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Welcome Message from the Chairpersons

On behalf of the Organizing Committee, we wish to welcome you to the *2018 IEEE International Conference on Metrology for Archaeology and Cultural Heritage - MetroArchaeo2018*.

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 IEEE International Conference on Metrology for Archaeology and Cultural Heritage - MetroArchaeo2018* 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. *MetroArchaeo2018* 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 (2015-2016), Turin (2017) and Lecce (2017), this year's conference has been organized in Cassino, a town that houses the testimonies of a prestigious historical and cultural tradition, spanning from Roman antiquity to Middle Ages, up to modern times. Cassino's origins lie in a Volscan settlement later passed under the control of the Samintes, and then of the Romans, who established a fortified colony there at the end of the 4th century BC. Traces of the Roman era survive in the archaeological area located at the foot of Montecassino, showing the remains of the ancient Casinum: a Roman amphitheatre, a theatre, the mausoleum of the Roman matron Ummidia Quadrattilla, the so-called «nymphaeum Ponari» (belonging to the University of Cassino). Immediately above the archaeological area stands the Abbey of Montecassino, which is one of the most renowned Benedictine monasteries in the world. It was founded by St. Benedict in 529 on the remnants of a pre-existing Roman fortification, and destroyed four times: by the Longobards around 577, by the Saracens in 883, by an earthquake in 1349 and the last time in 1944, when it was bombed by the Allies at the end of World War II. The present-day Cathedral was reconstructed after its most recent destruction according to the 17th-18th century design.

The Abbey also hosts a museum and a library with a valuable collection of precious manuscripts and historical books. Cassino is also a reference point for contemporary art: CAMUSAC (Cassino Museum of Contemporary Art), a new structure created in 2013, houses a permanent private collection gathered over a period of more than twenty-five years, and the University itself also holds a significant collection of works by important contemporary artists.

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 southern Lazio. The University of Cassino 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.

Cassino 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.

MetroArchaeo2018 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, *MetroArchaeo2018* 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 John Bintliff, from Leiden University (The Netherlands) and the University of Edinburgh (UK), Rodney Ast, from the University of Heidelberg (Germany), and Anna Maria Mercuri, from the University of Modena and Reggio Emilia (Italy).

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

The social programme includes a Welcome party, to be held at the University Rectorate, and a social dinner at “La Cocincina” restaurant.

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 *2018 IEEE 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 Cassino! 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

Pasquale Daponte

Marilena Maniaci

MetroArcheo 2018 Committee

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

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

MetroArchaeo 2018 Keynote Speakers

Keynote Monday, October 22, 2018

Regional Surface Survey: From pictures via grab-samples to a quantified sub-discipline

John Bintliff

Leiden University, The Netherlands

University of Edinburg, UK

ABSTRACT. Landscape Archaeology began in the imagination, grew from firsthand qualitative description, and matured into a continuously innovating field of ever-increasingly detailed measurement of ancient surface artefacts and their spatial context. This paper will illustrate this evolution of regional surface survey techniques and discuss current challenges to further progress in rigorous analysis of past human presence as recorded on the present landscape.



John Bintliff (London, England, 1949) is Emeritus Professor of Classical and Mediterranean Archaeology at Leiden University, the Netherlands, and Emeritus Professor at the University of Edinburgh, UK. He studied Archaeology and Anthropology at Cambridge University, where he also completed his PhD in 1977 on the (pre)history of human settlement in Greece. He was Senior Lecturer in Archaeology at Bradford University, where he taught from 1977, then moved to Durham University as Reader in Archaeology in 1990, where he taught till moving to Leiden in 1999. In 1988 he was elected a Fellow of the Society of Antiquaries. Since 1978 he has been co-directing (with Cambridge University) the Boeotia Project, an interdisciplinary programme investigating the evolution of settlement in Central Greece, widely-recognised as one of the most significant regional research programmes in the Mediterranean region. His interests include social theory and the application of neuroscience to the Humanities.

