

2019 IMEKO TC-4 INTERNATIONAL CONFERENCE ON  
**METROLOGY FOR ARCHAEOLOGY  
AND CULTURAL HERITAGE**

FLORENCE, ITALY / DECEMBER 4-6, 2019



FLORENCE 2019



# FINAL PROGRAM

UNIVERSITY OF FLORENCE  
SAGAS DEPARTMENT  
VIA S. GALLO, 10

ITALIAN GEOGRAPHIC  
MILITARY INSTITUTE  
VIA C. BATTISTI, 10



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE



UNIVERSITÀ  
DEGLI STUDI  
DEL  
SANNIO  
Benevento

# TABLE OF CONTENTS

Welcome Message .....	2
Committee .....	5
Location .....	7
MetroArchaeo 2019 - Keynote Speakers.....	8
Awards.....	13
Social Events .....	14
Patronages.....	15
Program Schedule - December 4, 2019 .....	16
Program Schedule - December 5, 2019.....	17
Program Schedule - December 6, 2019.....	18
TECHNICAL SESSIONS - Wednesday, December 4 .....	19
TECHNICAL SESSIONS - Thursday, December 5.....	23
TECHNICAL SESSIONS - Friday, December 6.....	43



## Welcome Message

On behalf of the Organizing Committee, we wish to welcome you to the 2019 IMEKO TC-4 International Conference on Metrology for Archaeology and Cultural Heritage - MetroArchaeo2019.

The combined use of numerical approaches and metrology in archaeology and, more generally, in the study of cultural heritage, is a firmly established reality in contemporary research, which is undergoing rapid evolution both in the scale, type and scope of applications. Metrology includes both theoretical and practical aspects with reference to measurements, whatever their uncertainties are, and in whatever fields of science or technology they occur. The characterization, valorisation and preservation of cultural heritage are therefore deeply related to metrological issues, for the collection, interpretation and validation of data, through the use of different analytical tools, physical-chemical and mechanical techniques, digital technologies, new ICT tools.

The 2019 IMEKO TC-4 International Conference on Metrology for Archaeology and Cultural Heritage - MetroArchaeo2019 aims to gather a wide range of scholars and heritage scientists working in universities and research centres, museums, galleries, libraries, archives, small and medium enterprises. MetroArchaeo2019 is conceived as an occasion to foster exchanges of ideas and information, to establish connections and collaborations, and to share innovative solutions in the field of measurements applied to cultural heritage, among material scientists, chemists, physicists, engineers, archaeologists, conservators, restorers.

Following the positive experience of the first four editions held in Benevento (2015), Turin (2016), Lecce (2017) and Cassino (2018), this year's conference has been organized in Florence, a town that houses the testimonies of a prestigious historical and cultural tradition, spanning from Roman antiquity to Middle Ages, up to modern times.

The activities aimed at the conservation, protection, enhancement and use of cultural heritage, through the development and application of innovative

methods and technologies, have a consolidated academic, scientific and entrepreneurial tradition, recognized both at a national and international level, in the territory of Toscana Region. The University of Florence stands out for its commitment in this sector, with a number of initiatives involving a wide range of skills, projects, collaborations in progress with other research institutions, and industries.

Florence is therefore a perfect frame for a conference designed to encourage discussion and networking among scientists coming from all over the world, and to promote new interactions and collaborations among established scholars and new researchers working in different areas and interested in the use of measurements in the study of cultural heritage.

MetroArchaeo2019 hosts three plenary lectures and 25 oral, poster and demo sessions aiming to give a complete and multidisciplinary picture of the applications of measurements and data treatments to the characterization and safeguard of archaeological and historic heritage.

With the aim of providing a common ground for researchers to share their findings about metrology applied to archaeology and cultural heritage, MetroArchaeo2019 includes a significant number of special sessions, intended to group the different applications of metrology to archaeology and cultural heritage into thematic strands, and to allow coherent and targeted discussions.

The program includes three keynote lectures, which will be delivered by Guido Vannini, from the University of Florence (Italy), Yuval Goren, from the Ben-Gurion University of the Negev (Israel), and Francesco Porcelli, from the University of Turin (Italy). Two Tutorials will be held on "Use of portable instruments for metallic cultural heritage assets" and "Invisible Archaeology".

Awards will be assigned to a number of outstanding papers, posters and demos.

The organisation of the conference was a very complex task, due to the large interest in the wide range of topics listed in the call for papers. A generous and tireless scientific and organising committee was involved in drafting the technical program, arranging accommodation for the speakers, managing



the administrative aspects, and setting up the social programme. We are very grateful to all of them 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.

The 2019 IMEKO TC-4 International Conference on Metrology for Archaeology and Cultural Heritage is about to begin. We hope you will enjoy the company of colleagues and experts as well as the natural and artistic beauties of Florence! Please, let us have your comments and remarks: we all, metrologists, archaeologists, geologists, heritage scientists, colleagues and friends, know that criticism is the best way to improve quality, and to achieve lasting excellences.

*On behalf of the Organizing Committee*

*Marcantonio Catelani*

*Pasquale Daponte*

## Committee

### GENERAL CHAIRS

Marcantonio Catelani, *University of Florence, Italy*

Pasquale Daponte, *University of Sannio, Italy*

### TECHNICAL PROGRAM CO-CHAIRS

Luca Cappuccini, *University of Florence, Italy*

Lorenzo Ciani, *University of Florence, Italy*

Francesco Lamonaca, *University of Sannio, Italy*

Paolo Liverani, *University of Florence, Italy*

Paola Moscati, *CNR, Italy*

### INTERNATIONAL PROGRAM COMMITTEE

Emma Angelini, *Politecnico di Torino, Italy*

Fabrizio Antonelli, *LAMA - LabCoMaC - Iuav University of Venice, Italy*

Lucio Calcagnile, *University of Salento, Italy*

Franco Cambi, *University of Siena, Italy*

Stefano Campana, *University of Siena, Italy*

Piergiulio Cappelletti, *University of Naples, Italy*

Paolo Carafa, *University of Roma La Sapienza, Italy*

Juan Antonio Quirós Castillo, *Universidad del Pais Vasco, Spain*

Andrea Cataldo, *University of Salento, Italy*

Cristina Corsi, *University of Cassino and Southern Lazio, Italy*

Giuseppe Cultrone, *University of Granada, Spain*

Egidio De Benedetto, *University of Salento, Italy*

Lucio Del Corso, *University of Cassino and Southern Lazio, Italy*

Zaccaria Del Prete *Sapienza University of Rome, Italy*

Maria Grazia D'Urso, *University of Bergamo, Italy*

Francesco Fontanella, *University of Cassino and Southern Lazio, Italy*

Venice Gouda, *National Research Centre, Egypt*

Sabrina Grassini, *Politecnico di Torino, Italy*

Marco Laracca, *University of Cassino and Southern Lazio, Italy*

Giovanni Leucci, *IBAM-CNR, Italy*

Carmine Lubritto, *Università degli Studi della Campania "Luigi Vanvitelli", Italy*

Marilena Maniaci, *University of Cassino and Southern Lazio, Italy*

Lara Maritan, *University of Padova, Italy*

Alessandra Pecci, *University of Barcelona, Spain*

Giacomo Pardini, *University of Salerno, Italy*



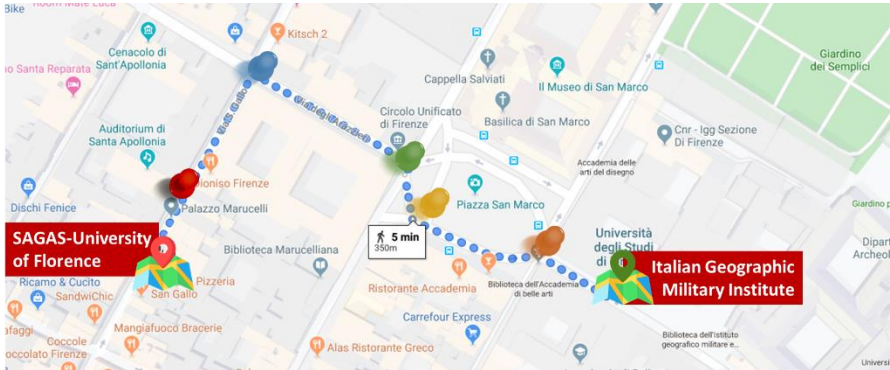
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Emanuele Piuzei, *Sapienza Università di Roma, Italy*  
Eugenio Polito, *University of Cassino and Southern Lazio, Italy*  
Gianluca Quarta, *University of Salento, Italy*  
Carmen Maria Roskopf, *University of Molise, Italy*  
José Antonio Barrera Vera, *University of Seville, Spain*

## LOCAL ARRANGEMENTS



## Location



*The Conference will take place at:*



**University of Florence  
SAGAS Department**

Via S. Gallo, 10  
Florence, Italy



**Italian Geographic Military Institute**

Via Cesare Battisti, 10/12  
Florence, Italy







## MetroArchaeo 2019 - Keynote Speakers

Keynote Wednesday, December 4, 2019

### **The historical dimension of archaeological research: from the episode to the phenomenon.**

Guido Vannini  
*University of Florence*

#### **ABSTRACT**

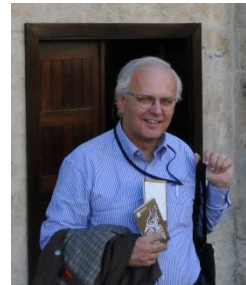
The historical dimension of archaeological research: from the episode to the phenomenon. From the experiences of a medievalist to the territorial approach of the research: we will talk about 'light' forms of archaeological approach, of public diffusion for a shared archaeology (and, also here, 'measured'), of recipients of technological processes at the service of the archaeological heritage. All this by paying attention to the risks of technicality ('poor neopositivism') and to the 'dynamic' methodology, i.e. correlated to the changing of the same quantitative and qualitative objectives of a research that at least tries to be in tune with today's society.

#### **SHORT BIOGRAPHY**

Full professor in Medieval Archaeology since 2002, Director of the Archaeology Specialization School at the University of Florence (since 2011) and member of Council of School of PhD at the University „La Sapienza“ of Rome.

Former Contrattista (1975-1980) and Researcher (1981-1990) at the University of Florence, after Associate Professor in Medieval Topography and Archaeology at the University of Calabria (1991-1996) and University of Florence (1996-2001); Dean of the Department of Arts (Un. of Calabria, 1993-1995). Cofounder of the inter-University (Universities of Aquila, Florence, Salerno, Tuscia, Milan „Cattolica“) Italian PhD in Medieval Archaeology (first in Italy, 1998); Fellows at 'The Harvard University Center for Renaissance Studies' (1976); Ministry of Culture Inspector at the Archaeological Superintendency of Tuscany (1981); honorary inspector of the Superintendency for architectural Heritage of Florence; advisor of the Europe Near East Centre (1995).

Co-director of 5 scientific series (including „Limina/Limites. Archeologies, histories, islands and frontiers in the Mediterranean (365-1556)“, BAR, Oxford; „Archeologia Pubblica“, FUP, Florence) and member of the scientific committee for other 4 series (including 'Tardoantico e Medioevo'



and „Confronti”). Guido Vannini is also a member of the scientific committees of 14 scientific journals (including "Archeologia Medievale", "Ricerche Storiche" "Archeologia Polona"; "Rivista di Scienze dell'Antichità", "Restauro Archeologico", "Schola Salernitana-Annali", "Bullettino Storico Pistoiese", "Florentia. Studi di Archeologia", "Libri Gedanenses", "Archeologia Viva") and of scientific Institutes (Deputazione di Storia Patria per la Toscana, Istituto Archeologico Italo-giordano, Centro Intern. di Studi 'La Gerusalemme di S. Vivaldo', Società Pistoiese di Storia Patria etc.); member of scientific committee of International Congress (including UNESCO Seminar Florence 2006; Archeologia dei castelli nell'Europa angioina (secoli XIII-XV), University of Salerno 2008; 'Trans-Jordan in 12th and 13th centuries and the „frontiers” of Medieval Mediterranean', University of Florence and ISU 2008). Associated to the Society of Medieval Archaeologists of Italy (SAMI) from 1995 and of I.C.O.M.O.S. (1987), Associazione di Studi storici 'Elio Conti'). Winner of the 'LUX et LAUS' medal awarded in 2018 by the Standing Committee of Polish Medievalists and of 'Father Piccirillo' award (Un. Naples 2018).

