**17:14 [7950] The Role of Photogrammetry in the Conservation Management of Al Mahatta Museum, Sharjah, UAE**

Ahmad Badr Aldin Fattal (University of Sharjah), Rami Al-Ruzouq (University of Sharjah) and Eslam Nofal (University of Sharjah)

**17:31 [587] LONG-LASTING METHODS TO PREVENT BIODETERIORATION OF STONE MONUMENTS: NEW SILICA NANOSYSTEM COUPLED TO NATURAL BIOCIDES**

Flavia Bartoli (Institute of Heritage Science (CNR-ISPC), Italy.), Zohreh Hosseini (Department of Sciences, University of Roma Tre, Italy.), Alma Kumbaric (Department of Sciences, University of Roma Tre, Italy.) and Giulia Caneva (Department of Sciences, University of Roma Tre, Italy.)

**17:48 [9070] Microwave transducers for moisture content characterization of cultural heritage materials**

Giovanni Gugliandolo (University of Messina), Alessio Altadonna (University of Messina), Adriana Arena (University of Messina), Marina Arena (University of Messina), Luigi Calabrese (University of Messina), Giuseppe Campobello (University of Messina), Giovanni Crupi (University of Messina), Daniela Iannazzo (University of Messina), Francesca Passalacqua (University of Messina), Fabio Todesco (University of Messina), Maria Gabriella Xibilia (University of Messina) and Nicola Donato (University of Messina)

16:40 - 18:20

*Aula 1 - Department of Sciences*

**Symposium III - Materials**

**Session 4.4 - Advancement in surface treatments and analyses in the field of conservation science**

**Chairs:** Francesca Volpi, Weththimuni Maduka Lankani, Giacomo Fiocco

**16:40 [4523] NYMPHA, a natural product for the conservation of ancient wood. Preliminary results**

Eleonora Cerafogli (La Sapienza University), Alessandro Ciccola (La Sapienza University), Amina Antonacci (Institute of Crystallography, National Research Council (CNR)), Annalisa Masi (Institute of Crystallography, National Research Council (CNR)), Teresa Rinaldi (La Sapienza University), Marcella Ioele (Central Institute for Restoration (ISCR)), Gabriele Favero (La Sapienza University), Laura Sadori (La Sapienza University) and Alessia Masi (La Sapienza University)

**16:57 [7382] Monitoring of protective products on Peperin stone using portable devices**  
Giuseppe Capobianco (Università Sapienza Ingegneria Materiali e Materie prime), Claudia Pelosi (University of Tuscia - DEIM Dept.), Luca Lanteri (University of Tuscia - DEIM Dept.), Giuseppe Bonifazi (DICMA Sapienza - University of Rome), Oriana Trotta (DICMA Sapienza - University of Rome) and Silvia Serranti (DICMA Sapienza - University of Rome)

**17:14 [8385] The use of micaceous pigments for the chromatic reintegration of the gilded stuccoes in the Lante della Rovere chapel of Palazzo Orsini at Bomarzo**

Elena Testa (University of Tuscia - DIBAF Dept.), Luca Lanteri (University of Tuscia - DEIM Dept.), Giuseppe Capobianco (Sapienza - University of Rome), Giuseppe Bonifazi (Sapienza - University of Rome), Silvia Serranti (Sapienza - University of Rome), Francesca Montozzi (University of Tuscia - DIBAF Dept.), Paola Pogliani (University of Tuscia - DIBAF Dept.) and Claudia Pelosi (University of Tuscia - DEIM Dept.)

**17:31 [9371] Nano-hydroxyapatite for the conservation of Serena stone**

Maduka Lankani Weththimuni (Department of Chemistry, University of Pavia), Giacomo Fiocco (Arvedi Laboratory of Non-Invasive Diagnostics, CISRIC, University of Pavia), Francesca Volpi (Department of Musicology and Cultural Heritage, University of Pavia), Marco Malagodi (Department of Musicology and Cultural Heritage, University of Pavia) and Maurizio Licchelli (Department of Chemistry, University of Pavia)

**17:48 [3588] Unveiling Hidden Insights of Ancient Roman wall paintings in Cremona: In-Depth Knowledge Beyond the Surface with Spectroscopic Analysis**

Francesca Volpi (University of Pavia), Michela Albano (University of Pavia), Giacomo Fiocco (University of Pavia), Maduka Weththimuni (University of Pavia) and Marco Malagodi (University of Pavia)

**18:05 [5724] The Roman mosaic in the Nymphaeum of Villa Giulia in Rome. Characterization of the deterioragen agents and preliminary experimentation of eco-sustainable products**

Miriam Lamonaca (Museo Nazionale Etrusco di Villa Giulia)

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16:40 - 18:10 *Aula 2 - Department of Sciences*

**Symposium IV - Sensors**

**Session 4.5 - Microclimate for Cultural Heritage: Conservation in Indoor Environments**

**Chairs:** Chiara Coletti, Eleonora Balliana

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**16:40 [1178] Indoor Climate Characterisation of the Quarantine Room of NTNU University Library**

Giulia Boccacci (Department of Earth Sciences, Sapienza University of Rome), Francesca Frasca (Department of Physics, Sapienza University of Rome), Chiara Bertolin (Department of Mechanical and Industrial Engineering, Norwegian University of Science and Technology), Claudio Chimenti (Department of Biology



and Biotechnologies "Charles Darwin", Sapienza University of Rome), Erlend Lund (Library Section for Collections, Resources and Digital Services, NTNU University Library), Tonje Dahlin Sæter (Library Section for Collections, Resources and Digital Services, NTNU University Library) and Anna Maria Siani (Department of Physics, Sapienza University of Rome)

**16:57 [4150] Environmental tendency from the retrofit to current time: a case study in Rome, Italy**

Beatrice Bartolucci (Department of Earth Science, Sapienza University of Rome (Italy)), Francesca Frasca (Department of Physics, Sapienza University of Rome (Italy)), Chiara Bertolin (Department of Mechanical and Industrial Engineering, Norwegian University of Science and Technology (Trondheim, Norway)), Gabriele Favero (Department of Environmental Biology, Sapienza University of Rome (Italy)) and Anna Maria Siani (Department of Physics, Sapienza University of Rome (Italy))

**17:14 [5288] Cluster Analysis to identify Microclimate Patterns in a Multi-room Film Archive**

Lisa Vergelli (Sapienza Università di Roma), Francesca Frasca (Sapienza Università di Roma), Chiara Bertolin (Norwegian University of Science and Technology, Trondheim, Norway, Dept. of Mechanical and Industrial Engineering), Gabriele Favero (Sapienza Università di Roma) and Anna Maria Siani (Sapienza Università di Roma)

**17:31 [6331] The diagnostic study of the plaster casts of the Trajan's Column in the Museum of Roman Civilisation (Rome)**

Federica Bubola (Department of Geosciences, University of Padua), Chiara Coletti (Department of Geosciences, University of Padua), Eleonora Balliana (Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University), Claudia Cecamore (Sovrintendenza Capitolina ai Beni Culturali, Rome), Claudio Parisi Presicce (Sovrintendenza Capitolina ai Beni Culturali, Rome) and Claudio Mazzoli (Department of Geosciences, University of Padua)