Keynote Tuesday, October 23, 2018

Advanced Technologies and the Written Heritage

Rodney Ast

University of Heidelberg, Germany

ABSTRACT. Technology has improved the way we decipher, organize, and retrieve elements of historical written records. High resolution images as well as methods in multi-spectral (MSI) and reflectance transformation imaging (RTI) have made it easier to study inscribed historical artifacts without actually taking them in hand. Large datasets of textual transcriptions can be subjected to pattern recognition via search engines far more efficiently than in the past, when scholars relied primarily on printed texts and indices for organizing and analyzing their historical sources. Although, over the last several decades, efforts have tended to focus largely on the storage and retrieval of these datasets, recent attention has shifted to methods of processing image data, in the interest of advancing, for example, the study of paleography. The result has been increased interest in the application of neural networks and machine learning for image recognition processes.

This talk surveys a variety of the technologies currently in use in ancient studies. It focuses, on a practical level, on their current limitations, while pointing, on the conceptual level, to the potential they have to transform scientific practice even further. How all these tools can make us better humanists should be at the heart of technological development, and this talk also serves as a reminder of ways in which they have and can continue doing this..



Rodney Ast has a PhD in Classics from the University of Toronto. He is Senior Research and Teaching Associate in the Institute for Papyrology at the University of Heidelberg. His main areas of interest are Greek and Latin documentary and literary papyrology and palaeography; the cultural and social history of Graeco-Roman Egypt; Egyptian archaeology; digital papyrology. Besides authoring works on Greek and Latin papyrological and inscriptional texts, he is involved

in digital initiatives (papyri.info, Digital Corpus of Literary Papyri, pappal.info) and takes part in excavations at Amheida (Dakhla Oasis) and Berenike (Eastern Desert).

Keynote Wednesday, October 24, 2018

Why, what and how can archaeobotany measure the past? Cultural landscapes of the Mediterranean and Saharan areas

Anna Maria Mercuri

University of Modena and Reggio Emilia, Italy

ABSTRACT: Today as in the past, plants are everywhere around us, they are different and have special needs to grow, are members of the ecosystems and have been included in our culture as natural resources since the beginning of human history on the world. For all these reasons plants are excellent bioindicators of environmental quality and human behaviour, and Archaeobotany is the science that has developed the ability to measure the related characters and processes based on plant records unearthed from archaeological sites.

The talk introduces principles, methods and objects of the archaeobotanical research, with special focus on pollen analysis. The Mediterranean case studies are reported to demonstrate that Archaeobotany is able to reconstruct cultural landscapes: They are the Bronze Age Terramara's culture, the Roman Peasants in southern Tuscany, the Roman to Medieval farmhouse of Piazza Armerina in Sicily. The Saharan case studies are described to show how the same data can give both palaeoenvironmental and ethnobotanical information on the transformations of this desert: They are the Sai Island in Sudan, the necropolis of Gobero in Niger, and the Wadi Teshuinat area in southern Libya. The talk concludes on the site of Takarkori from which an unexpected exploitation of wild cereals has opened a new perspective on the sustainable resources for the future.



Anna Maria Mercuri, biologist and palynologist, Associate Professor of Systematic Botany at the Università di Modena e Reggio Emilia, Italy; teacher of 'Applied Palynology and Botany', coordinator of the Italian Working Group of Palynology and Palaeobotany for the Italian Botanical Society (GPPSBI, since 2012); she designed the archaeobotanical network BRAIN (<https://brainplants.unimore.it>), published > 200 research papers, and organised three international conferences on palynology and archaeobotany in Modena. Her scientific interests include aerobiology, the relationship between plant landscapes and human activities, and the

human impact and vegetation history in the Mediterranean Basin and the Sahara.

Awards and Distinctions

BEST CONFERENCE PAPER AWARD

Description: To recognize the most outstanding paper presented at the annual IEEE International Workshop on Metrology for Archaeology and Cultural Heritage.