Director of some 60 national and international archaeological projects in seven Euro-Mediterranean countries - 54 archaeological areas (6 abroad) of which 22 urban and 32 rural – and organizer of 30 exhibitions, also abroad (including 'From Petra to Shawbak. Archaeology of a frontier', Florence, Pitti Palace, 2009: the first in Italy with the principles of Public Archaeology; or the permanent exposition 'Percorso archeologico attrezzato permanente nell'area archeologica dell'antico vescovado di Pistoia (secc. II. a.C.-XIX d.C.)'). Major running projects include the 'Strategic Athenaeum Project' on the Mediterranean Medieval Feudal Society: archaeological profiles (with projects in Italy: Toscana, Marche, Calabria; and abroad: France, Hispania, Malta, Jordan, Syria, Lebanon) and the archaeological mission in Jordan on Medieval Petra. Archaeology of Crusader-Ayyubid in Transjordan since 1986 („Progetto Pilota” MAE, 1999 e MIUR, 'Prog. scient. d'interesse nazionale' dal 1987; 2009-2012: European Project ENPI-CIUDAD „Liason for worth”: Toscana, Transgiordania, Armavir armeno); and FIRB Project (2005-2007) Dallo scavo al Museo. Metodi e tecniche avanzate di ricerca, elaborazione e fruizione condivisa del patrimonio culturale mediterraneo (responsible for Research Unit). As holder of the Chair he has therefore led the scientific supervision of a mission in Armenia ('The Silk Road in Armenia and the euro-Asian connectivity in the Middle Ages: an light archeology'), MAE-Erevan Un. and a development cooperation mission in Iraqi Kurdistan (2013-2015: MAE Cooperation project, lead partner City of Florence, 'The higher education level for the preservation and development of the tangible and intangible cultural heritage of Iraq').

Author of almost 300 scientific publications (including twelve monographs) - about themes articulated in specific research projects, generally connotable as historical-archeological cutting - on medieval urban settlement, Incastellamento, settlement in Mediterranean feudal territories, Production Archaeology, Landscape archaeology ('Light Archaeology') and, more recently, Public Archaeology.



Keynote Thursday, December 5, 2019

## Conservation Science and Ethics in the Analytical Studies of Clay Cuneiform Tablets from Ancient Near Eastern Archives

Yuval Goren

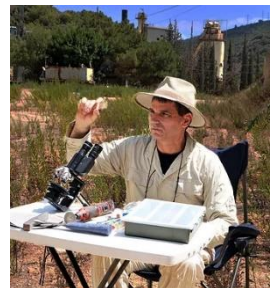
*Department of Bible, Archaeology and Ancient Near East  
Ben-Gurion University of the Negev, Israel*

### ABSTRACT

The Late Bronze Age (ca. 1500-1200 BC) constitutes the heyday of the great empires of the ancient Near East (ANE), such as Egypt, Hatti, Mitanni, Babylonia, and Assyria. Centuries of conflicts followed by peaceful relations, marked the interrelations of these superpowers. Rich literary records in the form of archives of cuneiform texts were established. These archives contain abundant tablets whose origin is unknown. Sometimes the letterhead is missing, in other cases, we may have the name of the sender and still ignore his domicile. Further, the location of many ANE countries and cities has not yet been clearly established. Hence, revealing the origin of documents has the potential of shedding new light on the history of the ANE and beyond. The paper will discuss the use of a rich array of non-destructive testing (NDT) and minimally-destructive testing (MDT) methods for studying the composition, technology and provenance of ANE cuneiform tablets. This approach opens new horizons in the interpretation of the clay documents. We applied such analyses on hundreds of tablets from el Amarna, Ras Shamra/Ugarit, Boğazköy/Hattusha, and sites in Cyprus and Israel/Palestine. made during the last decade, serves as the basis for this study. The results raise a set of ethical and practical issues concerning the study and conservation of such precious artifacts.

### SHORT BIOGRAPHY

**Yuval Goren** is Professor of Archaeology at the Ben Gurion University of the Negev (previously at Tel Aviv University where he was faculty member for twenty years). He joined the faculty of Tel Aviv University after graduating at the Hebrew University in Jerusalem and working for several years as a petrography researcher in the Israel Antiquities Authority. He served as the Head of the Department of Archaeology and Ancient Near Eastern Cultures and as Vice Dean of the Faculty of Humanities of Tel Aviv University. Goren was the initiator and head of the



graduate program in Archaeology and Archaeomaterials and the Laboratory for Comparative Microarchaeology at Tel Aviv University. In the Ben Gurion University of the Negev he established the Trach for Archaeomaterials and Conservation Sciences (TACS), now part of the European Erasmus and ITN ARCHMAT consortia and the formal representative of Israel in the COST-SAGA project. His research focuses on early technology and provenance of ceramics, plasters and metallurgy, using mineralogical, structural and geochemical methods. Goren co-directed the excavations of Chalcolithic sites at Nahal Sekher, Kissufim cemetery and recently the so-called shrine at Ein Gedi. He was also directing the excavation at the 1st millennium BC Tel Sochoh.



Keynote Friday, December 6, 2019

## Archaeo-physics in the Valley of the Kings, Luxor

Francesco Porcelli

*Dept. of Applied Science and Technology,  
Polytechnic University of Turin*

### ABSTRACT

The existence of hidden chambers and corridors adjacent to Tutankhamun's tomb (code name KV62) has been long debated. In 2015 it was suggested that these chambers might host the as yet undiscovered burial of Nefertiti. In order to test this hypothesis, two Ground Penetrating Radar (GPR) surveys, conducted in 2015 and 2016 from inside KV62, were carried out, but gave contradictory results. To solve these uncertainties and obtain a more confident and conclusive response, a team led by the Politecnico di Torino in February 2018 conducted a third GPR survey. The results of this third radar scan, published in Ref. [1], are discussed in this talk. I will discuss also the first results obtained in the framework of a more extensive project, entitled "The complete geophysical survey of the Valley of the Kings", initiated in 2017 and still ongoing. This project indicates how Geophysics and Geomatics can support archaeological research within the context of a broad multidisciplinary approach.

### SHORT BIOGRAPHY

**Francesco Porcelli** (PhD Physics, Scuola Normale Sup. di Pisa, 1985) is a full professor of Physics of Matter at the Polytechnic University of Turin. His recent research interest, developed during an eight-year long period spent in Egypt as Scientific Attaché at the Embassy of Italy, concerns the application of physics and technology to cultural heritage. In 2014-2016 he coordinated a team that established the meteoritic origin of Tutankhamen's iron dagger blade. Since 2017 he leads a project entitled "The Complete Geophysical Survey of the Valley of the Kings". Within this project, he conducted the third Ground-Penetrating-Radar (GPR) scan of Tutankhamen's tomb, searching for hidden chambers and testing the hypothesis that this tomb could be part of a larger burial place perhaps belonging to the legendary Nefertiti.



## Awards

### Best Conference Paper Award

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**Description:** To recognize the most outstanding paper presented at the annual 2019 IMEKO TC-4 International Conference on Metrology for Archaeology and Cultural Heritage

**Basis for Judging:** Technical merit, originality, potential impact on the field, clarity of the written paper, and quality of the oral or other presentation.

### Best Paper Presented by a Young Researcher

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**Description:** An exclusive plaque will be given for the best paper authored and presented by a researcher younger than 35 years in age.

**Basis for Judging:** Technical merit, originality, potential impact on the field, clarity of the written paper, and quality of the oral or other presentation.

### Best Paper Presented by a Woman

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**Description:** An exclusive plaque will be given for the best paper authored and presented by a woman.

**Basis for Judging:** Technical merit, originality, potential impact on the field, clarity of the written paper, and quality of the oral or other presentation.

### Best Paper of the Poster Session

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**Description:** An exclusive plaque will be given for the best poster presented.

**Basis for Judging:** Technical merit, originality, potential impact on the field, clarity of the written paper, and quality of the poster presentation.

### Best Live Demonstration

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**Description:** To highlight the importance of the Demo Session, an exclusive plaque will be given for the best demo.



## Social Events

### Welcome Party

The Welcome Party will be held at **Italian Geographic Military Institute**,  
**December 4, 2019 - H 19:00**



#### ADDRESS

Via Battisti Cesare 10  
Florence, Italy

### Gala Dinner

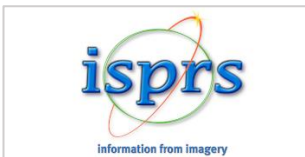
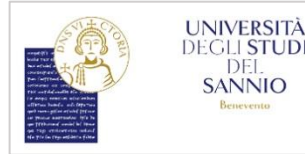
The Gala Dinner will be held at "**Sabatini**" Restaurant  
**December 5, 2019 - H 20:00**



#### ADDRESS

Via Panzani, 9/a,  
Florence, Italy

## Patronages







## Program Schedule - December 4, 2019

<b>Wednesday, December 4, 2019</b>		
<b>14:00 - 18:00</b>	<b>Registration</b> University of Florence, SAGAS Department - Via San Gallo, 10	
<b>15:30 - 16:00</b>	Opening Ceremony University of Florence, SAGAS Department Via San Gallo, 10 - Great Hall	
<b>16:00 - 16:30</b>	<b>Keynote Lecture</b> University of Florence, SAGAS Department - Great Hall  <b>Guido Vannini, University of Florence, Italy</b> <b>The historical dimension of archaeological research: from the episode to the phenomenon</b>	
<b>16:30 - 17:00</b>	<b>Coffee Break</b> University of Florence, SAGAS Department	
	<i>University of Florence, SAGAS Dep. Via San Gallo, 10 - Great Hall</i>	<i>University of Florence, SAGAS Dep. Via San Gallo, 10 - Parva Hall</i>
<b>17:00 - 18:15</b>	Special Session on Data Acquisition and Processing by Integrated Geomatic Techniques, Experiences and Open Issues - PART I	Special Session on IoT based Systems for the Structural Health Monitoring and the Analysis of Cultural Heritage Building and Archaeological Sites
<b>19:00 - 21:00</b>	<b>Welcome Party</b> <i>Italian Geographic Military Institute Via Cesare Battisti 10 - Florence</i>	