**17:48 [9255] Monitoring of relative humidity in extreme environments: the hypogeum of "Tomba della Scimmia"**

Francesca Frasca (Sapienza University of Rome), Alessia Caratelli (Tecno.EL S.r.l.) and Anna Maria Siani (Sapienza University of Rome)

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19:00 - 23:00 *Stadium of Domitian - Stadio Domiziano*  
**GALA DINNER**

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19:00 - Arrival / Aperitif

19:45 - Guided Tour of the Stadium

21:00 - Dinner

## Technical Program - Saturday, October 21

08:30 - 12:00 *Department of Sciences*  
**REGISTRATION**

09:00 - 11:00 *Aula 1 - Department of Sciences*  
**Symposium I - Digital**  
**Session 5.1 - How do we measure scientific reliability? Semantic approaches and software solutions for 3D virtual reconstruction in archaeology**  
**Chairs:** Emanuel Demetrescu, Simone Berto, Eleonora Scopinaro

**09:00 [277] Documentation and Evaluation of Virtual Reconstructions**

Marc Grellert (Technische Universität Darmstadt, FG Digitales Gestalten), Markus Wacker (HTW Dresden, Fakultät Informatik/Mathematik), Jonas Bruschke (HTW Dresden, Fakultät Informatik/Mathematik), Wolfgang Stille (Technische Universität Darmstadt, hessian.ai) and Daniel Beck (Technische Universität Darmstadt, hessian.ai)

**09:17 [2271] Reconstruction beyond Representation in Notre-Dame de Paris**

Anaïs Guillem (UMR 3495 MODÈLES ET SIMULATIONS POUR L'ARCHITECTURE ET LE PATRIMOINE CNRS), Antoine Gros (UMR 3495 MODÈLES ET SIMULATIONS POUR L'ARCHITECTURE ET LE PATRIMOINE CNRS), Abergel Violette (UMR 3495 MODÈLES ET SIMULATIONS POUR L'ARCHITECTURE ET LE PATRIMOINE CNRS) and Livio De Luca (UMR 3495 MODÈLES ET SIMULATIONS POUR L'ARCHITECTURE ET LE PATRIMOINE CNRS)

**09:34 [2839] Virtual Reconstruction as a Scientific Inquiry Tool: the Late Antique Wall of Aquileia (M2) Using the Extended Matrix**

Nicola Delbarba (Università degli Studi di Verona)

**09:51 [4012] A new section of the Extended Matrix methodology: Transformation Stratigraphic Unit (TSU)**

Eleonora Scopinaro (Institute of Heritage Science, National Research Council of Italy (ISPC-CNR)), Simone Berto (Institute of Heritage Science, National Research Council of Italy (ISPC-CNR)) and Emanuel Demetrescu (Institute of Heritage Science, National Research Council of Italy (ISPC-CNR))

**10:08 [8030] A Landscape Matrix: the EM tool for the analysis of the via Appia**

Matteo Lombardi (Università degli Studi di Ferrara)

**10:25 [6422] "Building and reconstructing contexts". Interdisciplinary approach to the enhancement of Phoenician-Punic archaeological elements exhibited in the Museum of Cádiz (SW, Spain)**

Pablo Sicre-González (Universidad de Cádiz - Grupo de Investigación HUM509), Ana María Niveau-de-Villedary Y Mariñas (Universidad de Cádiz - Grupo de Investigación HUM509), Juan Ignacio Vallejo Sánchez



(Museo Provincial de Cádiz, Junta de Andalucía – Grupo de Investigación HUM509) and María Auxiliadora Llamas Márquez (Museo Provincial de Cádiz, Junta de Andalucía, Cádiz)

**10:42 [9624] The Virtual Recreation of Mani's Auto de Fe (1562): Methodology and Approach to an Historical Event**

Antonio Rodríguez Alcalá (Universidad Anahuac Mayab), John F. Chuchiak IV (Missouri State University), Zoraida Raimúndez Ares (Universidad Complutense de Madrid), Maria Felicia Rega (Sapienza Università di Roma), Luis Díaz de León (Universidad Autónoma de Yucatán) and Hans B. Erikson (Missouri State University)

09:00 - 11:00

*Aula 3 - Department of Sciences*

**Symposium II - Diagnostic**

**Session 5.2 - Nuclear Techniques for Cultural Heritage**

**Chairs:** Francesco Arneodo, Lisa Castelli, Lorenzo Giuntini, Mirko Massi

**09:00 [8299] Heritage conservation science at SESAME**

Andrea Lausi (SESAME)

**09:17 [6246] Broadband Multi-Analytical Datacube Exploration Tool Needs: A Museum Perspective**

Pablo Londero (Louvre Abu Dhabi)

**09:34 [6840] Degraded or restored bones: possible issues in radiocarbon dating and methods to overcome them**

Serena Barone (Università degli studi di Firenze, Istituto Nazionale di Fisica Nucleare - Sez. Firenze), Mariaelena Fedi (Istituto Nazionale di Fisica Nucleare - Sez. Firenze) and Lucia Liccioli (Istituto Nazionale di Fisica Nucleare - Sez. Firenze)

**09:51 [1494] When a painting is a history on the rock. A methodological approach to rock art studies through the case of El Alto-Ancasti's Mountain**

Lucas Ignacio Gheco (Centro de Estudios sobre Patrimonios y Ambiente (CEPyA), EAyP-EHyS.)

**10:08 [8652] An innovative neutron spectroscopic imaging technique: mapping the elements distribution inside the bulk of archaeological artefacts**

Giulia Marucci (Dipartimento di Fisica "G. Occhialini", Università degli Studi di Milano Bicocca and INFN, Sezione di Milano Bicocca), Antonella Scherillo (ISIS Neutron and Muon Source, Didcot, UK), Maria Pia Riccardi (Dip. di Scienze della Terra e dell'Ambiente and Arvedi Laboratorio, Università degli Studi di Pavia), Costanza Cucini (Laboratoire "Métallurgies et Cultures" CNRS, IRAMAT, Université de Technologie Belfort Montbéliard), Marco Tizzoni (Laboratoire "Métallurgies et Cultures" CNRS, IRAMAT, Université de Technologie Belfort Montbéliard) and Daniela Di Martino (Dipartimento di Fisica "G. Occhialini", Università degli Studi di Milano Bicocca and INFN, Sezione di Milano Bicocca)

**10:25 [1644] MACROSCOPIC FT-IR MAPPING FOR THE IN-SITU STUDY OF PICTORIAL MATERIALS: TECHNOLOGICAL ADVANCES AND APPLICATIONS**

Mariangela Cestelli Guidi (INFN-Laboratori Nazionali di Frascati, Rome (Italy));, Lucilla Pronti (INFN-Laboratori Nazionali di Frascati, Rome (Italy));, Martina Romani (INFN-Laboratori Nazionali di Frascati, Rome (Italy));, Antonella Balerna (INFN-Laboratori Nazionali di Frascati, Rome (Italy));, Giacomo Viviani (INFN-Laboratori Nazionali di Frascati, Rome (Italy)); and Vittorio Sciarra (INFN-Laboratori Nazionali di Frascati, Rome (Italy));