BEST PAPER PRESENTED BY A WOMAN

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

BEST PAPER PRESENTED BY A YOUNG RESEARCHER

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

BEST PAPER OF THE POSTER SESSION

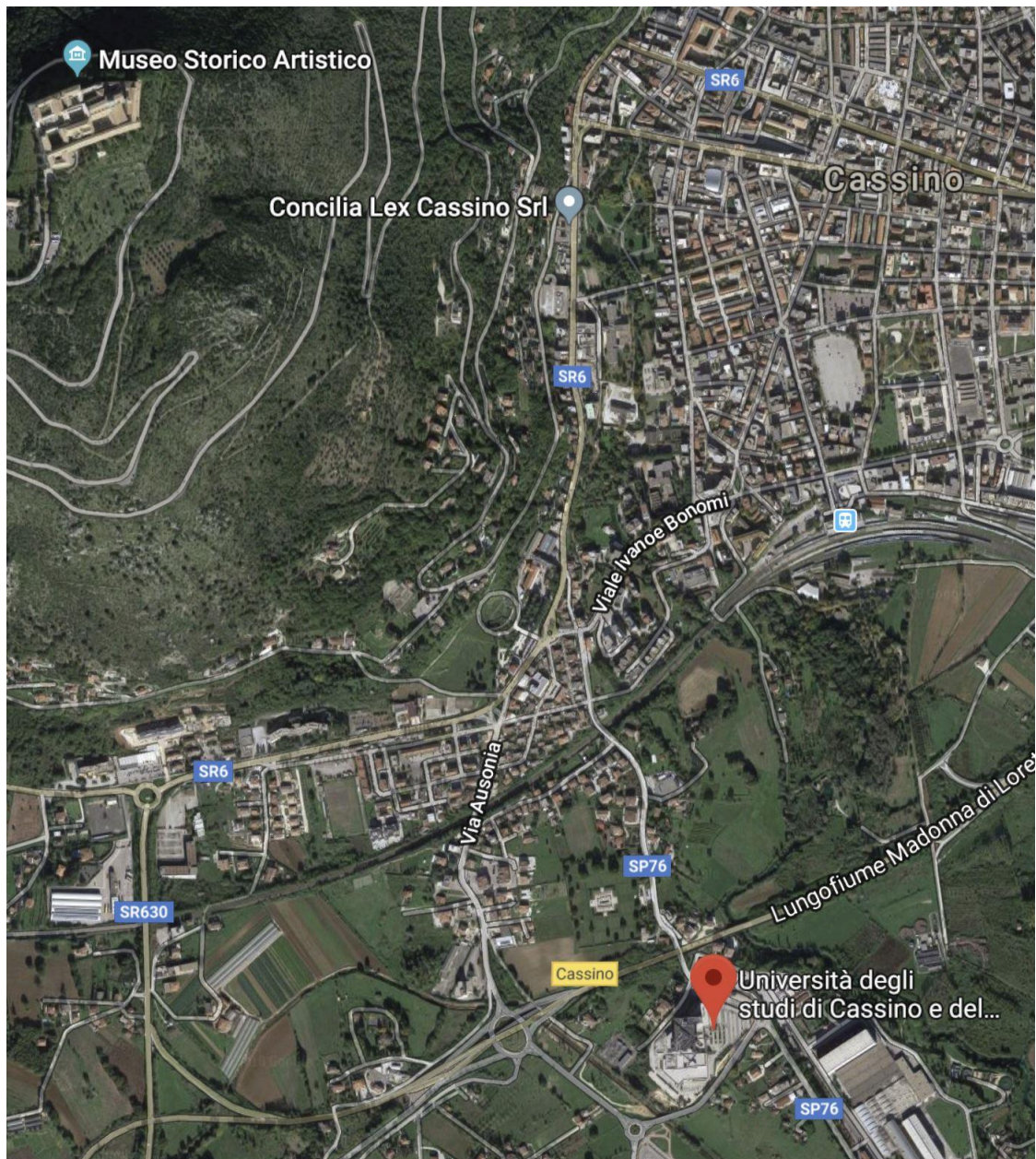
Description: An exclusive plaque will be given for the best poster presented.