## Program Schedule - December 5, 2019

Thursday, December 5, 2019					
08:30 - 17:45	<b>Registration</b> <b>University of Florence, SAGAS Department- Via San Gallo, 10</b>				
09:00 - 10:00	<b>Keynote Lecture</b> <i>University of Florence, SAGAS Department - Great Hall</i> <b>Yuval Goren, Ben-Gurion University of the Negev, Israel</b> <b>Conservation Science and Ethics in the Analytical Studies of Clay Cuneiform Tablets from Ancient Near Eastern Archives</b>				
10:00 - 11:30	<i>University of Florence, SAGAS Dep. Via San Gallo, 10 - Great Hall</i> Special Session on Advanced methodologies for diagnostic and preventive conservation of stone materials in subaerial and underwater environment	<i>University of Florence, SAGAS Dep. Via San Gallo, 10 - Parva Hall</i> Special Session on Measuring Ancient Mortars and Concretes to Discover the Past	10:15 - 11:30	<i>Italian Geographic Military Institute Via Cesare Battisti, 10 - De Vecchi Hall</i> Special Session on Electromagnetic methods in Archaeology and Cultural Heritage applications - PART I	<i>Italian Geographic Military Institute Via Cesare Battisti, 10 - Sala del Cortile</i> General Session - PART I
	<b>Coffee Break</b> <i>University of Florence, SAGAS Department</i>			<b>Coffee Break</b> <i>Italian Geographic Military Institute - Via Cesare Battisti, 10</i>	
11:50 - 13:05	<i>University of Florence, SAGAS Dep. Via San Gallo, 10 - Great Hall</i> Special Session on Integrated Digital Survey Methodologies for the Knowledge and Enhancement of Architectural and Urban Heritage - PART I	<i>University of Florence, SAGAS Dep. Via San Gallo, 10 - Parva Hall</i> Special Session on Non-Invasive Systems and Techniques for "on-site" Monitoring and Diagnosis - PART I	12:05 - 13:15	<i>Italian Geographic Military Institute Via Cesare Battisti, 10 - De Vecchi Hall</i> Special Session on Electromagnetic methods in Archaeology and Cultural Heritage applications - PART II	<i>Italian Geographic Military Institute Via Cesare Battisti, 10 - Sala del Cortile</i> General Session - PART II
	<b>Lunch</b> <i>Italian Geographic Military Institute - Via Cesare Battisti, 10</i>				
14:40 - 15:55	<i>University of Florence, SAGAS Dep. Via San Gallo, 10 - Great Hall</i> Special Session on Integrated Digital Survey Methodologies for the Knowledge and Enhancement of Architectural and Urban Heritage - PART II	<i>University of Florence, SAGAS Dep. Via San Gallo, 10 - Parva Hall</i> Special Session on Non-Invasive Systems and Techniques for "on-site" Monitoring and Diagnosis - PART II	14:30 - 15:40	<i>Italian Geographic Military Institute Via Cesare Battisti, 10 - De Vecchi Hall</i> Special Session on Electromagnetic methods in Archaeology and Cultural Heritage applications - PART III	<i>Italian Geographic Military Institute Via Cesare Battisti, 10 - Sala del Cortile</i> Special Session on Data Acquisition and Processing by Integrated Geomatic Techniques, Experiences and Open Issues - PART II
	<b>Coffee Break</b> <i>University of Florence, SAGAS Department</i>				
16:15 - 17:45	<i>University of Florence, SAGAS Dep. Via San Gallo, 10 - Great Hall</i> Special Session on Conservation and protection of natural and artificial stones used in historical buildings	<i>University of Florence, SAGAS Dep. Via San Gallo, 10 - Parva Hall</i> Special Session on Logic and Computing, the Underlying Basis of Digital Archaeology			
20:00 - 23:00	<b>Gala Dinner</b> <i>"Sabatini" Restaurant</i> <i>Via Panzani 9A - Florence</i>				



## Program Schedule - December 6, 2019

Friday, December 6, 2019					
08:30 - 17:00	<b>Registration</b> University of Florence, SAGAS Department- Via San Gallo, 10				
09:30 - 10:30	<b>Keynote Lecture</b> University of Florence, SAGAS Department - Great Hall  <b>Francesco Porcelli, University of Turin, Italy</b> <b>Archaeo-physics in the Valley of the Kings, Luxor</b>				
10:30 - 10:50	<b>Coffee Break</b> University of Florence, SAGAS Department				
	University of Florence, SAGAS Dep. Via San Gallo, 10 - Great Hall			Italian Geographic Military Institute Via Cesare Battisti, 10 - De Vecchi Hall	Italian Geographic Military Institute Via Cesare Battisti, 10 - Sala del Cortile
10:50 - 11:20	<b>TUTORIAL - Session 1</b> Use of portable instruments for metallic cultural heritage assets			Special Session on Pigments and palettes through the Ages: science of painting techniques	<b>POSTER SESSION</b>  <b>LIVE DEMO SESSION</b>  Italian Geographic Military Institute Via Cesare Battisti, 10
	University of Florence, SAGAS Dep. Via San Gallo, 10 - Great Hall	University of Florence, SAGAS Dep. Via San Gallo, 10 - Parva Hall	11:10 - 12:25		
11:20 - 12:05	Special Session on Neutron Methods for Cultural Heritage	Special Session on Geoarchaeological Methods for coastal site and landscape reconstructions			
12:25 - 13:20	<b>POSTER SESSION - LIVE DEMONSTRATION SESSION</b> Italian Geographic Military Institute - Via Cesare Battisti, 10				
13:20 - 14:30	<b>Lunch</b> Italian Geographic Military Institute - Via Cesare Battisti, 10				
	University of Florence, SAGAS Dep. Via San Gallo, 10 - Great Hall	University of Florence, SAGAS Dep. Via San Gallo, 10 - Parva Hall		Italian Geographic Military Institute Via Cesare Battisti, 10 - De Vecchi Hall	<b>POSTER SESSION</b>  <b>LIVE DEMO SESSION</b>  Italian Geographic Military Institute Via Cesare Battisti, 10
14:40 - 15:10	<b>TUTORIAL - Session 2</b> Invisible Archaeology	Special Session on Measuring in the past: ancient instruments between science and technology	14:30 - 15:45	General Session - PART III	
15:10 - 15:55	<b>Live Demonstration</b>				
15:55 - 16:10	<b>Coffee Break</b> University of Florence, SAGAS Department				
	University of Florence, SAGAS Dep. Via San Gallo, 10 - Great Hall	University of Florence, SAGAS Dep. Via San Gallo, 10 - Parva Hall			
16:10 - 17:25	Special Session on Measurement and Instrumentation for the Preventive Conservation of Metallic Works of Art	Special Session on Metrology for taphonomy: quantifying the alterations of skeletal remains in archaeology			
17:25 - 17:45	Closing and Award Ceremony University of Florence, SAGAS Dep. - Via San Gallo, 10 - Great Hall				

## TECHNICAL SESSIONS - Wednesday, December 4

**14:00 – 18:00**

**REGISTRATION**

*University of Florence, SAGAS Department - Via San Gallo, 10*

**15:30 – 16:00**

**Opening Ceremony**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Great Hall*

**16:00 – 16:30**

**INVITED TALK**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Great Hall*

**Chair:** *Michele Nucciotti, University of Florence, Italy*

**Guido Vannini**, *University of Florence, Italy*

**The historical dimension of archaeological research:  
from the episode to the phenomenon**

**16:30 – 17:00**

**COFFEE BREAK**



**17:00 – 18:15**

**Special Session on Data Acquisition and Processing by Integrated Geomatic Techniques, Experiences and Open Issues - PART I**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10 Great Hall*

**Chairs:** Gabriele Bitelli, *University of Bologna, Italy*  
Maria Grazia D'Urso, *University of Bergamo, Italy*

**17:00 An Updated Comparison on Contemporary Approaches for Digitization of Heritage Objects**

Efstathios Adamopoulos, *Università degli Studi di Torino, Italy*  
Fulvio Rinaudo, *Politecnico di Torino, Italy*

**17:15 A methodology for semi-automatic documentation of archaeological elements using RPAS imagery**

Eduard Angelats, *Centre Tecnològic de Telecomunicacions de Catalunya, Spain*  
M. E. Parés, *Centre Tecnològic de Telecomunicacions de Catalunya, Spain*  
C. Mas-Florit, *Universitat de Barcelona, Spain*  
M.A Cau-Ontiveros, *Universitat de Barcelona, ICREA, Spain*

**17:30 Modelling the Seventies: Image-Based Modelling to Investigate Landscape Change in a Mediterranean Mountain Area**

Manuel J.H. Peters, *Politecnico di Torino, Italy, Universidade de Évora, Portugal, Universiteit Leiden, The Netherlands*  
Tesse D. Stek, *Universiteit Leiden, The Netherlands, Royal Netherlands, Italy*

**17:45 Evaluation of the Expected Data Quality in Laser Scanning Surveying of Archaeological Sites**

Mattia Previtali, *Politecnico Milano, Italy*  
Lucia Díaz-Vilariño, *Universidade de Vigo, Spain*  
Marco Scaioni, *Politecnico Milano, Italy*  
Ernesto Frias Nores, *Universidade de Vigo, Spain*

**18:00 Rapid Mapping methods for archaeological sites**

Antonia Spanò, *Politechnics of Turin, Italy*

**17:00 – 18:15**

**Special Session on IoT based Systems for the Structural Health Monitoring and the Analysis of Cultural Heritage Building and Archaeological Sites**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10 Parva Hall*

**Chair:** *Carmelo Scuro, University of Calabria, Italy*

**17:00 The Non-smooth tale of “Apennine Churches” stroked by the Central Italy Earthquakes of 2016**

*Angela Ferrante, Polytechnic University of Marche, Italy*

*Ersilia Giordano, Polytechnic University of Marche, Italy*

*Francesco Clementi, Polytechnic University of Marche, Italy*

*Gabriele Milani, Politecnico di Milano, Italy*

*Antonio Formisano, University of Naples ‘Federico II’, Italy*

**17:15 Cultural Heritage and earthquake: the case study of San Francesco’s church in Amandola (Central Italy)**

*Ersilia Giordano, Polytechnic University of Marche, Italy*

*Angela Ferrante, Polytechnic University of Marche, Italy*

*Francesco Clementi, Polytechnic University of Marche, Italy*

*Gabriele Milani, Politecnico di Milano, Italy*

*Antonio Formisano, University of Naples ‘Federico II’, Italy*

**17:30 An innovative structural health monitoring system for the preliminary study of an ancient anti-seismic construction technique.**

*Carmelo Scuro, University of Calabria, Italy*

*Domenico Luca Carnì, University of Calabria, Italy*

*Francesco Lamonaca, University of Sannio, Italy*

*Renato Sante Olivito, University of Calabria, Italy*

*Gabriele Milani, University of Milan, Italy*

**17:45 Automated procedure for the creation of finite element mesh: application to non-periodic historical masonry**

*Simone Tiberti, University of Milan, Italy*

*Gabriele Milani, University of Milan, Italy*



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**18:00 SHM systems applied to the built heritage inventory at the territorial scale. A preliminary study based on CARTIS approach**

Renato Sante Olivito, *University of Calabria, Italy*

Saverio Porzio, *University of Calabria, Italy*

Carmelo Scuro, *University of Calabria, Italy*

Domenico Luca Carnì, *University of Calabria, Italy*

Francesco Lamonaca, *University of Sannio, Italy*

**19:00 - 21:00**

**Welcome Party**

*Italian Geographic Military Institute*

*Via Cesare Battisti 10 - Florence*

## TECHNICAL SESSIONS - Thursday, December 5

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**08:30 – 17:45**

**REGISTRATION**

*University of Florence, SAGAS Department, Via San Gallo, 10*

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**09:00 – 10:00**

**INVITED TALK**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Great Hall*

**Chair:** *Emma Angelini, Politecnico di Torino, Italy*

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**Yuval Goren**, *Department of Bible, Archaeology and Ancient Near East  
Ben-Gurion University of the Negev, Israel*

**Conservation Science and Ethics in the Analytical Studies of Clay  
Cuneiform Tablets from Ancient Near Eastern Archives**





**10:00 – 11:30**

**Special Session on Advanced methodologies for diagnostic and preventive conservation of stone materials in subaerial and underwater environment**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10 Great Hall*

**Chairs:** *Mauro Francesco La Russa, University of Calabria, Italy  
Paola Fermo, University of Milan, Italy*

**10:00 SEM-EDS microanalysis in cultural heritage and archaeology: thickness effects and measurement strategy for ultrathin glass and metal fragments and particles**

*Daniele Moro, Università di Bologna "Alma Mater Studiorum", Italy  
Gianfranco Ulian, Università di Bologna "Alma Mater Studiorum", Italy  
Giovanni Valdrè, Università di Bologna "Alma Mater Studiorum", Italy*

**10:15 Evaluation of commercial consolidating agents on very porous biocalcarenite**

*Maduka Lankani Weththimuni, Università di Pavia, Italy  
Fabio Crivelli, Università di Pavia, Italy  
Cristoforo Galimberti, Chem Spec srl, Italy  
Marco Malagodi, Università di Pavia, Italy  
Maurizio Licchelli, Università di Pavia, Italy*

**10:30 CT scanning Image New Applied Technique for Evaluation Consolidants of Sandstone, Avenue of Shpinx, Luxor, Egypt**

*Ahmed Sallam, University, Aswan, Egypt*

**10:45 Colorimetric monitoring of Palazzo Margherita, US Embassy in Rome.**

*Andrea Macchia, YOCOCU, Italy  
Valeria Brunori, US Embassy, Italy  
Laura Rivaroli, YOCOCU, Italy  
Piero Coronas, Kermes s.n.c. Restauro Beni Artistici, Italy  
Cristina Balzani, Kermes s.n.c. Restauro Beni Artistici, Italy*

**11:00 Ultrasonic Nondestructive Testing of building materials for the diagnosis and characterization of the decay due to salts crystallization**