### **10:42 [8938] Quantitative criteria to configure and characterise portable X-ray fluorescence spectrometers**

Eleni Konstantakopoulou (Polytechnic School, Aristotle University of Thessaloniki), Annalaura Casanova Muncicchia (Consiglio Nazionale delle Ricerche Istituto di Scienze del Patrimonio Culturale (CNR-ISPC)), Roberto Ferretti (Department of Mathematics and Physics, Roma Tre University), Simone Porcinai (Ministero della Cultura Opificio delle Pietre Dure) and Marco Ferretti (Consiglio Nazionale delle Ricerche Istituto di Scienze del Patrimonio Culturale (CNR-ISPC))

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09:00 - 11:00 *Aula 4 - Department of Sciences*  
**Symposium II - Diagnostic**  
**Session 5.3 - Organic components in archaeological findings and works of art: current challenges in their identification and characterization**  
**Chairs:** Leila Birolo, Giulia Germinario

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### **09:00 [5022] Proteomics and spectroscopic analyses for the molecular characterization of collagen-based animal glues**

Georgia Ntasi (University of Naples Federico II, Department of Chemical Sciences), Brunella Cipolletta (University of Naples Federico II, Department of Chemical Sciences), Carmen Aprea (University of Naples Federico II, Department of Chemical Sciences), Laura Dello Ioio (Dello Ioio Restauri, Vico Equense, Naples), Celia Duce (University of Pisa, Department of Chemistry and Industrial Chemistry), Emanuele Crisci (University of Pisa, Department of Chemistry and Industrial Chemistry), Emilia Bramanti (CNR Pisa, Institute of Chemistry of Organo Metallic Compounds), Alessandro Vergara (University of Naples Federico II, Department of Chemical Sciences), Ilaria Bonaduice (University of Pisa, Department of Chemistry and Industrial Chemistry) and Leila Birolo (University of Naples Federico II, Department of Chemical Sciences)

### **09:17 [5403] A pre-restoration minero-petrographic, chemical and microbiological analysis of the sculpture “Real Infante Carlo Tito di Borbone”**

Piergiulio Cappelletti (Dip. di Scienze della Terra, dell’Ambiente e delle Risorse, Università degli Studi di Napoli Federico II), Francesco Izzo (Dip. di Scienze della Terra, dell’Ambiente e delle Risorse, Università degli Studi di Napoli Federico II), Concetta Rispoli (Dip. di Scienze della Terra, dell’Ambiente e delle Risorse, Università degli Studi di Napoli Federico II), Antonino Pollio (Dip. di Biologia , Università degli Studi di Napoli Federico II), Antonino De Natale (Dip. di Biologia , Università degli Studi di Napoli Federico II), Mariagiòia Petrarretti (Dip. di Biologia , Università degli Studi di Napoli Federico II), Andrea Carpentieri (Dip. di Scienze Chimiche, Università degli Studi di Napoli Federico II), Leila Birolo (Dip. di Scienze Chimiche, Università degli Studi di Napoli Federico II), Giarita Ferraro (Dip. di Scienze Chimiche, Università degli Studi di Napoli Federico II), Anna Manzone (Restoration Laboratory, Royal Palace of Caserta, of the Ministry of Culture) and Alessandro Vergara (Dip. di Scienze Chimiche, Università degli Studi di Napoli Federico II)





**09:34 [6425] Wine production and consumption in context: organic residue analysis in the so-called thermopolium V 4, 6-8 at Pompeii**

Alessandra Pecci (ERAAUB, IAUB, INSA-UB, UNIVERSITAT DE BARCELONA), Simona Mileto (ERAAUB, Universitat de Barcelona), Silvia Ritondale (Scuola Interateneo di Specializzazione in Beni Archeologici - SISBA – DISU), Valeria Amoretti (Parco Archeologico di Pompei), Luana Toniolo (Parco Archeologico di Pompei) and Daniela Cottica (Università Ca' Foscari Venezia, Dipartimento di Studi Umanistici)

**09:51 [6507] The challenge of extracting proteins from potteries**

Brunella Cipolletta (Department of Chemical Sciences, University of Naples Federico II, Naples, Italy), Myriam Fiore (Department of Chemical Sciences, University of Naples Federico II, Naples, Italy), Georgia Ntasi (Department of Chemical Sciences, University of Naples Federico II, Naples, Italy), Massimo Botto (National Research Council of Italy (CNR), Institute of Heritage Sciences (ISPC)), Leila Birolo (Department of Chemical Sciences, University of Naples Federico II, Naples, Italy) and Livia Tirabassi (Department of Archaeology, Ghent University, Ghent, Belgium)

**10:08 [7356] Exploring the Early Neolithic food system through the analysis of cooking stones**

Margherita Cantelli (Universidad Autònoma de Barcelona - Barcelona, Spain), Xavier Terradas (Consejo Superior de Investigaciones Científicas - Barcelona, Spain), Didier Binder (Centre National de la Recherche Scientifique - Nice, France), Martine Regert (Centre National de la Recherche Scientifique - Nice, France) and André Carlo Colonese (Departamento de Prehistoria & ICTA-UAB, Universidad Autònoma de Barcelona - Barcelona, Spain)

**10:25 [7746] INTERPRETING SOILS. ARCHAEOLOGY AND CHEMICAL ANALYSIS: ORGÈRES SITE (LA THUILE, AO - ITALY)**

Chiara Maria Lebole (Università di Torino, Dipartimento di Studi Storici), Giorgio Di Gangi (Università di Torino, Dipartimento di Studi Storici), Gabriele Sartorio (Ufficio archeologia, didattica e valorizzazione, Regione Autonoma Valle d'Aosta), Marco Ginepro (Dipartimento di Chimica, Università di Torino) and Giulia Costamagna (Dipartimento di Chimica, Università di Torino)

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09:00 - 11:00

*Aula 6 - Department of Sciences*

**Symposium VI - Underwater**

**Session 5.4 - Building Materials and Decay Assessment for On-Land and Underwater Cultural Heritage (CH)**

**Chairs:** Michela Ricca, Luciana Randazzo

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**09:00 [3267] Archaeometric investigations on ancient funerary stone elements from the National Archaeological Museum of Adria (Rovigo, Italy)**

Simone Dilaria (Department of Cultural Heritage, University of Padova), Luigi Germinario (Department of Geosciences, University of Padova), Chiara Giroto (Department of Cultural Heritage, University of Padova), Claudio Mazzoli (Department of Geosciences, University of Padova), Caterina Previato (Department of Cultural Heritage, University of Padova), Giovanna Falezza (Soprintendenza archeologia, belle arti e paesaggio per le province di Verona, Rovigo e Vicenza), Alberta Facchi (Museo Archeologico Nazionale di Adria (RO), Polo museale del Veneto) and Jacopo Bonetto (Department of Cultural Heritage, University of Padova)

**09:17 [4274] Study and restoration of the Sacra Conversazione by Lorenzo Berrettini and experimental tests to evaluate the application of diammonium phosphate as consolidant for the wall painting**

Antonio Paucech (University of Tuscia - DIBAF Dept.), Luca Lanteri (University of Tuscia - DEIM Dept.), Francesca Montozzi (University of Tuscia - DIBAF Dept.), Paola Pogliani (University of Tuscia - DIBAF Dept.) and Claudia Pelosi (University of Tuscia - DEIM Dept.)