BEST DEMO

Description: To highlight the importance of the Demo Session, an exclusive plaque that will be given for the best line demonstration.

Location

The Conference sessions will take place in Cassino (FR), University Campus, Via S. Angelo - Località Folcara.



Convention Map

UNIVERSITY CAMPUS - LEVEL 1



Social Functions

WELCOME PARTY

The Welcome Party will be held at the Rectorate of the University of Cassino and Southern Lazio, on October 22, 2018 - H. 19.00.

A shuttle service will be provided.

GALA DINNER

The Gala Dinner will be held at “La Cocincina” restaurant on October 23, 2018 - H. 20.00.

A shuttle service will be provided.



Shuttle Routes

Two free shuttle services will be provided from the hotels and B&B listed below for the duration of the Conference.

IMPORTANT. A free shuttle bus will be available on October 21-22-23 from Cassino Railway Station to University Campus, at each hour starting from 10.00.

The shuttle service will be available for the Welcome Party and Gala Dinner too.

The Meeting Points will be announced at the Registration Desk.

ROUTE A

STOP A-1: HOTEL MARCONI - H 8.15

Hotel Piazza Marconi

Via G. Marconi, 25, 03043 Cassino FR

STOP A-2: BOTEROOM - 8.20

B&B Boterom

Via G. Di Biasio, 82, 03043 Cassino FR

STOP A-3: HOTEL ALBA - 8.25

Hotel Alba

Via G. Di Biasio, 53, 03043 Cassino FR

STOP A-4: HOTEL AL BOSCHETTO - 8.35

Hotel Al Boschetto

Via Ausonia, 54, 03043 Cassino FR

STOP A-5: UNIVERSITY CAMPUS - 8.45

University of Cassino and Souther Lazio

Via Sant'Angelo – Loc. Folcara, 03043 Cassino FR

ROUTE B

STOP B-1: HOTEL ROCCA – H 8.15

Hotel Rocca

Via Sferracavalli, 105, 03043 Cassino FR

STOP B-2: HOTEL LA PACE - H 8.25

Hotel La Pace

Via Abruzzi, 16, 03043 Cassino FR

STOP B-3: PIAZZA SAN GIOVANNI - H 8.40

(Meeting Point for the following B&B)

- B&B Allaportaccanto

Via Secondino Pagano, 7, 03043 Cassino FR

- B&B La Suite

Via E. De Nicola, 151, 03043 Cassino FR

- B&B La stazione di Posta

Via degli eroi, 9, 03043 Cassino FR

STOP B-4: PIAZZA PIER CARLO RESTAGNO ore- H 8.45

B&B L'angolo di Mo

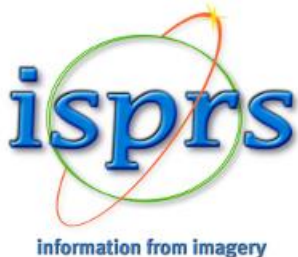
STOP A-5: UNIVERSITY CAMPUS - 8.45

University of Cassino and Souther Lazio

Via Sant'Angelo – Loc. Folcara, 03043 Cassino FR

MetroArcheo 2018 Supports





Alumni-ALACLAM
ASSOCIAZIONE DEI LAUREATI DELL' ATENEIO DI
CASSINO E
DEL LAZIO MERIDIONALE



Program Schedule - Monday, October 22

MONDAY, OCTOBER 22, 2018			
15:00 - 15:30	Welcome Addresses - Opening Ceremony <i>Aula Magna, Cassino University Campus</i>		
15:30 - 16:30	Keynote Speaker John Bintliff <i>Aula Magna, Cassino University Campus</i>		
16:30 - 16:50	COFFEE BREAK		
	Aula Magna Cassino University Campus	B 2.07 Hall Cassino University Campus	1.09 Hall Cassino University Campus
16:50 - 18:30	SS1 - Special Session on Non-invasive systems and techniques for "on site" monitoring and diagnosis - PART I	SS15 - Special Session on Artificial intelligence for measurements in cultural heritage - PART I	General Session PART I
19:00 - 21:00	WELCOME PARTY		