Raul Arcidiacono, *DIMES, The University of Calabria, Italy*  
Pietro Burrascano, *Dept. of Engineering, The University of Perugia, Italy*  
Mauro Francesco La Russa, *DIBEST, The University of Calabria, Italy*  
Stefano Laureti, *DIMES, The University of Calabria, Italy*  
Luciana Randazzo, *DIBEST, The University of Calabria, Italy*  
Marco Ricci, *DIMES, The University of Calabria, Italy*

**11:15 Metals distributions within black crusts sampled on the facade of an historical monument: the case study of the Cathedral of Monza (Milan, Italy)**

Valeria Comite, *Università degli Studi di Milano, Italy*  
Jose Santiago Pozo-Antonio, *University of Vigo, Spain*  
Carolina Cardell, *University of Granada, Spain*  
Teresa Rivas, *University of Vigo, Spain*  
Luciana Randazzo, *Università della Calabria, Italy*  
Mauro Francesco La Russa, *Università della Calabria, Italy*  
Paola Fermo, *Università degli Studi di Milano, Italy*

**10:00 – 11:30**

**Special Session on Measuring Ancient Mortars and Concretes to Discover the Past**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10 Parva Hall*

**Chairs:** *Marco Lezzerini, University of Pisa, Italy*  
*Andrea Aquino, University of Pisa, Italy*

**10:00 Characterization of mortars of Giotto's Bell Tower for radiocarbon dating**

Sara Calandra, *(CNR-ICVBC), University of Florence, Italy*  
Serena Barone, *University of Florence, INFN Florence Unit, Italy*  
Emma Cantisani, *(CNR-ICVBC), Italy*  
Mariaelena Fedi, *INFN Florence Unit, Italy*



Carlo Alberto Garzonio, *University of Florence, Italy*  
Lucia Liccioli, *INFN Florence Unit, Italy*  
Barbara Salvadori, *(CNR-ICVBC), Italy*  
Teresa Salvatici, *University of Florence, Italy*  
Paola Ricci, *University of Campania Luigi Vanvitelli, Italy*

### **10:18 Calcarenite di Gravine Formation, a Row Material for the lime production**

Agnese Emanuela Bonomo, *University of Basilicata, Italy*  
G. Prosser, *University of Basilicata, Italy*  
G. Rizzo, *University of Basilicata, Italy*

### **10:36 The production of binding materials in southern Florence area: stones and their properties (Greve in Chianti, Italy)**

Andrea Aquino, *Università di Pisa, Italy*  
Elena Pecchioni, *Università di Firenze, Italy*  
Sonia La Felice, *Consiglio Nazionale delle Ricerche, Italy*  
Tsegaye Abebe, *Adhana Geological Consultancy Service, Italy*  
Claudia Principe, *Consiglio Nazionale delle Ricerche, Italy*  
Marco Lezzerini, *Università di Pisa, Italy*

### **10:56 New Strategies in Mortar Characterization and Radiocarbon Dating**

Giulia Ricci, *University of Padova, Italy*  
Michele Secco, *University of Padova, Italy*  
Fabio Marzaioli, *(CIRCE), INNOVA SCaRL, Italy*  
Isabella Passariello, *(CIRCE), INNOVA SCaRL, Campania Uni. "Luigi Vanvitelli", Italy*  
Filippo Terrasi, *(CIRCE), INNOVA SCaRL, Campania Uni. "Luigi Vanvitelli", Italy*  
Gilberto Artioli, *University of Padova, Italy*

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**11:30 – 11:50**

**COFFEE BREAK**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10*

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**10:15 – 11:30**

**Special Session on Electromagnetic methods in Archaeology and Cultural Heritage applications - PART I**

**Room:** *Italian Geographic Military Institute  
Via Cesare Battisti, 10 - De Vecchi Hall*

**Chairs:** *Giovanni Leucci, IBAM-CNR, Italy  
Rita Deiana, University of Padova, Italy  
Raffaele Martorana, University of Palermo, Italy*

**10:15 The watch towers in Malta: a patrimony to preserve for the future**

*Raffaele Persico, IBAM-CNR, University Uninettuno UTIU, Italy  
Giovanni Leucci, IBAM-CNR, Italy  
Sebastiano D'Amico, University of Malta, Malta  
Lara De Giorgi, IBAM-CNR, Italy  
Emanuele Colica, University of Malta, Malta  
Maurizio Lazzari, IBAM-CNR, Italy*

**10:30 Matera European Capital of Culture 2019: NDT surveys in cave churches**

*Lara De Giorgi, IBAM-CNR, Italy  
Maurizio Lazzari, IBAM-CNR, Italy  
Giovanni Leucci, IBAM-CNR, Italy  
Raffaele Persico, IBAM-CNR, Italy*

**10:45 Application of Multispectral Imaging and spectroscopic portable instruments to the analysis of Medieval Illuminated Manuscripts**

*Alfonso Zoleo, University of Padova, Italy  
Cecilia Rossi, University of Padova, Italy  
Renzo Bertonecello, University of Padova, Italy  
Rita Deiana, University of Padova, Italy  
Federica Toniolo, University of Padova, Italy  
Federica Bolpagni, University of Padova, Italy*



## 11:00 Remotely controlled aerial and underwater vehicles in support to magnetic surveys

Salvatore Scudero, *INGV, Osservatorio Nazionale Terremoti, Italy*  
Giovanni Vitale, *INGV, Osservatorio Nazionale Terremoti, Italy*  
Antonino Pisciotta, *INGV, Sezione di Palermo, Italy*  
Raffaele Martorana, *Università degli studi di Palermo, Italy*  
Patrizia Capizzi, *Università degli studi di Palermo, Italy*  
Antonino D'Alessandro, *INGV, Osservatorio Nazionale Terremoti, Italy*

## 11:15 Recent developments on portable XRF scanner

Sergio Augusto Barcellos Lins, *La Sapienza Università di Roma, INFN, Roma Tre, Italy*  
Giovanni Ettore Gigante, *La Sapienza Università di Roma, Italy*  
Roberto Cesaro, *Università degli Studi di Sassari, Italy*  
Stefano Ridolfi, *Ars Mensurae, Italy*

10:15 – 11:30

### General Session - PART I

**Room:** *Italian Geographic Military Institute*

*Via Cesare Battisti, 10 - Sala del Cortile*

**Chairs:** Marco Carpiceci, *Sapienza University of Rome, Italy*

Marcantonio Catelani, *University of Florence, Italy*

## 10:15 Managing complex Synchrotron radiation FTIR micro-spectra from historic bowed musical instruments by chemometrics

Silvia Grassi, *Università degli Studi di Milano, Italy*  
Giacomo Fiocco, *Università degli Studi di Pavia, Università di Torino, Italy*  
Claudia Invernizzi, *Università degli Studi di Pavia, Uni. degli Studi di Parma, Italy*  
Tommaso Rovetta, *Università degli Studi di Pavia, Italy*  
Michela Albano, *Università degli Studi di Pavia, Italy*  
Patrizia Davit, *Università di Torino, Italy*  
Monica Gulmini, *Università di Torino, Italy*  
Chiaramaria Stani, *Elettra-Sincrotrone Trieste, Italy*  
Lisa Vaccari, *Elettra-Sincrotrone Trieste, Italy*  
Maurizio Lichelli, *Università degli Studi di Pavia, Italy*  
Marco Malagodi, *Università degli Studi di Pavia, Italy*

**10:30 First sampling of ceramic mixtures for Valle d'Aosta: research and perspectives related to the alpine settlement of Orgères (La Thuile-AO, Italy).**

Chiara Maria Lebole, *University of Torino, Italy*  
Marco Russo, *University of Torino, Italy*  
Alberto Spegis, *University of Torino, Italy*  
Giorgio Di Gangi, *University of Torino, Italy*

**10:45 Metrological study some wooden statues of Tutankhamun using X-ray**

Moamen Othman, *Egyptian Museum in Cairo, Egypt*  
Mohamed Abd El-Rahman, *Ministry of Antiquities, Egypt*  
Ahmed Tarek, *Grand Egyptian Museum, Egypt*  
Eid Mertah, *Grand Egyptian Museum, Egypt*

**11:00 The shape of the colour.  
The cave of San Michele on Monte Tancia (Italy)**

Marco Carpiceci, *Sapienza University of Rome, Italy*  
Andrea Angelini, *National Research Council, Italy*

**11:15 Structural degradation measurement and diagnostics of historical masonry buildings.**

Valentino Sangiorgio, *Politecnico di Bari, Italy*  
Silvia Martiradonna, *Politecnico di Bari, Italy*  
Fabio Fatiguso, *Politecnico di Bari, Italy*  
Giuseppina Uva, *Politecnico di Bari, Italy*

**11:30 – 12:00**

**COFFEE BREAK**

**Room:** *Italian Geographic Military Institute - Via Cesare Battisti, 10*



**11:50 – 13:05**

**Special Session on Integrated Digital Survey Methodologies for the Knowledge and Enhancement of Architectural and Urban Heritage - PART I**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10 Great Hall*

**Chairs:** *Marco Giorgio Bevilacqua, University of Pisa, Italy*  
*Assunta Pelliccio, University of Cassino, Italy*

**11:50 'Steel Houses' in Zabrze as a unique form of dwelling - analysis and conservation guidelines**

*Magdalena Zmudzinska-Nowak, Silesian University of Technology, Poland*  
*Magdalena Krause, Archma Reserch and Design Office, Mikolow, Poland*

**12:05 Integrated digital survey methodologies for the knowledge and enhancement of the ancient city walls. The "Curtain" of Santa Chiara in Cagliari (Italy)**

*Andrea Pirinu, University of Cagliari, Italy*  
*Marco Utzeri, University of Cagliari, Italy*

**12:20 Historical data of laser scanning and photogrammetry for the knowledge and memory plan of Cultural Heritage**

*Gabriella Caroti, DICI, University of Pisa, Italy*  
*Isabel Martínez-Espejo Zaragoza, DICI, University of Pisa, Italy*  
*Andrea Piemonte, DICI, University of Pisa, Italy*

**12:35 The integrated survey of a stratified abbey complex: the study case of San Giovanni di Lucoli (L'Aquila)**

*Ilaria Trizio, CNR, Italy*  
*Sandra Fiore, CNR, Italy*  
*Alessandro Giannangeli, CNR, Italy*  
*Andrea Ruggieri, Engineer, Free lance*  
*Francesca Savini, CNR, Italy*

**12:50 SfM and Digital Modelling for Enhancing Architectural Archives Heritage**

Roberta Spallone, *Politecnico di Torino, Italy*

Giulia Bertola, *MODLab Arch, Italy*

Francesca Ronco, *MODLab Design, Italy*

**11:50 – 13:05**

**Special Session on Non-Invasive Systems and Techniques for "on-site" Monitoring and Diagnosis - PART I**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10 Parva Hall*

**Chairs:** Emanuele Piuzzi, *Sapienza University of Rome, Italy*

Livio d'Alvia, *Sapienza University of Rome, Italy*

**11:50 A comparative evaluation of patch resonators layouts for moisture measurement in historic masonry units**

Livio D'Alvia, *Sapienza University of Rome, Italy*

Eduardo Palermo, *Sapienza University of Rome, Italy*

Zaccaria Del Prete, *Sapienza University of Rome, Italy*

Erika Pittella, *Sapienza University of Rome, Italy*

Stefano Pisa, *Sapienza University of Rome, Italy*

Emanuele Piuzzi, *Sapienza University of Rome, Italy*

**12:08 Integrated approach for non-invasive diagnostic investigation at the Bishop's Palace of Frascati**

Luisa Caneve, *ENEA, Italy*

Francesco Colao, *ENEA, Italy*

Massimiliano Guarneri, *ENEA, Italy*

Marialuisa Mongelli, *ENEA, Italy*

Valeria Spizzichino, *ENEA, Italy*

Massimo Francucci, *ENEA, Italy*





## **12:26 Mid-wave infrared imaging analysis of XVII century paintings on canvas of the Chigi Palace in Ariccia**

Sofia Ceccarelli, *Università degli Studi di Roma Tor Vergata, Italy*

Noemi Orazi, *Università degli Studi di Roma Tor Vergata, Italy*

Fulvio Mercuri, *Università degli Studi di Roma Tor Vergata, Italy*

Stefano Paoloni, *Università degli Studi di Roma Tor Vergata, Italy*

Ugo Zammit, *Università degli Studi di Roma Tor Vergata, Italy*

Francesco Petrucci, *Palazzo Chigi, Italy*

## **12:44 Photogrammetry and structured light: comparison and integration of techniques in survey of the Corsini Throne at Corsini Gallery in Rome**