**09:34 [4490] From the context knowledge to Assessment of the Architectural Heritage decay: the case of Santa Maria di Vezzolano rectory (AT)**

Francesca Alberghina (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria), Valentina Barberis (Regional Directorate of Piedmont Museums, Ministry of Culture), Patrizia Capizzi (Department of Earth and Marine Sciences (DiSTeM), University of Palermo), Giulia Comello (Regional Directorate of Piedmont Museums, Ministry of Culture), Giuseppe Milazzo (Regional Directorate of Piedmont Museums, Ministry of Culture), Luciana Randazzo (Department of Earth and Marine Sciences (DiSTeM), University of Palermo) and Salvatore Schiavone (S.T.Art-Test di S. Schiavone & C sas)

**09:51 [6897] Surface and stratigraphic analysis of black crusts using Laser Induced Breakdown Spectroscopy**

Andrea Bergomi (University of Milan), Valeria Comite (University of Milan), Cristina Della Pina (University of Milan), Paula Maria Carmona Quiroga (Instituto de Quimica Fisica Rocasolano), Laura Maestro-Guijarro (Instituto de Quimica Fisica Rocasolano), Mohamed Oujja (Instituto de Quimica Fisica Rocasolano), Ana Crespo Ibanez (Instituto de Estructura de la Materia), Chiara Andrea Lombardi (University of Milan), Mattia Borelli (University of Milan), Marta Castillejo (Instituto de Quimica Fisica Rocasolano) and Paola Fermo (University of Milan)

**10:08 [7072] Promising surface-active ionic liquid coatings for underwater cultural heritage conservation**

Marika Luci (University of Messina and Stazione zoologica Anton Dohrn - Calabria Marine Centre), Filomena De Leo (University of Messina), Clara Urzi (University of Messina), Christian Galasso (Stazione zoologica Anton Dohrn - Calabria Marine Centre), Nadia Ruocco (Stazione zoologica Anton Dohrn - Calabria Marine Centre), Donatella De Pascale (Stazione zoologica Anton Dohrn), Sandra Lo Schiavo (University of Messina), Michela Ricca (University of Calabria), Silvestro Antonio Ruffolo (University of Calabria) and Mauro Francesco La Russa (University of Calabria)

**10:25 [7141] Decay assessment approach of building stones from cultural heritage in freshwater reservoirs**

Ada Saez (Instituto de Geociencias - CSIC Spanish Research Council and UCM Complutense University of Madrid), Natalia Perez-Ema (Instituto de Geociencias - CSIC Spanish Research Council and UCM Complutense University of Madrid) and Monica Alvarez de Buergo (Instituto de Geociencias - CSIC Spanish Research Council and UCM Complutense University of Madrid)

**10:42 [8242] Preliminary assessment of wave energy hazards in a shallow underwater water cultural heritage site**

George Alexandrakis (Coastal & Marine Research Lab, Foundation for Research and Technology - Hellas), Stelios Petrakis (Institute of Oceanography, Hellenic Centre for Marine Research (HCMR)) and Nikolaos Kampanis (Coastal & Marine Research Lab, Foundation for Research and Technology - Hellas)

09:00 - 11:00

Aula 7 - Department of Sciences

**Symposium IV - Sensors**

**Session 5.5 - The interaction between atmospheric pollution and cultural heritage: From outdoor to indoor environments - Measurement and Instrumentation for Structural Health Monitoring in Cultural Heritage Structures**

**Chairs:** Valeria Comite, Maria Ricciardi, Livio D'Alvia

**09:00 [3961] Cultural heritage safeguard through multi-parameter air quality monitoring**

Mattia Borelli (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia), Andrea Bergomi (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia), Valeria Comite (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia), Vittoria Guglielmi (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia), Chiara Andrea Lombardi (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia), Maria Grazia Perrone (XEArPro Srl., Via delle Primule, 16, 20815, Cogliate (MB), Italia) and Paola Fermo (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia)

**09:17 [4272] Air quality assessment in cultural heritage: the case study of the Amalfi Cathedral (Amalfi, Salerno, Italy)**

Daniele Sofia (DIIN-Department of Industrial Engineering, University of Salerno), Maria Ricciardi (DCB – Department of Chemistry and Biology, University of Salerno), Oriana Motta (Department of Medicine and Surgery, University of Salerno) and Antonio Proto (DCB – Department of Chemistry and Biology, University of Salerno)

**09:34 [7391] Protecting Art and People: Environmental Monitoring of Beata Vergine dei Miracoli Sanctuary for Health and Heritage Conservation**

Antonio Spagnuolo (Energreenup srl), Andrea Bergomi (Department of Chemistry, University of Milan), Carmela Vetromile (Energreenup srl), Antonio Masiello (Energreenup srl), Noemi Mantile (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, University of Campania), Mattia Borelli (Department of Chemistry, University of Milan), Chiara Andrea Lombardi (Department of Chemistry, University of Milan), Valeria Comite (Department of Chemistry, University of Milan), Paola Fermo (Department of Chemistry, University of Milan) and Carmine Lubritto (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, University of Campania)

**09:51 [7493] Preventive conservation of the pictorial evidence in the church of Sotterra (Paola, Italy): a microclimatic investigation in a hypogeum environment**

Maria Antonietta Zicarelli (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria), Michela Ricca (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria), Silvestro Antonio Ruffolo (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria), Raffaella Greca (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria) and Mauro Francesco La Russa (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria)

**10:08 [3493] A metrological approach to the study of ancient architecture. The cases of the Grotta dell'Arsenale and the villas of Gradola and Damecuta in Capri**

Cecilia Giorgi (CNR ISPC) and Giovanni Caratelli (CNR ISPC)

**10:25 [2851] Investigation on a prototype integrated system for strengthening and monitoring architectural heritage**

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

11:00 - 11:20 *Department of Sciences*  
**COFFEE BREAK**

11:20 - 13:20 *Aula 1 - Department of Sciences*  
**Symposium I - Digital**  
**Session 6.1 - Size matters. High-resolution survey of small artifacts: acquisition strategies and methodologies, level of detail, dissemination - Artificial Intelligence for Cultural Heritage: Tools and applications**  
**Chairs: Daniele Ferdani, Diego Ronchi**