Program Schedule - Tuesday, October 23

TUESDAY, OCTOBER 23, 2018			
09:00 - 10:00	Keynote Speaker Rodney Ast <i>Aula Magna, Cassino University Campus</i>		
	Aula Magna Cassino University Campus	B 2.07 Hall Cassino University Campus	1.09 Hall Cassino University Campus
10:00 - 11:40	SS12 - Special Session on Metrological approaches to the study of ancient and medieval written Heritage - PART I	SS3 - Special Session on Integrated Digital Survey Methodologies for the Knowledge and Enhancement of Architectural and Urban - PART I	SS15 - Special Session on Artificial intelligence for measurements in cultural heritage - PART II
11:40 - 12:00	COFFEE BREAK		
12:00 - 13:20	SS8 - Special Session on Using multivariate analyses to interpret lithic variability: contributions and limitations	SS4 - Special Session on Cultural Heritage: Measurement of Immeasurable Values - PART I	SS5 - Special Session on Geomatic Techniques for Integrated 3D Data Acquisition, Metric Validation and Management - PART I
13:20 - 14:30	LUNCH		
14:30 - 15:20	Presentation of "DTC Lazio" (Excellence Research and Training Centre for Technologies applied to Cultural Heritage)		
	Aula Magna Cassino University Campus	B 2.07 Hall Cassino University Campus	1.09 Hall Cassino University Campus
15:20 - 17:00	SS3 - Special Session on Integrated Digital Survey Methodologies for the Knowledge and Enhancement of Architectural and Urban - PART II	SS11 - Special Session on Pondera Online: An international network for ancient and byzantine metrology	SS2 - Special Session on Full Coverage Geophysical Prospection on Protohistoric and Roman Central Settlements in Italy
17:00 - 17:20	COFFEE BREAK		
17:20 - 18:40	SS5 - Special Session on Geomatic Techniques for Integrated 3D Data Acquisition, Metric Validation and Management - PART II	SS4 - Special Session on Cultural Heritage: Measurement of Immeasurable Values - PART II	SS1 - Special Session on Non-invasive systems and techniques for "on site" monitoring and diagnosis - PART II
20:00 - 23:00	GALA DINNER		

Program Schedule - Wednesday, October 24

WEDNESDAY, OCTOBER 24, 2018			
09:00 - 10:00	Keynote Speaker Anna Maria Mercuri <i>Aula Magna, Cassino University Campus</i>		
	Aula Magna Cassino University Campus	B 2.07 Hall Cassino University Campus	1.09 Hall Cassino University Campus
10:00 - 11:40	General Session PART II	DEMO SESSION	SS12 - Special Session on Metrological approaches to the study of ancient and medieval written Heritage - PART II
11:40 - 12:00	COFFEE BREAK		
12:00 - 13:00	POSTER SESSION		
13:00 - 14:10	LUNCH		
14:10 - 14:30	AWARD CEREMONY		
	Aula Magna Cassino University Campus	B 2.07 Hall Cassino University Campus	1.09 Hall Cassino University Campus
14:30 - 16:10	SS16 - Special Session on Non-Destructive Analytical Approaches applied to the Study of Ancient Stone Materials	SS6 - Special Session on Archaeopalynology for the reconstruction of environmental and cultural landscapes	General Session PART III
16:10 - 16:30	COFFEE BREAK		
16:30 - 17:50	SS9 - Special Session on Dating and Provenance of Ancient Artifacts: Methods, Applications and Future Perspectives	SS13 - Special Session on Measuring in the past: ancient instruments	SS7 - Special Session on Technological information and learning patterns in pottery production
17:50 - 18:00	CLOSING CEREMONY		