Marialuisa Mongelli, *ENEA, Italy*

Giulia Chellini, *ENEA, Italy*

Silvio Migliori, *ENEA, Italy*

Antonio Perozziello, *ENEA, Italy*

Samuele Pierattini, *ENEA, Italy*

Marco Puccini, *ENEA, Italy*

Alessandro Cosma, *Galleria Nazionale Corsini, Italy*

**12:00 – 13:15**

### **Special Session on Electromagnetic methods in Archaeology and Cultural Heritage applications - PART II**

**Room:** *Italian Geographic Military Institute*

*Via Cesare Battisti, 10 - De Vecchi Hall*

**Chairs:** Giovanni Leucci, *IBAM-CNR, Italy*

Rita Deiana, *University of Padova, Italy*

Raffaele Martorana, *University of Palermo, Italy*

## **12:00 Structural detailing of buried Roman baths through GPR inspection**

Luca Bianchini Ciampoli, *Roma Tre University, Italy*

Roberta Santarelli, *Roma Tre University, Italy*

Ersilia Maria Loreti, *Sovrintendenza Capitolina ai Beni Culturali, Italy*

Alessandra Ten, *University of Roma La Sapienza, Italy*

Andrea Benedetto, *Roma Tre University, Italy*

**12:20 A 3D information framework for automated archaeological pottery archival**

Luca Di Angelo, *University of L'Aquila, Italy*  
Paolo Di Stefano, *University of L'Aquila, Italy*  
Emanuele Guardiani, *University of L'Aquila, Italy*  
Anna Eva Morabito, *University of Salento, Italy*

**12:40 Utilization of low resolution SWIR camera to obtain infrared reflectograph mosaic of Serbian high-baroque icon**

Miroslav Cvetinov, *University of Novi Sad, Serbia*  
Daniela Korolija-Crkvenjakov, *University of Novi Sad, Serbia*  
Željko Mandić, *University of Novi Sad, Serbia*

**13:00 Hydrogeological and geotechnical modeling of the foundation soils of Maredolce Lake in Palermo, aided by geophysical surveys**

Fabio Cafiso, *University of Palermo, Italy*  
Alessandro Canzoneri, *University of Palermo, Italy*  
Patrizia Capizzi, *University of Palermo, Italy*  
Alessandra Carollo, *University of Palermo, Italy*  
Raffaele Martorana, *University of Palermo, Italy*  
Filippo Romano, *University of Palermo, Italy*

**12:00 – 13:15**

**General Session - PART II**

**Room:** *Italian Geographic Military Institute*  
*Via Cesare Battisti, 10 - Sala del Cortile*

**Chairs:** Paolo Liverani, *University of Florence, Italy*  
Marcantonio Catelani, *University of Florence, Italy*

**12:00 Metrological approach to the study of Central European regular cities**

Maria Legut-Pintal, *Wroclaw University of Science and Technology, Poland*  
Anna Kubicka, *Wroclaw University of Science and Technology, Poland*



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**12:20 Roman fragmentary painting: surveying technologies and methodological approaches.**

Diego Ronchi, *Spiron Heritage and Survey*

Silvia Fortunati, *"Sapienza" Università degli Studi di Roma, Italy*

Marco Limongiello, *University of Salerno, Italy*

**12:40 Using of neutron activation analysis to study elemental composition of Middle Ages historical figures remains**

Andrey Dmitriev, *Joint Institute for Nuclear Research, Russia*

T. D. Panova, *Moscow Kremlin Museums, Russia*

S. B. Borzakov, *Joint Institute for Nuclear Research, Russia*

O. E. Chepurchenko, *Joint Institute for Nuclear Research, Russia*

Yu. G. Filina, *Joint Institute for Nuclear Research, Russia*

V. S. Smirnova, *Joint Institute for Nuclear Research, Russia*

**13:00 Thermoluminescence dating laboratory improvements tested on an archaeological rescue site in Trino, Vercelli province, Italy.**

Laura Guidorzi, *Università di Torino, INFN Sezione di Torino, Italy*

Fulvio Fantino, *TecnArt S.r.l., Italy*

Elisabetta Durisi, *Università di Torino, INFN Sezione di Torino, Italy*

Marco Ferrero, *Università di Torino, INFN Sezione di Torino, Italy*

Alessandro Re, *Università di Torino, INFN Sezione di Torino, Italy*

Luisa Vigorelli, *Università di Torino, Italy*

Lorenzo Visca, *Università di Torino, INFN Sezione di Torino, Italy*

Monica Gulmini, *Università di Torino, Italy*

Giovanni Dughera, *INFN Sezione di Torino, Italy*

Giuseppe Giraudo, *INFN Sezione di Torino, Italy*

Debora Angelici, *TecnArt S.r.l., Italy*

Elisa Panero, *Ministero per i Beni e le Attività Culturali, Italy*

Alessandro Lo Giudice, *Università di Torino, INFN Sezione di Torino, Italy*

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**13:20 – 14:30**

**Lunch**

*Italian Geographic Military Institute - Via Cesare Battisti, 10*

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**14:40 – 15:55**

**Special Session on Integrated Digital Survey Methodologies for the Knowledge and Enhancement of Architectural and Urban Heritage - PART II**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10 Great Hall*

**Chairs:** *Marco Giorgio Bevilacqua, University of Pisa, Italy*  
*Assunta Pelliccio, University of Cassino, Italy*

**14:40 Digital Survey and 3D Geometric Interpretation of Complex Vaulted Systems.**

**Palazzo Valperga Galleani di Barbaresco in Turin**

*Marco Vitali, Politecnico di Torino, Italy*  
*Fabrizio Natta, Politecnico di Torino, Italy*

**14:55 Rule-based inferencing diagnosis in HBIM**

*Silvana Bruno, Polytechnic University of Bari, Italy*  
*Antonella Musicco, Polytechnic University of Bari, Italy*  
*Rosella Alessia Galantucci, Polytechnic University of Bari, Italy*  
*Fabio Fatiguso, Polytechnic University of Bari, Italy*

**15:10 3D procedural modeling of complex vaulted systems: geometric rules vs SfM based modeling**

*Vincenzo Bagnolo, DICAAR, University of Cagliari, Italy*  
*Raffaele Argiolas, DICAAR, University of Cagliari, Italy*

**15:25 Roots of 'Parametric Thinking' in Palladio's Villas. Surveying, interpreting and visual programming the plates from I quattro libri di architettura**

*Roberta Spallone, Politecnico di Torino, Italy*  
*Michele Calvano, Politecnico di Torino, Italy*

**15:40 Integration and modelling of 3D data as strategy for structural diagnosis in Endangered Sites. The study case of Church of the Annunciation in Pokcha (Russia)**

*Sandro Parrinello, University of Pavia, Italy*  
*Raffaella De Marco, University of Pavia, Italy*



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**14:40 – 15:55**

**Special Session on Non-Invasive Systems and Techniques for "on-site" Monitoring and Diagnosis - PART II**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10 Parva Hall*

**Chairs:** *Emanuele Piuzei, Sapienza University of Rome, Italy*  
*Livio d'Alvia, Sapienza University of Rome, Italy*

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**14:40 Structural health monitoring of the Ninfeo Ponari by combined use of fibre optic sensors, photogrammetry and laser scanning**

Michele Arturo Caponero, *ENEA, Italy*  
Ernesto Grande, *Univ. Guglielmo Marconi, Italy*  
Maura Imbimbo, *Univ. of Cassino and Southern Lazio, Italy*  
Giuseppe Modoni, *Univ. of Cassino and Southern Lazio, Italy*  
Marialuisa Mongelli, *ENEA, Italy*  
Eugenio Polito, *Univ. of Cassino and Southern Lazio, Italy*

**14:55 Archaeological application of centreless X-ray diffractometers for non-destructive pole figure measurements**

Máté Sepsi, *University of Miskolc, Hungary*  
Márton Benke, *University of Miskolc, Hungary*  
Valéria Mertinger, *University of Miskolc, Hungary*

**15:10 Archaeological textiles from El Ashmunein (Egypt): A non-invasive investigation of the dyes**

Monica Gulmini, *Università di Torino, Italy*  
Patrizia Davit, *Università di Torino, Italy*  
Chiara Ricci, *"La Venaria Reale", Italy*  
Giacomo Fiocco, *Università di Torino, Università degli Studi di Pavia, Italy*  
Matilde Borla, *SABAP, Italy*  
Valentina Turina, *Museo Egizio, Italy*  
Cinzia Oliva, *Oliva Restauri, Italy*  
Maurizio Aceto, *Università del Piemonte Orientale & CenISCo, Italy*

**15:25 New, non-invasive texture measurement method for archaeology**

Máté Sepsi, *University of Miskolc, Hungary*  
Márton Benke, *University of Miskolc, Hungary*  
Valéria Mertinger, *University of Miskolc, Hungary*

**15:40 Diagnostic of historical vehicle's engines by acoustic emission techniques**

Alejandro Roda-Buch, *Haute Ecole Arc, Ecole Polytechnique Fédérale, Switzerland*  
Emilie Cornet, *Haute Ecole Arc, Switzerland*  
Guillaume Rapp, *Haute Ecole Arc, Switzerland*  
Brice Chalançon, *Musée National de l'Automobile, France*  
Stefano Mischler, *Ecole Polytechnique Fédérale, Switzerland*  
Laura Brambilla, *Haute Ecole Arc, Switzerland*

**14:30 – 15:40**

**Special Session on Electromagnetic methods in Archaeology and Cultural Heritage applications - PART III**

**Room:** *Italian Geographic Military Institute*  
*Via Cesare Battisti, 10 - De Vecchi Hall*

**Chairs:** Giovanni Leucci, *IBAM-CNR, Italy*  
Rita Deiana, *University of Padova, Italy*  
Raffaele Martorana, *University of Palermo, Italy*

**14:30 Ground Penetrating Radar investigation of the floor of Palazzo Vecchio's Great Hall**

Massimiliano Pieraccini, *University of Florence, Italy*  
Lapo Miccinesi, *University of Florence, Italy*  
Heidi Garcia Canizares, *University of Florence, Italy*

**14:48 Architectural survey and analysis of the costal tower of S. Maria dell'Alto in Nardò (Lecce, Italy).**

Francesco Gabellone, *(ISPC-CNR) National Research Council, Italy*  
Ivan Ferrari, *(ISPC-CNR) National Research Council, Italy*  
Alessandro Giuri, *External collaborator, Italy*  
Francesco Giuri, *(ISPC-CNR) National Research Council, Italy*



## **15:06 Effectiveness of electromagnetic conductivity mapping for delineating subsurface structures related to the Roman port of Emporiae**

Albert Casas, *University of Barcelona, Spain*  
Pere Castanyer, *Empúries. Museo d'Arqueologia, Spain*  
Mahjoub Himi, *University of Barcelona, Spain*  
Raul Lovera, *University of Barcelona, Spain*  
Lluís Rivero, *University of Barcelona, Spain*  
Marta Santos, *Empúries. Museo d'Arqueologia, Spain*  
Joaquim Tremoleda, *Empúries. Museo d'Arqueologia, Spain*  
Rubén García, *University of Barcelona, Spain*  
Aritz Urruela, *University of Barcelona, Spain*

## **15:24 The Pietragalla Project: first results of the geophysical activities on the Monte Torretta archaeological site**

Luigi Capozzoli, *CNR – IMAA, Italy*  
Vincenzo Capozzoli, *Université Paris, 1 Panthéon-Sorbonne, France*  
Gregory De Martino, *CNR – IMAA, Italy*  
Alain Duploux, *Université Paris, 1 Panthéon-Sorbonne, France*  
Agnes Henning, *Humboldt Universität zu Berlin, Germany*  
Enzo Rizzo, *CNR – IMAA, Italy*

**14:30 – 15:40**

### **Special Session on Data Acquisition and Processing by Integrated Geomatic Techniques, Experiences and Open Issues - PART II**