**11:20 [333] The Dynamic Collections project: providing structured online access to digital replicas**

Åsa Berggren (Department of Archaeology and Ancient History, Lund University), Marco Callieri (Visual Computing Laboratory, ISTI-CNR), Nicolò Dell'Unto (Department of Archaeology and Ancient History, Lund University), Paola Derudas (Department of Archaeology and Ancient History, Lund University), Domenica Dininno (ISPC-CNR, Lund University), Fredrik Ekengren (Department of Archaeology and Ancient History, Lund University) and Giuseppe Naponiello (Lund University)

**11:37 [1252] The survey of the “precious one of Constance”. Tools and techniques for three-dimensional restitution of complex surfaces at sub-millimetre resolution**

Francesco Di Paola (Università degli Studi di Palermo), Sara Morena (Università degli Studi di Palermo) and Sara Antinozzi (Università degli Studi di Salerno)

**11:54 [2711] The recognition of Southern African archaeological settlement sites from satellite images through open-source computer vision**

Kezala Jere (L' Orientale Università degli studi di Napoli)

**12:11 [7190] Ponte San Lorenzo, a case study for the comparison of image-based survey tools. NeRF as an alternative to photogrammetry**

Maurizio Perticarini (Università degli Studi di Padova) and Andrea Giordano (Università degli Studi di Padova)

**12:28 [7761] A deep learning experiment for semantic segmentation of overlapping characters in palimpsests**

Michela Perino (Sapienza Università di Roma), Michele Ginolfi (Università degli studi di Firenze), Anna Candida Felici (Sapienza Università di Roma) and Michela Rosellini (Sapienza Università di Roma)

11:20 - 13:20

Aula 3 - Department of Sciences

**Symposium II - Diagnostic**

**Session 6.2 - Nuclear Techniques for Cultural Heritage - Organic components in archaeological findings and works of art: current challenges in their identification and characterization - Multi-analytical approaches for the study of written archaeological artefacts**

**Chairs:** Lorenzo Giuntini, Mirko Massi, Chiara Colini, Giulia Germinario

**11:20 [9497] A new IBA imaging system for the transportable MACHINA accelerator**

Rodrigo Alberto Torres Saavedra (University of Florence), Francesco Taccetti (Istituto Nazionale di Fisica Nucleare, Sezione di Firenze), Lisa Castelli (Istituto Nazionale di Fisica Nucleare, Sezione di Firenze), Caroline Czelusniak (Istituto Nazionale di Fisica Nucleare, Sezione di Firenze), Mirko Massi (Istituto Nazionale di Fisica Nucleare, Sezione di Firenze), Chiara Ruberto (Istituto Nazionale di Fisica Nucleare, Sezione di Firenze) and Lorenzo Giuntini (Dipartimento di Fisica e Astronomia - University of Florence)

**11:37 [6918] Revealing and unveiling the polychromy of the Camponeschi Monument in L'Aquila**

Elena De Panfilis (Gran Sasso Science Institute, L'Aquila)

**11:54 [8482] A natural resins reference collection to identify organic compounds in archaeological samples**

Marc Valls Mompo (University of Valencia), Gianni Gallelo (University of Valencia), Irene Sáez Giménez (University of Valencia), Agustín Pastor Garcia (University of Valencia) and María Oreto Garcia Puchol (University of Valencia)

**12:11 [8685] Alpine archaeology and everyday life at high altitudes: from the excavation to the laboratory (Orgères-La Thuile, AO, Italy)**

Giorgio Di Gangi (Department of Historical Studies (University of Torino)), Chiara Maria Lebole (Department of Historical Studies (University of Torino)), Sergio Enrico Favero Longo (Department of Life Sciences and Systems Biology (University of Torino)), Laura Guglielmone (Department of Life Sciences and Systems Biology (University of Torino)), Gabriele Sartorio (Ufficio archeologia, didattica e valorizzazione, Regione Autonoma Valle d'Aosta) and Samuele Voyron (Department of Life Sciences and Systems Biology (University of Torino))

**12:28 [2379] Scribes and Writing Practices in Egypt's Ala Veterana Gallica: A Preliminary Study of Inks from a Military Roll**

Olivier Bonnerot (Cluster of Excellence "Understanding Written Artefacts", University of Hamburg) and Leah Mascia (Cluster of Excellence "Understanding Written Artefacts", University of Hamburg)

**12:45 [1582] Leafing through time: Ink Analysis of the longest Qur'an on Papyrus**

Sowmeya Sathiyamani (Universität Hamburg), Mathieu Tillier (Sorbonne Université, Paris (France)), Naïm Vanthieghem (Institut de recherche et d'histoire du texte, CNRS, Paris (France)) and Claudia Colini (Universität Hamburg)

11:20 - 13:20

*Aula 4 - Department of Sciences*

**Symposium II - Diagnostic**

**Session 6.3 - Damage and Radiological Risk Assessment: Diagnosis and Monitoring for the Restoration, Preventive Conservation, Usability and Maintenance of Cultural Heritage**

**Chairs:** Simona Mancini, Francesco Caridi

**11:20 [305] Can X-ray fluorescence spectrometry help in authentication of papyrus dealer provenance narratives?**

Arzak Mohamed (PhD student at School of Natural Sciences, Macquarie University, Sydney.), Damian Gore (Professor at School of Natural Sciences, Macquarie University.) and Malcolm Choat (Professor at Department of History and Archaeology, Macquarie University, Sydney)

**11:37 [2356] XRF investigation of the Monument to the Fallen of the Great War by Francesco Jerace in San Ferdinando (Reggio Calabria, Italy)**

Francesco Caridi (University of Messina), Simona Mancini (University of Salerno), Giuseppe Paladini (University of Catania), Pasquale Faenza (G. Rohlfs Museum of the Calabrian Greek Language, Bova (RC)), Vincenza Crupi (University of Messina), Valentina Venuti (University of Messina) and Domenico Majolino (University of Messina)

**11:54 [3527] X-ray fluorescence analysis of bronze sculptures by Giuseppe Renda**

Francesco Caridi (University of Messina), Giuseppe Paladini (University of Catania), Pasquale Faenza (G. Rohlfs Museum of the Calabrian Greek Language), Vincenza Crupi (University of Messina), Domenico Majolino (University of Messina) and Valentina Venuti (University of Messina)

**12:11 [3668] Assessment of the natural radioactivity content in typical building materials employed in the Italian cultural heritage**

Serpil Akozcan (Kirkklareli University), Simona Mancini (university of Salerno), Natasa Todorovic (University of Novi Sad), Selin Ozden (Kirkklareli university) and Michele Guida (university of salerno)

**12:28 [4864] Monitoring of indoor Radon in historical heritage buildings by means of passive and active methods. A case study.**

Simona Mancini (university of Salerno), Natasa Todorovic (university of Novi sad), Serpil Akozcan (Kirkklareli University), Domenico Guida (university of Salerno), Albina Cuomo (university of salerno) and Michele Guida (university of salerno)