Technical Program - Monday, October 22

14:00 - 18:30

REGISTRATION

Room: 1.11 - Welcome Area, Cassino University Campus

15:00 - 15:30

WELCOME ADDRESSES

OPENING CEREMONY

Room: Aula Magna, Cassino University Campus

15:30 - 16:30

PLENARY OPENING SESSION

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

Room: Aula Magna, Cassino University Campus

John Bintliff

Leiden University, The Netherlands

University of Edimburgh, UK

**Regional Surface Survey: From pictures via grab-samples
to a quantified sub-discipline**

16:30 - 16:50

COFFEE BREAK

Place: Coffee Break Area, Cassino University Campus

16:50 - 18:30

Special Session on Non-invasive systems and techniques for "on site" monitoring and diagnosis - PART I

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

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

Room: *Aula Magna, Cassino University Campus*

16:50 Effect of Applied Pressure on Patch Resonator - Based Measurements of Moisture Level for Cultural Heritage Materials

Livio D'Alvia, *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*

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

17:10 Multidisciplinary approach for the study of the Ptolemaic coffin of Ankh-hapy from the Egyptian collection of MANN in Naples

Alessia Volino, *Università degli Studi Suor Orsola Benincasa, Italy*

Maria Rosaria Barone Lumaga, *Università degli Studi di Napoli Federico II, Italy*

Paola Cennamo, *Università degli Studi Suor Orsola Benincasa, Italy*

Giancarlo Fatigati, *Università degli Studi Suor Orsola Benincasa, Italy*

Giorgio Trojsi, *Università degli Studi Suor Orsola Benincasa, Italy*

17:30 Acoustic Characterization of Outcropping Stratigraphic Units

Andrea Azelio Mencaglia, *Institute of Applied Physics "Nello Carrara", Italy*

Ilaria Cacciari, *Institute of Applied Physics "Nello Carrara", Italy*

Giorgio Franco Pocobelli, *Cooperativa Archeologia, Italy*

Salvatore Siano, *Institute of Applied Physics "Nello Carrara", Italy*

17:50 Non-destructive Diagnostics of Architectonic Elements in San Giuseppe Calasanzio's Church in Cagliari: a Test-case for Micro-geophysical Methods within the Framework of Holistic/integrated Protocols for Artefact Knowledge.

Luca Piroddi, *University of Cagliari, Italy*

Giulio Vignoli, *University of Cagliari, Italy*

Antonio Trogu, *University of Cagliari, Italy*

Gian Piero Deidda, *University of Cagliari, Italy*

18:10 Use of Ground Penetrating Radar for Assessing Interconnections between Root Systems of Different Matured Tree Species

Livia Lantini, *University of West London, UK*

Rich Holleworth, *University of West London, UK*

Daniel Egyir, *University of West London, UK*

Iraklis Giannakis, *University of West London, UK*

Fabio Tosti, *University of West London, UK*

Amir M. Alani, *University of West London, UK*

16:50 - 18:30**Special Session on Artificial intelligence for measurements in cultural heritage - PART I**

Chairs: Francesco Colace, *University of Salerno, Italy*

Mario Molinara, *University of Cassino and Southern Lazio, Italy*

Room: B 2.07 Hall, Cassino University Campus

16:50 Automatic writer recognition in medieval books

Claudio De Stefano, *University of Cassino and Southern Lazio, Italy*

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

Claudio Marrocco, *University of Cassino and Southern Lazio, Italy*

Mario Molinara, *University of Cassino and Southern Lazio, Italy*

Alessandra Scotto di Freca, *University of Cassino and Southern Lazio, Italy*

17:10 Recognition of Oracle Bone Inscriptions Using Deep Learning based on Data Augmentation