**Room:** *Italian Geographic Military Institute*

*Via Cesare Battisti, 10 - Sala del Cortile*

**Chairs:** *Maria Grazia D'Urso, University of Bergamo, Italy*  
*Grazia Tucci, DICEA, University of Florence, Italy*

## **14:30 Geomatics for Cultural Heritage conservation: integrated survey and 3D modeling**

Valeria Croce, *DICI, University of Pisa, Italy*  
Gabiella Caroti, *DICI, University of Pisa, Italy*  
Andrea Piemonte, *DICI, University of Pisa, Italy*  
Marco Giorgio Bevilacqua, *DESTEC, University of Pisa, Italy*

**14:48 High-resolution 3D surveying in support of Cultural Heritage**

Francolini Chiara, *University of Bologna, Italy*

Gabriele Bitelli, *University of Bologna, Italy*

Beatrice Borghi, *University of Bologna, Italy*

Filippo Galletti, *University of Bologna, Italy*

**15:06 Terrestrial laser scanning points clouds for modeling masonry vaults**

Maria Grazia D'Urso, *Department of Engineering and Applied Sciences, Italy*

Valerio Manzari, *Department of Civil and Mechanical Engineering, Italy*

Barbara Marana, *Department of Engineering and Applied Sciences, Italy*

**15:24 Additive manufacturing of marble statues: 3D replicas for the preservation of the originals**

Grazia Tucci, *DICEA, University of Florence, Italy*

Valentina Bonora, *DICEA, University of Florence, Italy*

Valerio Tesi, *Soprintendenza Archeologia, Belle arti e paesaggio, Italy*

Bernardo Pagnini, *Freelance Architect, Italy*

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**15:55 – 16:15**

**COFFEE BREAK**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10*

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**16:15 – 17:45**

**Special Session on Conservation and protection of natural and artificial stones used in historical buildings**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Great Hall*

**Chairs:** Marco Lezzerini, *University of Pisa, Italy*

Rosaria D'Amato, *ENEA, Italy*

Andrea Aquino, *University of Pisa, Italy*

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## **16:15 Performance of consolidants in marble and sandstone from Tuscany: a comparison**

Andrea Aquino, *Università di Pisa, Italy*  
Marco Lezzerini, *Università di Pisa, Italy*

## **16:30 Synthesis and characterization of nanosilica products for the consolidation of stones.**

Neva Maria Elisabetta Stucchi, *Università Ca' Foscari di Venezia, Italy*  
Elena Tesser, *Iuav University of Venice, Italy*  
Fabrizio Antonelli, *Iuav University of Venice, Italy*  
Alvise Benedetti, *Università Ca' Foscari di Venezia, Italy*

## **16:45 Matera building stones: chemical, mineralogical and petrophysical characterization of the calcarenite di gravina formation**

Agnese Emanuela Bonomo, *University of Basilicata, Italy*  
Marco Lezzerini, *University of Pisa, Italy*  
G. Prosser, *University of Basilicata, Italy*  
A. Munnecke, *University of Erlangen-Nuremberg, Germany*  
R. Koch, *University of Erlangen-Nuremberg, Germany*  
G. Rizzo, *University of Basilicata, Italy*

## **17:00 Intercalibration of hyperspectral and multispectral systems for Laser Induced Fluorescence imaging**

Maria Federica Caso, *ENEA, Italy*  
Luisa Caneve, *ENEA, Italy*  
Valeria Spizzichino, *ENEA, Italy*

## **17:15 Archaeometric studies and conservation solutions for Corvins' Castle circular towers**

Rodica-Mariana Ion, *ICECHIM, Research Group, Valahia University of Târgoviște, Romania*  
Sorin Tincu, *Corvin's Castle, Romania*  
Lorena Iancu, *ICECHIM, Research Group, Valahia University of Târgoviște, Romania*  
Ramona Marina Grigorescu, *ICECHIM, Research Group, Romania*  
Cristiana Radulescu, *University of Târgoviște ICSTM-UVT, Romania*  
Sofia Teodorescu, *University of Târgoviște ICSTM-UVT, Romania*  
Ioana Daniela Dulama, *University of Târgoviște ICSTM-UVT, Romania*  
Raluca Maria Stirbescu, *University of Târgoviște ICSTM-UVT, Romania*

Ioan Alin Bucurica, *University of Târgoviște ICSTM-UVT, Romania*  
Mihaela Lucia Ion, *Atelierul de Creatie, Romania*  
Anca Irina Gheboianu, *University of Târgoviște ICSTM-UVT, Romania*

**17:30 A novel fibre optic sensor of relative humidity for application in cultural heritage**

Rosaria D'Amato, *ENEA, Italy*  
Michele Arturo Caponero, *ENEA, Italy*  
Barbara Palazzo, *ENEA, Italy*  
Gaetano Terranova, *ENEA, Italy*  
Andrea Polimadei, *ENEA, Italy*

**16:15 – 17:45**

**Special Session on Logic and Computing. the Underlying Basis of Digital Archaeology**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10 Parva Hall*

**Chairs:** Paola Moscati, *CNR, Italy*  
Alessandra Caravale, *CNR, Italy*

**16:15 Logic and Computing: A Historical Background**

Paola Moscati, *CNR, Italy*

**16:30 From databases to archaeological online resources. The logic of object classification**

Alessandra Caravale, *Istituto di Studi sul Mediterraneo Antico, CNR, Italy*

**16:45 Modelling the Past Logic and Semantics of Biological and Neural Computing in Archaeology**

Marco Ramazzotti, *Sapienza University of Rome, Italy*

**17:00 The cylinder seal as elective challenge for quantitative investigation, electronic cataloguing and digital visualization in ancient Western Asiatic studies: proposal and comparisons**

Alessandro Di Ludovico



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**17:15 Qualitative and quantitative approaches in Digital Epigraphy**

Irene Rossi, *Istituto di Studi sul Mediterraneo Antico, CNR, Italy*

**17:30 The ArchaeoBIM method and the role of digital models in  
Archaeology**

Simone Garagnani, *University of Bologna, Italy*

Andrea Guacci, *University of Bologna, Italy*

**20:00 – 23:00**

**Gala Dinner**

*“Sabatini” Restaurant*

*Via Panzani 9A - Florence*

## TECHNICAL SESSIONS - Friday, December 6

**08:30 – 17:00**

**REGISTRATION**

*University of Florence, SAGAS Department - Via San Gallo, 10*

**09:30 – 10:30**

**INVITED TALK**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Great Hall*

**Chair:** *Sabrina Grassini, Politecnico di Torino, Italy*

**Francesco Porcelli**, *Polytechnic University of Turin*

### **Archaeo-physics in the Valley of the Kings, Luxor**

**10:30 – 10:50**

**COFFEE BREAK**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10*

**10:50 – 11:20**

**TUTORIAL**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Great Hall*

**TUTORIAL** - *Session 1*

***Use of portable instruments for metallic cultural heritage assets***



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**11:20 – 12:05**

**Special Session on Neutron Methods for Cultural Heritage**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Great Hall*

**Chair:** *Rosina Celeste Ponterio, IPCF CNR, Italy  
Giulia Festa, Centro Fermi, Italy*

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**11:20 Elemental analysis beneath the surface**

*B. V. Hampshire, ISIS facility, University of Warwick, UK*

*G. Green, University of Warwick, Ashmolean Museum, UK*

*K. Butcher, University of Warwick, UK*

*M. Ponting, University of Liverpool, UK*

*K. Ishida, RIKEN Nishina Center, Japan*

*A.D. Hillier, ISIS facility UK*

**11:40 Neutron investigations for underwater archaeometry**

*Francesco Armetta, Università degli Studi di Palermo, Italy*

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**11:20 – 12:05**

**Special Session on Geoarchaeological Methods for coastal site and  
landscape reconstructions**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Parva Hall*

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**11:20 New insight on the 1st century BC paleo-sea level and related  
vertical ground movements along the Baia - Miseno coastal  
sector (Campi Flegrei, southern Italy)**

*Pietro Aucelli, Università degli Studi di Napoli Parthenope, Italy*

*Claudia Caporizzo, Università degli Studi di Napoli Parthenope, Italy*

*Aldo Cinque, Università di Napoli 'Federico II', Italy*

*Gaia Mattei, Università degli Studi di Napoli Parthenope, Italy*

*Gerardo Pappone, Università degli Studi di Napoli Parthenope, Italy*

*Michele Stefanile, Università degli Studi di Napoli Parthenope, Italy*

**11:35 Paleoshoreline reconstruction of Ayios Vlassis Bay (East Peloponnese, Greece)**

Eleni Kolaiti, *National Technical University of Athens, Greece*

Nikos Mourtzas, *National Technical University of Athens, Greece*

**11:50 Reconstructing the Roman landscape of Megaris islet (Naples, Southern Italy) from geomorphological, archaeological and morphoacoustic data.**

Gerardo Pappone, *Università degli Studi di Napoli Parthenope, Italy*

Pietro P.C. Aucelli, *Università degli Studi di Napoli Parthenope, Italy*

Gaia Mattei, *Università degli Studi di Napoli Parthenope, Italy*

Francesco Peluso, *Università degli Studi di Napoli Parthenope, Italy*

Michele Stefanile, *Università L'Orientale di Napoli, Italy*

Armando Carola, *Centro Studi Subacquei, Italy*

**11:10 – 12:25**

**Special Session on Pigments and palettes through the Ages: science of painting techniques**

**Room:** *Italian Geographic Military Institute*

*Via Cesare Battisti, 10 - De Vecchi Hall*

**Chair:** *Vincenza Crupi, University of Messina, Italy*

*Valentina Venuti, University of Messina, Italy*

**11:10 A multi-analytical approach for the characterization of red dyestuffs used in ancient tapestries: construction of a reference database**

Paola Fermo, *Dipartimento di Chimica, University of Milan, Italy*

Valeria Comite, *Dipartimento di Chimica, University of Milan, Italy*

Vittoria Guglielmi, *Dipartimento di Chimica, University of Milan, Italy*

Marco Schiavoni, *Dipartimento di Chimica, University of Milan, Italy*

Elisabetta Boanini, *Fondazione Enaip Lombardia, Italy*

Elisa Monfasani, *Fondazione Enaip Lombardia, Italy*

Roberto Bonomi, *Fondazione Enaip Lombardia, Italy*

Valerio Pasini, *Thermo Fisher Scientific Spa, Italy*



**11:25 Painting recipes. An experimental characterization of mineral pigments and binding media on groundstones.**

Giuseppina Mutri, *La Sapienza University of Rome, Italy*

Isabella Caricola, *University of Newcastle, UK*

Andrea Zupancich, *La Sapienza University of Rome, Italy*

Delia Gazzoli, *La Sapienza University of Rome, Italy*

Ida Pettiti, *La Sapienza University of Rome, Italy*

Stella Nunziante Cesaro, *CNR, Italy*

Emanuela Cristiani, *La Sapienza University of Rome, Italy*

**11:40 The use of eco – friendly materials in restoration oil painting**

Sanaa Abotaleb, *Aswan University, Egypt*

**11:55 Chemical-structural analysis of wooden painted specimens by clinical multi-slice computed tomography (MSCT) and surface-enhanced Raman scattering (SERS)**

Sveva Longo, *University of Messina, Sapienza University of Rome, Italy*

Francesca Granata, *University of Messina, Italy*

Silvia Capuani, *Sapienza University of Rome, Italy*

Fortunato Neri, *University of Messina, Italy*

Enza Fazio, *University of Messina, Italy*

**12:10 Scientific investigation of The Conversion of St Paul painting (Mdina, Malta)**

Sebastiano D'Amico, *University of Malta, Malta*

Valentina Venuti, *University of Messina, Italy*

Emanuele Colica, *University of Malta, Malta*

Vincenza Crupi, *University of Messina, Italy*

Domenico Majolino, *University of Messina, Italy*

Giuseppe Paladini, *University of Messina, Italy*

Sante Guido, *University of Trento, Italy*

Giuseppe Mantella, *Giuseppe Mantella Restauro Opere D'Arte, Italy*

Rosarianna Zumbo, *St Martin's College, Malta*

**12:25 – 13:20**

**POSTER SESSION**

**Room:** *Italian Geographic Military Institute  
Via Cesare Battisti, 10 - Sala del Cortile*

**Chair:** *Lorenzo Ciani, University of Florence, Italy*

**PS-1 New insights about the consolidation of archaeological mortars located in underwater environment: the case study of the apsidal fishpond of Castrum Novum (Santa Marinella, Rome, Italy)**