**12:45 [4899] Radioactivity content in construction materials of assets of particular historical-artistic interest**

Francesco Caridi (University of Messina), Giuseppe Paladini (University of Catania), Santina Marguccio (Agenzia Regionale Protezione Ambientale Calabria (ARPACal), Dipartimento di Reggio Calabria), Maurizio D'Agostino (Agenzia Regionale Protezione Ambientale Calabria (ARPACal), Dipartimento di Reggio Calabria), Alberto Belvedere (Agenzia Regionale Protezione Ambientale Calabria (ARPACal), Dipartimento di Reggio Calabria), Vincenza Crupi (University of Messina), Domenico Majolino (University of Messina) and Valentina Venuti (University of Messina)

**13:02 [5388] Thermoluminescence dating of historical buildings as a tool for assessing natural radioactivity risk**

Rosaria Galvagno (Department of Physics and Astronomy “E. Majorana”, University of Catania, Italy,), Alessia D’Anna (Department of Physics and Astronomy “E. Majorana”, University of Catania, Italy,), Anna Maria Gueli (Department of Physics and Astronomy “E. Majorana”, University of Catania, Italy,), Giuseppe Politi (Department of Physics and Astronomy “E. Majorana”, University of Catania, Italy) and Giuseppe Stella (Department of Physics and Astronomy “E. Majorana”, University of Catania, Italy)

11:20 - 13:20

*Aula 6 - Department of Sciences*

**Symposium VI - Underwater**

**Session 6.4 - Remote sensing methods and approaches for Underwater Cultural Heritage research and management**

**Chairs:** Crescenzo Violante, Barbara Davidde, Nikos Papadopoulos

**11:20 [8795] Geophysical and geoarchaeological investigations in the Submerged Archaeological Park of Baia (south Italy)**

Crescenzo Violante (Institute of Cultural Heritage\_ISPC-CNR), Enrico Gallocchio (Phlegraean Fields Archaeological Park (PAFLEG), Palazzo de Fraja - Pozzuoli (NA)), Fabio Pagano (Phlegraean Fields Archaeological Park (PAFLEG), Palazzo de Fraja - Pozzuoli (NA)) and Nikos Papadopoulos (Institute for Mediterranean Studies, Foundation for Research and Technology, Nikiforou Foka 130, Rethymno)

**11:37 [1038] iblueCulture – An Innovative Underwater Cultural Heritage Real-Time Streaming System In A Virtual Reality Environment**

Apostolos Vlachos (Information Technologies Institute Centre for Research and Technology Hellas), Stelios Krinidis (Information Technologies Institute Centre for Research and Technology Hellas), Kimon Papadimitriou (Aristotle University of Thessaloniki), Aggelos Manglis (Skopelos Dive Centre, Atlantis Consulting S.A.), Anastasia Fourkiotou (Atlantis Consulting S.A.) and Dimitrios Tzovaras (Information Technologies Institute Centre for Research and Technology Hellas)

**11:54 [5372] Marine remote sensing and photogrammetric survey of an UCH site: A cluster of cannons in the SW Gulf of Patras, Greece**

Alexandros Labrianidis (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Elias Fakiris (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Georgiou Nikos (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Dimitris Christodoulou (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Xenophon Dimas (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Maria Geraga (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Nikos Mavrommatis (Intelligent Machines P.C., Ag. Paraskevis, 26504, Patras, Greece) and George Papatheodorou (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras)

**12:11 [7930] A low cost Unmanned Surface Vehicle for mapping shallow-water UCH sites: Ancient and historical shipwrecks in Methoni bay, Greece**

Vasileios Giannakopoulos (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), George Papatheodorou (Laboratory of Marine Geology and Physical Oceanography,

Dept. Geology, University of Patras), Dimitris Christodoulou (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Elias Fakiris (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Maria Geraga (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Panagiotis Gkionis (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Nikos Mavrommatis (Intelligent Machines P.C., Ag. Paraskevis, 26504, Patras, Greece) and Thomas Levy (Center for Cyber-Archaeology and Sustainability, Qualcomm Institute, University of California)

**12:28 [8827] Coastal and shallow marine geophysical investigations in the Roman site of Baia in Naples, Italy**

Nikos Papadopoulos (GeoSat Lab, IMS-FORTH), Crescenzo Violante (Institute of Heritage Science), Dimitrios Oikonomou (GeoSat Lab, IMS-FORTH) and George Kritikakis (Technical University of Crete, School)

**12:45 [8060] Archaeological predictive modelling in underwater contexts. Utility and challenges**

Manuela Ritondale (University of Groningen)

**13:02 [6041] Combining acoustic and optical cameras onboard an ROV as a detection and expertise tool for underwater preventive archaeology: a case study off Marseilles (France)**

Souen Fontaine (Institut National de Recherches Archéologiques Préventives), Alex Sabastia (Institut National de Recherches Archéologiques Préventives), Jérôme Sialelli (Copetech SM), Denis Dégez (Département des Recherches Archéologiques Subaquatiques et Sous-Marines), Alexis Rochat (Département des Recherches Archéologiques Subaquatiques et Sous-Marines) and Marine Sadania (Département des Recherches Archéologiques Subaquatiques et Sous-Marines)

11:20 - 13:20

*Aula 7 - Department of Sciences*

**Symposium V - Historical Gardens**

**Session 6.5 - Historical gardens and archaeological landscape: knowledge and valorization**

**Chairs:** Flavia Bartoli, Seyedh Zohreh Hosseini

**11:20 [1098] Garden heritage and tourism: present and future of Madeira Island as a garden destination**

Susana Silva (University of Coimbra, CEGOT – Centre of Studies in Geography and Spatial Planning, Faculty of Arts and Humanities) and Paulo Carvalho (University of Coimbra, CEGOT – Centre of Studies in Geography and Spatial Planning, Faculty of Arts and Humanities)

**11:37 [3536] Preserving and valuing historic gardens: an analysis of projects under the Portugal 2020 investment framework (2014-2020)**

Susana Silva (University of Coimbra, CEGOT – Centre of Studies in Geography and Spatial Planning, Faculty of Arts and Humanities) and Paulo Carvalho (University of Coimbra, CEGOT – Centre of Studies in Geography and Spatial Planning, Faculty of Arts and Humanities)





**11:54 [4040] The urban landscape of Imperial Rome: archaeobotanical data from Horti Lamiani (Esquiline Hill)**

Cristiano Vignola (Sapienza University of Rome), Alessia Masi (Sapienza University of Rome), Alessandro Lazzara (Sapienza University of Rome), Mirella Serlorenzi (Soprintendenza Speciale di Roma Archeologia, Belle Arti e Paesaggio) and Antonio F. Ferrandes (Sapienza University of Rome)

**12:11 [4657] Identification of plant elements represented in the suburban Villa della Piscina di Centocelle (Rome, Italy) as a source of reconstruction of the ancient gardens**

Alma Kumbaric (Roma Tre University), Flavia Bartoli (ISPC-CNR), Zohreh Hosseini (Roma Tre University) and Giulia Caneva (Roma Tre University)

**12:28 [6005] The Fathers' cell gardens of the Charterhouse of Calci-Pisa in Tuscany (Central Italy): pollen and multidisciplinary reconstruction**