Lin Meng, *Ritsumeikan University, Japan*

Naoki Kamitoku, *Ritsumeikan University, Japan*

Katsuhiko Yamazaki, *Ritsumeikan University, Japan*

17:30 Encoding and Simulating the Past. A Machine Learning Approach to the Archaeological Information

Marco Ramazzotti, *Sapienza University of Rome, Italy*

Paolo Massimo Buscema, *Semeion Research Centre of Sciences of Communication, Italy*

Giulia Massini, *Semeion Research Centre of Sciences of Communication, Italy*

Francesca Della Torre, *Semeion Research Centre of Sciences of Communication, Italy*

17:50 Deep learning for object detection in fine-art paintings

Stanislav Smirnov, *University of Paderborn, Germany*

Alma Eguizabal, *University of Paderborn, Germany*

- 18:10 Cultural Heritage Buildings Degradation Simulation**
Francisco Serrano, *Polytechnic Institute of Leiria, Portugal*
João Serrano, *Polytechnic Institute of Leiria, Portugal*
Alexandrino Gonçalves, *Polytechnic Institute of Leiria, Portugal*
Carlos Grilo, *Polytechnic Institute of Leiria, Portugal*
Nuno Rodrigues, *Polytechnic Institute of Leiria, Portugal*
Virgílio Hipólito-Correia, *Conimbriga Monographic Museum, Portugal*

16:50 - 18:30

General Session PART I

Chairs: Maria Grazia D'Urso, *University of Cassino and Southern Lazio, Italy*
Marco Laracca, *University of Cassino and Southern Lazio, Italy*

Room: 1.09 Hall, *Cassino University Campus*

- 16:50 Sources**
Silvana Errico, *FAI member, Italy*
- 17:10 Archaeology and archaeozoology: the alpine settlement of Orgères (La Thuile-Aosta, ITALY)**
Chiara Maria Lebole, *University of Torino, Italy*
Chiara Mascarello, *University of Torino, Italy*
Giorgio Di Gangi, *University of Torino, Italy*
- 17:30 Developing automated digitization system for cultural heritage documentation - case study**
Maciej Karaszewski, *University of Technology Warsaw, Poland*
Eryk Bunsch, *Museum of King Jan III's Palace at Wilanów, Poland*
Krzysztof Lech, *University of Technology Warsaw, Poland*
Robert Sitnik, *University of Technology Warsaw, Poland*
- 17:50 Digital models for archaeological documentation in urban context. 3D surveys in the new underground of Naples (Municipio station)**
Giovanni Caratelli, *Institute for Technologies Applied to Cultural Heritage (ITABC) National Research Council (CNR), Italy*
Cecilia Giorgi, *Institute for Technologies Applied to Cultural Heritage (ITABC) National Research Council (CNR), Italy*
- 18:10 Problems in Three-Dimensional Measurement of Japanese Kenjutsu Using Existing Sensing Devices**
Risako Aoki, *Meiji University, Japan*
Ryusuke Miyamoto, *Meiji University, Japan*

19:00 - 21:00

WELCOME PARTY

Place: *Rectorate, University of Cassino and Southern Lazio*

Technical Program - Tuesday, October 23

08:30 - 18:00

REGISTRATION

Room: 1.11 - Welcome Area, Cassino University Campus

09:00 - 10:00

PLENARY OPENING SESSION

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

Room: Aula Magna, Cassino University Campus

Advanced Technologies and the Written Heritage

Rodney Ast

Heidelberg University, Germany

10:00 - 11:40

Special Session on Metrological approaches to the study of ancient and medieval written Heritage - PART I

Chair: Gianluca Del Mastro, *Università degli Studi di Napoli Federico II, Italy*

Room: Aula Magna, Cassino University Campus

10:00

Panorama of writing inks: from late Antiquity to the Middle Ages.