Mauro Francesco La Russa, *University of Calabria, Italy*

Luciana Randazzo, *University of Calabria, Italy*

Michela Ricca, *University of Calabria, Italy*

Daniela Pellegrino, *University of Calabria, Italy*

Daniele La Russa, *University of Calabria, Italy*

Alessandro Morrone, *University of Calabria, Italy*

Barbara Davidde, *Ministero dei Beni e delle Attività Culturali e del Turismo, Italy*

Flavio Enei, *Museo del Mare e della Navigazione Antica, Italy*

**PS-2 A combined petrographic and geochemical metrological approach to assess the provenance of the building limestone used in the Batalha Monastery (Portugal)**

Yufan Ding, *University of Évora, Portugal*

Jose Mirao, *University of Évora, Portugal*

Pedro Redol, *Mosteiro da Batalha, Portugal*

Luis Dias, *University of Évora, Portugal*

Patricia Moita, *University of Évora, Portugal*

Emma Angelini, *Politecnico di Torino, Italy*

Sabrina Grassini, *Politecnico di Torino, Italy*

Nicola Schiavon, *University of Évora, Portugal*

**PS-3 Ground-penetrating Radar surveys in the Lecce Cathedral**

Giovanni Leucci, *IBAM-CNR, Italy*

Ilaria Miccoli, *IBAM-CNR, Italy*

Lara De Giorgi, *IBAM-CNR, Italy*

Immacolata Ditaranto, *IBAM-CNR, Italy*

Giuseppe Scardozzi, *IBAM-CNR, Italy*





**PS-4 The Epizefiri Archaeological Site in Locri (Reggio Calabria, Italy): Geophysical surveys for excavation project**

Giovanni Leucci, *CNR, Italy*  
Daniele Malfitana, *CNR, Italy*  
Lara De Giorgi, *CNR, Italy*  
Antonino Mazzaglia, *CNR, Italy*  
Giovanni Fragalá, *CNR, Italy*

**PS-5 Geophysical investigations for the knowledge of the buried structures in the Basilica Julia at the Roman Forum**

Giovanni Leucci, *IBAM-CNR, Italy*  
Tommaso Ismaelli, *IBAM-CNR, Italy*  
Lara De Giorgi, *IBAM-CNR, Italy*  
Immacolata Ditaranto, *IBAM-CNR, Italy*  
Giuseppe Scardozi, *IBAM-CNR, Italy*  
Marco Galli, *Sapienza Università di Roma, Italy*  
Carlo Inglese, *Sapienza Università di Roma, Italy*  
Marika Griffio, *Sapienza Università di Roma, Italy*

**PS-6 Melite Civitas Romana Project: preliminary results from GPR survey**

Robert Brown, *Australian National University, Australia*  
David Cardona, *Heritage, Malta*  
Lara De Giorgi, *CNR, Italy*  
Giovanni Leucci, *CNR, Italy*  
Ben Lowe, *University of North Alabama, USA*  
Raffaele Persico, *CNR, Italy*  
Davide Tanasi, *University of South Florida, USA*  
Andrew Wilkinson, *Flinders University, Australia*

**PS-7 GIS to catalogue the shipment of naves lapidariae in Mediterranean Sea**

Maurizio Delli Santi, *CNR – ISPC, Italy*

**PS-8 Geophysical surveys for the restoration of Branciforte Palace in Palermo**

Patrizia Capizzi, *University of Palermo, Italy*  
Raffaele Martorana, *University of Palermo, Italy*

**PS-9 A multidisciplinary non-invasive approach in geoarchaeology conducted on the archaeological area of Selinunte**

Antonino Pisciotta, *Istituto Nazionale di Geofisica e Vulcanologia, Italy*

Raffaele Martorana, *University of Palermo, Italy*

Antonio Costanzo, *Istituto Nazionale di Geofisica e Vulcanologia, Italy*

Maria Iliaria Pannaccione Apa, *Istituto Nazionale di Geofisica e Vulcanologia, Italy*

Simona Bongiovanni, *University of Palermo, Italy*

Patrizia Capizzi, *University of Palermo, Italy*

Antonino D'Alessandro, *Istituto Nazionale di Geofisica e Vulcanologia, Italy*

Sergio Falcone, *Istituto Nazionale di Geofisica e Vulcanologia, Italy*

Carmelo La Piana, *Istituto Nazionale di Geofisica e Vulcanologia, Italy*

**PS-10 FDEM and ERT measurements for archaeological prospecting at the Nuraghe S'Urachi (West-Central Sardinia)**

Rita Deiana, *University of Padova, Italy*

Gian Piero Deidda, *University of Cagliari, Italy*

Peter Van Dommelen, *Brown University, Usa*

Alfonso Stiglitz, *Museo Civico, San Vero Milis, Italy*

**PS-11 The Basilica of Santa Caterina d'Alessandria in Galatina (Lecce, Italy): NDT surveys for the conservation project**

Giovanni Leucci, *CNR, Italy*

Lara De Giorgi, *CNR, Italy*

Giancarlo De Pascalis, *Università La sapienza Roma, Italy*

Giuseppe Scardozi, *CNR, Italy*

**PS-12 The Monastery of Santa Chiara in Nardó (Lecce, Italy): GPR preliminary results**

Giovanni Leucci, *CNR, Italy*

Lara De Giorgi, *CNR, Italy*

Giancarlo De Pascalis, *Università La sapienza Roma, Italy*

Francesco Giuri, *CNR, Italy*

**PS-13 Preliminary results from NDT-SPR survey on wooden beams**

Lara De Giorgi, *CNR, Italy*

Giovanni Leucci, *CNR, Italy*



**PS-14 Geophysical surveys in the external areas of the Basilica of St Nicholas (Bari, Italy)**

Lara De Giorgi, *CNR, Italy*  
Giovanni Leucci, *CNR, Italy*  
Raffaele Persico, *CNR, Italy*

**PS-15 Characterization of the decay of a wooden trunk through electrical resistivity**

Lara De Giorgi, *CNR, Italy*  
Giovanni Leucci, *CNR, Italy*

**PS-16 Conservation purpose material testing of corrosion products on outdoor bronze statues in Museum Park of Hungarian National Museum**

Bubonyi Tamás, *University of Miskolc, Hungary*  
Melinda Nagy, *Hungarian National Museum, Hungary*  
Szilvia Gyöngyösi, *University of Debrecen, Hungary*  
Laura Juhász, *University of Debrecen, Hungary*  
Péter Barkóczy, *FUX Co. Miskolc, Hungary*  
György Forgács, *Forgax Alkotóműhely kft, Hungary*  
Bakonyi Eszter Szatmáriné, *University of Fine Arts Budapest, Hungary*

**PS-17 Non-invasive characterization of ancient Cu-based coins using Raman spectroscopy**

Leila Es Sebar, *Politecnico di Torino, Italy*  
Leonardo Iannucci, *Politecnico di Torino, Italy*  
Yuval Goren, *Ben Gurion University of the Negev, Israel*  
Peter Fabian, *Ben Gurion University of the Negev, Israel*  
Emma Angelini, *Politecnico di Torino, Italy*  
Sabrina Grassini, *Politecnico di Torino, Italy*

**PS-18 Characterisation of Roman copper alloy artefacts and soil from Rakafot 54 (Beer Sheva, Israel)**

Manuel J.H. Peters, *Politecnico di Torino, Italy, Universidade de Évora, Portugal, Ben-Gurion University of the Negev, Israel*

Yuval Goren, *Ben Gurion University of the Negev, Israel*

Peter Fabian, *Ben Gurion University of the Negev, Israel*

José Mirão, *Universidade de Évora, Portugal*

Sabrina Grassini, *Politecnico di Torino, Italy*

Emma Angelini, *Politecnico di Torino, Italy*

**PS-19 Monitoring Degradation in Historic Silk (*Bombyx mori*) by Nuclear Magnetic Resonance**

Zhanyun Zhu, *Polytechnical University, China*

**PS-20 The photogrammetric survey of Tomb II in Agios Athanasios, Thessaloniki**

Alessandra Turco, *University of Salerno, Italy*

**PS-21 Metrological characterization of a textile temperature sensor**

Lorenzo Quartini, *University of Florence, Italy*

Andrea Zanobini, *University of Florence, Italy*

**PS-22 Settlement and viewshed dynamics between the ancient sites of the Erei hills as a key of interpretation and enhancement of Sicily's historical landscape**

Eleonora Draia, *Università di Roma Tor Vergata, Italy*

Massimo Cultraro, *CNR, Italy*

Emanuele Brienza, *Univesità degli Studi di Enna Kore, Italy*

**PS-23 Form and function in Roman public architecture of the Late Republic. The exemplary case of the piazza Pozzo Dorico substructures in Cori**

Giovanni Caratelli, *CNR, Istituto di Scienze del Patrimonio Culturale, Italy*



**PS-24 A Machine Learning approach to aerial photointerpretation and mapping**

Ilaria Cacciari, *“Nello Carrara” – CNR, Italy*

Giorgio Franco Pocobelli, *SAGAS, Università di Firenze, Italy*

Salvatore Siano, *“Nello Carrara” – CNR, Italy*

**PS-25 Architecture - Conceptual design in terms of the intuitive metrology method as an element of the natural development of the landscape and spatial context**

Jerzy Wojewodka, *Silesian University of Technology, Poland*

Julia Gizewska, *Silesian University of Technology, Poland*

**PS-26 Measurement and analysis of visitors’ trajectories in crowded museums**

Pietro Centorrino, *Sapienza Università di Roma, Italy*

Alessandro Corbetta, *Eindhoven University of Technology, The Netherlands*

Emiliano Cristiani, *CNR, Italy*

Elia Onofri, *CNR, Italy*

**PS-27 A novel approach for in-situ assessment of the efficacy of biocides on building of historical interest by bioluminescence**

Eleonora Marconi, *Università Roma Tre, Italy*

Simonetta Tuti, *Università Roma Tre, Italy*

Maria Rosaria Fidanza, *Università Roma Tre, Italy*

Fabio Leccese, *Università Roma Tre, Italy*

Adele Galetti, *Leonardo S.r.l., Italy*

Francesco Geminiani, *Leonardo S.r.l., Italy*

**PS-28 Projected Fringes Profilometry for Cultural Heritage Studies**

Giuseppe Schirripa Spagnolo, *Università degli Studi Roma Tre, Italy*

Lorenzo Cozzella, *Università degli Studi Roma Tre, Italy*

Fabio Leccese, *Università degli Studi Roma Tre, Italy*

**PS-29 Multi-band infrared imaging for the characterization of underlying elements in the Santa Maria in Cosmedin altarpiece**

Sofia Ceccarelli, *Università degli Studi di Roma Tor Vergata, Italy*  
Noemi Orazi, *Università degli Studi di Roma Tor Vergata, Italy*  
Cristina Cicero, *Università degli Studi di Roma Tor Vergata, Italy*  
Fulvio Mercuri, *Università degli Studi di Roma Tor Vergata, Italy*  
Ugo Zammit, *Università degli Studi di Roma Tor Vergata, Italy*  
Stefano Paoloni, *Università degli Studi di Roma Tor Vergata, Italy*  
Anna Candida Felici, *Università di Roma "La Sapienza", Italy*  
Francesca Matera, *Private Restorer, Italy*  
Mariella Nuzzo, *Ministero per i Beni e le attività Culturali, Italy*

**PS-30 Using 3D scanning in the protection of industrial heritage- the example of Queen Luise Adit**

Krzysztof Herner, *The Coal Mining Museum in Zabrze, Poland*

**PS-31 Adaptation of the Rocca Janula castle in Cassino, Italy to the headquarters of the Corvi di Giano organization.**

Magdalena Wątek, *Silesian University of Technology*

**PS-32 Design and Implementation of a Mobile Robot for the Mechatronic Survey**

Erika Ottaviano, *University of Cassino and Southern Lazio, Italy*  
Pierluigi Rea, *University of Cassino and Southern Lazio, Italy*