Eleonora Clò (Università degli Studi di Modena e Reggio Emilia), Gabriele Gattiglia (Università di Pisa), Eleonora Rattighieri (Università degli Studi di Modena e Reggio Emilia), Francesca Anichini (Università di Pisa), Antonio Campus (Università di Pisa), Marta Rossi (Università degli Studi di Siena), Mauro Buonincontri (Università degli Studi di Siena) and Anna Maria Mercuri (Università degli Studi di Modena e Reggio Emilia)

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13:20 - 14:20 *Department of Sciences*  
**LUNCH**

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13:20 - 14:20 *Department of Sciences*  
**POSTER SESSION #2**  
**Chairs: Seyedh Zohreh Hosseini, Alessandro Lazzara**

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**PS2-01 [6794] Extending the Extended Matrix with CIDOC-CRM. A formal method for virtual reconstruction processes and beyond**

Elisabetta Caterina Giovannini (Department of Architecture and Design, Politecnico di Torino), Emanuel Demetrescu (Istituto di Scienze del Patrimonio Culturale CNR-ISPC) and Jacopo Bono (Department of Architecture and Design, Politecnico di Torino)

**PS2-02 [8066] Acoustic characteristics and defects of adhesion of ancient construction materials using the PICUS system**

Francesca Mariani (Università della Tuscia), Giosuè Caliano (Università Roma Tre), Stefano De Angeli (Università della Tuscia) and Pogliani Paola (Università della Tuscia)

**PS2-03 [3901] The Via Severiana and its Representation in the Tabula Peutingeriana**

Enrico Petritoli (Dipartimento di Scienze - Università degli Studi "Roma Tre") and Fabio Leccese (Dipartimento di Scienze - Università degli Studi "Roma Tre")

**PS2-04 [9067] First results of plant processing on ground stone tools: phytolith evidence and GC-MS from archaic Messapian settlements - San Vito dei Normanni and Cavallino (Puglia, Italy)**

Gaia Sabetta (Università del Salento), Grazia Semeraro (Università del Salento), Florinda Notarstefano (Università del Salento) and Marta Portillo (Archaeology of Social Dynamics (2021SGR 501), (IMF - CSIC))

**PS2-05 [8163] Isotopic analysis of black crust samples from the Monza Cathedral (Italy): a preliminary study**

Maria Ricciardi (Department of Chemistry and Biology, University of Salerno), Valeria Comite (Department of Chemistry, University of Milan), Andrea Bergomi (Department of Chemistry, University of Milan), Chiara Andrea Lombardi (Department of Chemistry, University of Milan), Paola Fermo (Department of Chemistry, University of Milan), Antonio Faggiano (Department of Chemistry and Biology, University of Salerno), Antonino Fiorentino (Department of Chemistry and Biology, University of Salerno), Concetta Pironti (Department of Medicine and Surgery, University of Salerno), Luana Bontempo (Fondazione Edmund Mach, Research and Innovation Center, Food Quality and Nutrition Department), Federica Camin (Fondazione Edmund Mach, Research and Innovation Center, Food Quality and Nutrition Department), Oriana Motta (Department of Medicine and Surgery, University of Salerno) and Antonio Proto (Department of Chemistry and Biology, University of Salerno)

**PS2-06 [5438] Diagnostic study and efficiency evaluation of treatments against rising damp and salts crystallization in ornamental stones: the case of the green stone sacristy washbasin in the Church of San Domenico in Cosenza (Calabria, Italy)**

Michela Ricca (University of Calabria)

**PS2-07 [3413] GP-NEP: a prototype of an assistant for non-experts in photogrammetric survey**

Luisa Ammirati (Alma Mater Studiorum University of Bologna), Bianca Magliocchetti (Sapienza University of Rome), Simone Berto (Institute of Heritage Science, National Research Council) and Emanuel Demetrescu (Institute of Heritage Science, National Research Council)

**PS2-08 [4163] Object detection and classification based on deep learning for archaeological artifact characterization**

Zied Mnasri (Università di Napoli L'Orientale) and Andrea D'Andrea (Università di Napoli L'Orientale)

**PS2-09 [554] New green solvents for cleaning and conservation of Cultural Heritage: Deep Eutectic Solvents (DESs)**

Romina Strangis (University of Calabria), Mauro Francesco La Russa (University of Calabria), Andrea Macchia (YOCOCU), Giorgia Salatino (University of Calabria), Anna Arcudi (University of Calabria), Raffaella Mancuso (University of Calabria) and Chiara Biribicchi (University of Rome La Sapienza)

**PS2-10 [1401] Diagnostic investigation on a Sorel and Portland cement boiserie at Palazzo Fizzarotti (1850-1908, Bari)**

Liano Marica (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro), Tiziana E. De Lillo (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro), Annarosa Mangone (Department of Chemistry, University of Bari Aldo Moro), Alessandro Monno (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro), Rocco Laviano (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro), Stefano Roascio (Parco Archeologico dell'Appia Antica, Ministero della Cultura, Roma), Gioacchino Tempesta (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro) and Giacomo Eramo (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro)



**PS2-11 [2388] Preliminary investigations of the action of nanostructured materials for the conservation of fresco paintings in high-humid environments**

Chiara Tuccio (University of Palermo), Francesco Armetta (University of Palermo) and Maria Luisa Saladino (University of Palermo)

**PS2-12 [934] Study of historical mortars from the Roman villa of Frielas (Loures, Portugal)**

Tanzil Ahmmed (University of Évora), Cristina Galacho (University of Évora), José Quaresma (New University of Lisbon), Patrícia Moita (Évora University | HERCULES Laboratory) and A.R. Silva (Museu Municipal de Loures, Quinta do Conventinho)

**PS2-13 [429] Seismic refraction tomography and multichannel analysis of surface waves for imaging offshore Cultural Heritage in very shallow water: Results from a synthetic study and real data**

P. Bilio Markasioti (Technical University of Crete, School of Mineral Resources Engineering, Applied Geophysics Lab), George Kritikakis (Technical University of Crete, School of Mineral Resources Engineering, Applied Geophysics Lab), Antonios Vafidis (Technical University of Crete, School of Mineral Resources Engineering, Applied Geophysics Lab) and Nikos Papadopoulos (Laboratory of Geophysical Satellite Remote Sensing and Archaeoenvironment, Institute for Mediterranean Studies)

**PS2-14 [6641] Satellite-Derived Bathymetry for the Islands of South-Eastern Crete**

Daniel Lassak (Laboratory of Geophysical-Remote Sensing & Archaeoenvironment, Institute for Mediterranean Studies), Anna Novikova (Laboratory of Geophysical-Remote Sensing & Archaeoenvironment, Institute for Mediterranean Studies), Athanasios Argyriou (Laboratory of Geophysical-Remote Sensing & Archaeoenvironment, Institute for Mediterranean Studies) and Nikos Papadopoulos (Laboratory of Geophysical-Remote Sensing & Archaeoenvironment, Institute for Mediterranean Studies)

**PS2-15 [8681] Geophysical investigation on the presumed Appian way**

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

**PS2-16 [9289] Electromagnetic survey at the messapian necropolis in Alezio (Lecce, Italy)**

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

**PS2-17 [9585] The Acait of Tricase (LE, Puglia, Italy): an agricultural cooperative for tobacco production. Surveys and conservation status**