**PS-33 A new mortar from a strange ancient mortar**

Fabio Fratini, *CNR, Italy*  
Silvia Rescic, *CNR, Italy*  
Emma Cantisani, *CNR, Italy*  
Elena Pecchioni, *CNR, University of Firenze, Italy*  
Stefano Pasolini, *Freelance restorer, Italy*  
Andrea Cagnini, *OPD (Opificio delle Pietre Dure), Italy*



## **PS-34 Petrographic characteristics of the mortars from the Pisa's Cathedral apse**

Marco Lezzerini, *University of Pisa, Italy*  
Marcello Spampinato, *Freelance petrographer, Italy*  
Anton Sutter, *Opera della Primaziale Pisana, Italy*  
Nadia Montevecchi, *Freelance archaeologist, Italy*  
Andrea Aquino, *University of Pisa, Italy*

## **PS-35 Quality Assurance for dosimetric measurements of mortar on polymineral fine grain fraction**

Kathya Bonilla, *PH3DRA labs, Italy*  
Alessia D'Anna, *PH3DRA labs, Italy*  
Sara Galvagno, *PH3DRA labs, Italy*  
Anna M. Gueli, *PH3DRA labs, Italy*  
Stefania Pasquale, *PH3DRA labs, Italy*  
Giuseppe Politi, *PH3DRA labs, Italy*  
Giuseppe Stella, *PH3DRA labs, Italy*

## **PS-36 Old anatomical models as makeshifts of measurements in medicine**

Emma Angelini, *Politecnico di Torino, Italy*  
Andrea Gori, *Museo Galileo, Italy*

## **PS-37 A petrographic study of the mortars from the Villa Reale di Marlia (NW Tuscany, Italy)**

Marco Lezzerini, *University of Pisa, Italy*  
Marcello Spampinato, *Freelance Applied Petrographer, Italy*  
Nadia Montevecchi, *Freelance Archaeologist, Italy*  
Luca Borgoni, *Freelance Architect, Italy*  
Henric Grönberg, *Villa Reale di Marlia, Italy*  
Andrea Aquino, *University of Pisa, Italy*

**13:20 – 14:30**

### **Lunch**

*Italian Geographic Military Institute - Via Cesare Battisti, 10*

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**14:40 – 15:10**

**TUTORIAL**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Great Hall*

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**TUTORIAL** - *Session 2*

***Invisible Archaeology***

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**14:40 – 15:55**

**Special Session on Measuring in the past: ancient instruments between science and technology**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Parva Hall*

**Chair:** *Emma Angelini, Politecnico di Torino, Italy  
Luisa Spairani, Gruppo Astrofili Eorediesi, Italy*

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**14:40 A short tale of the short story of the sliding rule**

*Andrea Bacciotti, Politecnico di Torino, Italy*

**14:55 The sixteenth-century find “Treatise On Land Surveying Methods Using the Surveyor’s Cross”, by Francesco Paciotti, military and civil architect to the Duchy of Urbino: the technical evolution of a surveying tool.**

*Raffaella Marotti, Università degli Studi di Urbino “Carlo Bo”, Italy*

**15:10 Measure by Measure they touched the heaven**

*Luisa Spairani, Gruppo Astrofili Eorediesi, Italy*

**15:25 Cleaning of historical scientific instruments: first analytical studies**

*Michela Albano, CISRiC, Università degli Studi di Pavia, Polytechnic of Milan, Italy  
Giacomo Fiocco, CISRiC, Università degli Studi di Pavia, Università di Torino, Italy  
Claudia Invernizzi, CISRiC, Uni. degli Studi di Pavia, Uni degli Studi di Parma, Italy  
Maurizio Licchelli, CISRiC, Università degli Studi di Pavia, Italy  
Marco Malagodi, CISRiC, Università degli Studi di Pavia, Italy*





Raffaella Marotti, *Università degli Studi di Urbino "Carlo Bo", Italy*  
Curzio Merlo, *CISRIC, Università degli Studi di Pavia, Cr.Forma, Italy*  
Tommaso Rovetta, *CISRIC, Università degli Studi di Pavia, Italy*  
Daniela Comelli, *Polytechnic of Milan, Italy*

## **15:40 Measuring instruments and protocols in Archaeomagnetic dating: Magneto-stratigraphy in Archaeology and Volcanology**

Claudia Principe, *CNR, Italy*  
Daniele Giordano, *Università degli Studi di Torino, Italy*  
Sonia La Felice, *CNR, Italy*  
Giulio Giovannetti, *CNR, Italy*  
Marina Devidze, *Tbilisi State University, Georgia*

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**15:10 – 15:55**

### **LIVE DEMONSTRATION SESSION**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Great Hall*

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#### **Demo-1 Reflectance Transformation Imaging**

Tomasz Lojewski, *AGH University of Science and Technology, Krakow, Poland*

#### **Demo-2 Microfading tests**

Tomasz Lojewski, *AGH University of Science and Technology, Krakow, Poland*

#### **Demo-3 An interactive system for quantifying and evaluating historical photographs as a means of volumetric documentation of built heritage**

Antonio Suazo

**14:30 – 15:45**

**General Session - PART III**

**Room:** *Italian Geographic Military Institute  
Via Cesare Battisti, 10 - De Vecchi Hall*

**Chair:** *Lorenzo Ciani, University of Florence, Italy*

**14:30 Presence and Applications of Bituminous Materials on the Ancient Vaccaei Culture: a Nondestructive Spectroscopic Study**

*Javier Pinto, University of Valladolid, Spain  
Carlos Sanz-Minguez, University of Valladolid, Spain  
Carmelo Prieto, University of Valladolid, Spain*

**14:45 Computational modelling of the mechanical behaviour of the Pentelic Marble -Steel clamp system on the structures of the Athens Acropolis**

*Zacharias Vangelatos, University of California, USA  
Michail Delagrammatikas, University of Athens, Greece  
Olga Papadopoulou, University of Athens, Greece  
Panayota Vassiliou, University of Athens, Greece*

**15:00 Indirect Temperature Measurements for TL Signal Loss during Drilling**

*Anna Maria Gueli, Università degli Studi di Catania & INFN-Sez CT, Italy  
Stefania Pasquale, Università degli Studi di Catania & INFN-Sez CT, Italy  
Giuseppe Politi, Università degli Studi di Catania & INFN-Sez CT, Italy  
Giuseppe Stella, Università degli Studi di Catania & INFN-Sez CT, Italy  
Carlo Trigona, Università degli Studi di Catania, Italy*

**15:15 From TLS To HBIM For Recording Cultural Heritage:The Case Study Of Chiesa di San Giusto**

*Guiye Lin, University of Padova, ICEA, Italy*

**15:30 ERT investigation of tumuli: does the errors in locating electrodes influence the resistivity?**

*Veronica Pazzi, University of Firenze, Italy  
Lorenzo Ciani, University of Firenze, Italy  
Luca Cappuccini, University of Firenze, Italy  
Mattia Ceccatelli, University of Firenze, Italy*



Gabriele Patrizi, *University of Firenze, Italy*  
Giulia Guidi, *University of Firenze, Italy*  
Nicola Casagli, *University of Firenze, Italy*  
Marcantonio Catelani, *University of Firenze, Italy*

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**15:55 – 16:10**

**COFFEE BREAK**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10*

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**16:10 – 17:25**

**Special Session on Measurement and Instrumentation for the Preventive Conservation of Metallic Works of Art**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Great Hall*

**Chair:** Panayota Vassiliou, *University of Athens, Greece*  
Sabrina Grassini, *Politecnico di Torino, Italy*

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**16:10 Micro-Raman investigation of dangerous corrosion products of archaeological bronzes from Tharros (Sardinia) Italy**

Tilde de Caro, *ISMN–CNR Rome, Italy*  
Leila Es Sebar, *Politecnico di Torino, Italy*  
Emma Angelini, *Politecnico di Torino, Italy*

**16:25 MA-XRF measurement for corrosion assessment on bronze artefacts**

Sergio Augusto Barcellos Lins, *La Sapienza Università di Roma, INFN Roma Tre, Italy*  
Elisabetta Di Francia, *INFN Roma Tre, Italy*  
Sabrina Grassini, *Politecnico di Torino, Italy*  
Giovanni Ettore Gigante, *La Sapienza Università di Roma, Italy*  
Stefano Ridolfi, *Ars Mensurae, Italy*

## **16:40 Measurement Setup for the Development of PreCorroded Sensors for Metal Artwork Monitoring**

Marco Faifer, *DEIB, Politecnico di Milano, Italy*  
Sara Goidanich, *Chemistry "Giulio Natta" Politecnico di Milano, Italy*  
Christian Laurano, *DEIB, Politecnico di Milano, Italy*  
Chiara Petiti, *Chemistry "Giulio Natta" Politecnico di Milano, Italy*  
Sergio Toscani, *DEIB, Politecnico di Milano, Italy*  
Michele Zanoni, *DEIB, Politecnico di Milano, Italy*

## **16:55 A long-term corrosion investigation of bronze sculptures exposed outdoor**

Leila Es Sebar, *Politecnico di Torino, Italy*  
Alessandro Re, *Università di Torino and INFN, Italy*  
Marco Parvis, *Politecnico di Torino, Italy*  
Emma Angelini, *Politecnico di Torino, Italy*  
Sabrina Grassini, *Politecnico di Torino, Italy*

## **17:10 Provenance, manufacturing and corrosion behavior of Ancient Hellenistic coins from Egypt**

Panayota Vassiliou, *School of Chemical Engineering, NTUA, Athens, Greece,*  
Olga Papadopoulou, *School of Chemical Engineering, NTUA, Athens, Greece,*  
Sabrina Grassini, *Politecnico di Torino, Italy*  
Emma Angelini, *Politecnico di Torino, Italy*

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### **16:10 – 17:25**

#### **Special Session on Metrology for taphonomy: quantifying the alterations of skeletal remains in archaeology**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10 Parva Hall*

**Chair:** *Francesco Boschin, Università degli Studi di Siena, Italy*  
*Simona Arrighi, Università di Bologna, Italy*

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## **16:10 A new geometric morphometrics-based shape and size analysis discriminating anthropogenic and non-anthropogenic bone surface modifications of an experimental data set**

Antoine Souron, *Université de Bordeaux, France*  
Alexandre Napias, *Université de Bordeaux, France*



Thomas Lavidalie, *Université de Bordeaux, France*  
Frédéric Santos, *Université de Bordeaux, France*  
Ronan Ledevin, *Université de Bordeaux, France*  
JeanChristophe Castel *Muséum d'histoire naturelle, Switzerland*  
Sandrine Costamagno, *Université de Toulouse Jean Jaurès, France*  
Daniel Cusimano, *Diablo Valley College, USA*  
Stephanie Drumheller, *The University of Tennessee, USA*  
Jennifer Parkinson, *University of San Diego, USA*  
Lee Rozada, *Muséum national d'Histoire naturelle, France*  
David Cochard, *Université de Bordeaux, France*

### **16:30 The cut runs deep: linking the cut marks to the cutting tools**

Francesco Boschin, *Università degli Studi di Siena, Italy*  
Erika Moretti  
Daniele Aureli, *Université Parigi Ouest Nanterre La Défense, France*  
Jacopo Crezzini, *Università degli Studi di Siena, Italy*  
Simona Arrighi, *Università di Bologna, Italy*

### **16:50 Detection of sexual dimorphism in the human neurocranium at local scale**

Antonietta Del Bove, *IPHES, Universitat Rovira i Virgili (URV), Spain*  
Antonio Profico, *University of York, UK*  
Carlos Lorenzo, *IPHES, Universitat Rovira i Virgili (URV), Spain*

### **17:10 Non-destructive characterization of heated flint artefacts using density measurements**

Angela Berloff, *University of Trento, Italy*  
Stefano Grimaldi, *University of Trento, Italy*  
Simona Maffei, *University of Trento, Italy*  
Fabio Santaniello, *University of Trento, Italy*  
Stefano Gialanella, *University of Trento, Italy*

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**17:25 – 17:45**

### **CLOSING AND AWARD CEREMONY**

**Room:** *University of Florence, SAGAS Department, Via San Gallo, 10  
Great Hall*

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