Francesco Giuri (CNR ISPC), Angela Calia (CNR ISPC), Ivan Ferrari (CNR ISPC), Antonio Monte (CNR ISPC), Giovanni Quarta (CNR ISPC) and Emilia Vasanelli (CNR ISPC)

**PS2-18 [9643] Ground Penetrating Radar survey at the Basilica of San Paolo fuori le mura (Roma, Italy)**

Salvatore Piro (ISPC CNR Institute of Heritage Sciences, Italy), Nicola M. Camerlenghi (Department of Art History, Dartmouth College, New Hampshire USA), Daniela Mondini (Istituto di Storia e Teoria dell'Arte e dell'Architettura, Università della Svizzera Italiana (USI)), Giorgia Pollio (Istituto di Storia e Teoria dell'Arte e dell'Architettura, Università della Svizzera Italiana (USI)) and Daniela Zamuner (ISPC CNR - Institute of Heritage Sciences)

**PS2-19 [9792] Instability assessment of “Grotta della Poesia” (Lecce, Italy)**

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

**PS2-20 [9824] Geophysical investigation at “Castle of Canossa”**

Annalisa Capurso (Soprintendenza Archeologia, Belle Arti e Paesaggio), Lara De Giorgi (ISPC-CNR), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR) and Giovanni Leucci (ISPC-CNR)

**PS2-21 [6669] The Roman amphitheater of Venosa (Basilicata, southern Italy): 3D survey and reconstruction**

Ivan Ferrari (ISPC CNR), Francesco Giuri (ISPC CNR) and Maurizio Lazzari (ISPC CNR)

**PS2-22 [7505] Geophysical surveys at the Roman Aqueduct “Aqua Virgo” (Roma, Italy)**

Vincenzo Di Fiore (ISPC-CNR), Michele Punzo (ISPC-CNR), Daniela Tarallo (ISPC-CNR), Maria Elisa Amadasi (Università di Roma la Sapienza) and Giovanni Leucci (ISPC-CNR)

**PS2-23 [8091] The digital database of dovecote towers in Salento (Southern Italy)**

Maurizio Delli Santi (ISPC-CNR)

**PS2-24 [4879] From knowledge to conservation: the hypogeum trappeto of Melpignano (LE, Apulia, Italy)**

Francesco Giuri (CNR ISPC), Giorgia Di Fusco (CNR ISPC), Ivan Ferrari (ISPC CNR), Annalisa Malerba (Comune di Melpignano (LE)), Antonio Monte (ISPC CNR) and Giovanni Quarta (ISPC CNR)

**PS2-25 [6403] Geophysical investigation at the Roman Amphitheatre (Lecce, Italy)**

Lara De Giorgi (ISPC-CNR), Immacolata Ditaranto (ISPC-CNR), Giovanni Leucci (ISPC-CNR), Ilaria Miccoli (ISPC-CNR) and Giuseppe Scardozi (ISPC-CNR)

**PS2-26 [3555] Geophysical investigation at the Monacato di Villa Eucheria (Frosinone, Italy)**

Dora Francesca Barbolla (ISPC-CNR), Veronica Ferrari (Università del Salento), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR), Ilaria Miccoli (ISPC-CNR), Giovanni Leucci (ISPC-CNR) and Giuseppe Scardozi (ISPC-CNR)

**PS2-27 [4498] Multitemporal aerial and satellite images for the study of the ancient city of Albania: remote sensing application at Apollonia and Phoenike**

Immacolata Ditaranto (ISPC-CNR), Fiorella De Luca (ISPC-CNR), Pasquale Merola (ISPC-CNR), Ilaria Miccoli (ISPC-CNR) and Giuseppe Scardozi (ISPC-CNR)

**PS2-28 [2348] Conservation of Underwater Cultural Heritage: preliminary coatings testing within the TECTONIC project**

Antonio Donato (University of Calabria - Department of Biology, Ecology and Earth Sciences (DiBEST)), Alex De Salvo (University of Calabria - Department of Chemistry and Chemical Technologies), Michal Novák (SYNPO akciová společnost, S. K. Neumanna 1316, Pardubice 532 07, Czech Republic), Marie Nováková (SYNPO akciová společnost, S. K. Neumanna 1316, Pardubice 532 07, Czech Republic), Silvestro Antonio Ruffolo (University of Calabria - Department of Biology, Ecology and Earth Sciences (DiBEST)), Mauro La Russa (University of Calabria - Department of Biology, Ecology and Earth Sciences (DiBEST)), Andrea Macchia (University of Calabria - Department of Biology, Ecology and Earth Sciences (DiBEST)) and Michela Ricca (University of Calabria - Department of Biology, Ecology and Earth Sciences (DiBEST))

**PS2-29 [4011] Integrated approaches for architectural decay mapping: a case study of the historic Tuna Factory "Florio" on Favignana Island, Sicily, Italy (IDEHA Project)**

Dario Giuffrida (Istituto per i Processi Chimico Fisici, CNR), Samuele Barone (Istituto di Scienze del Patrimonio Culturale, CNR), Licia Cutroni (Istituto di Scienze del Patrimonio Culturale, CNR), Giuseppe Cacciaguerra (Istituto di Scienze del Patrimonio Culturale, CNR) and Rosina Celeste Ponterio (Istituto per i Processi Chimico Fisici, CNR)

**PS2-30 [5026] Study of the catalytic action of heavy metals to understand the phenomenon of sulphation and the formation of black crusts**

Valeria Comite (University of Milan), Andrea Bergomi (University of Milan), Paola Fermo (University of Milan), Carlo Castellano (University of Milan), Mattia Borelli (University of Milan), Chiara Andrea Lombardi (University of Milan), Matteo Formenti (University of Milan), Cecilia Cavaterra (University of Milan) and Cristina Della Pina (University of Milan)

**PS2-31 [6922] Metallurgical technology of coins from Samshvilde fortress (South Georgia, Caucasus)**

Natalia Rovella (Institute on Membrane Technology (ITM-CNR)), Michela Ricca (University of Calabria), David Berikashvili (University of Georgia), Maria Pia Albanese (University of Calabria) and Mauro Francesco La Russa (University of Calabria)

**PS2-32 [8024] Knowledge and decay assessment to manage a restoration plan and to define a valorisation program for a sustainable CH conservation: the experience of the ADELE-RS project**

Maria Alberghina (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria), Michela Ricca (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria), Silvestro Antonio Ruffolo (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria) and Mauro Francesco La Russa (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria)

**PS2-33 [4869] A portable and autonomous system for the diagnosis of the structural health of cultural heritage (PICUS)**

Giosue Caliano (Dip. DICITA, Università Roma Tre), Francesca Mariani (DIBAF - Università della Tuscia) and Alessandro Salvini (Dip. DICITA - Università Roma Tre)

14:20 - 15:00

*Aula 1 - Department of Sciences*

**CLOSING AND AWARD CEREMONY**