Ira Rabin, CSMC, Germany

10:20

The secrets of Herculaneum papyri revealed by synchrotron based techniques: writing and ink composition

Silvia Romano, Institute for Microelectronics and Microsystems, Italy

Ana Sofia Leal, Institute for Microelectronics and Microsystems, Italy

Emmanuel Brun, ESRF, France

Daniel Delattre, CNRS-IRHT, France

Vito Mocella, Institute for Microelectronics and Microsystems, Italy

- 10:40 Document analysis at AGH University of Science and Technology**
Tomasz Łojewski, *AGH University of Science and Technology, Poland*
- 11:00 Multispectral Imaging at the CSMC: Recovery of Lost Writing**
I. Shevchuk, *(CSMC), University of Hamburg, Germany*
- 11:20 Scripta volant: measuring the purple spots biodeterioration of historical parchments by an interdisciplinary approach**
Nicoletta Perini, *University of Rome Tor Vergata, Italy*
Maria Cristina Thaller, *University of Rome Tor Vergata, Italy*
Alessandro Rubechini, *Archivio Segreto Vaticano, Città del Vaticano*
Fulvio Mercuri, *University of Rome Tor Vergata, Italy*
Silvia Orlanducci, *University of Rome Tor Vergata, Italy*
Luciana Migliore, *University of Rome Tor Vergata, Italy*

10:00 - 11:40**Special Session on Integrated Digital Survey Methodologies for the Knowledge and Enhancement of Architectural and Urban - PART I**

Chair: Marco Giorgio Bevilacqua, *University of Pisa, Italy*

Room: B 2.07 Hall, *Cassino University Campus*

- 10:00 Parametric Thinking: Recognizing the "Architectural Formulas" in Cultural Built Heritage by Parametric Digital Modelling**
Roberta Spallone, *Politecnico di Torino, Italy*
Marco Vitali, *Politecnico di Torino, Italy*
- 10:25 Spatial Data Analysis in Archaeology: A comparison of two available methods for site location**
Rafał Bieńkowski, *Polish Academy of Science, Poland*
Marta Lorenzon, *The University of Helsinki, Finland*
Agnieszka Kaliszewska, *Polish Academy of Science, Poland*
Krzysztof Leśniewski, *Polish Academy of Science, Poland*
- 10:50 Assessment of workflows for creating 3D semantic libraries: a study on medieval bell towers in the central region of Sicily**
Cettina Santagati, *University of Catania, Italy*
Raissa Garozzo, *University of Catania, Italy*
Melissa Lengies, *Carleton University, Ottawa*
Graziana D'Agostino, *University of Catania, Italy*
Mariateresa Galizia, *University of Catania, Italy*

- 11:15** **Geochemical and petrographic analysis on the stones and integrated digital survey of the Cathedral of Sant'Antioco di Bisarcio (Ozieri, Italy)**
Stefano Columbu, *Università di Cagliari, Italy*
Marco Lezzerini, *Università di Pisa, Italy*
Giorgio Verdiani, *Università di Firenze, Italy*

10:00 - 11:40

Special Session on Artificial intelligence for measurements in cultural heritage - PART II

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

Mario Molinara, *University of Cassino and Southern Lazio, Italy*

Room: 1.09 Hall, *Cassino University Campus*

- 10:00** **e-Tourism: A Context-Aware Framework for Services Dynamic Packaging**

Fabio Clarizia, *University of Salerno, Italy*

Francesco Colace, *University of Salerno, Italy*

Massimo De Santo, *University of Salerno, Italy*

Marco Lombardi, *University of Salerno, Italy*

Francesco Pascale, *University of Salerno, Italy*

Domenico Santaniello, *University of Salerno, Italy*

- 10:20** **Ancient Coin Classification Using Graph Transduction Games**

Sinem Aslan, *Ca' Foscari University of Venice, Italy, Ege University, Turkey*

Sebastiano Vascon, *Ca' Foscari University of Venice, Italy*

Marcello Pelillo, *Ca' Foscari University of Venice, Italy*

- 10:40** **Automatic Mosaic Digitalization: a Deep Learning approach to tessera segmentation**

Andrea Felicetti, *(DII) Università Politecnica delle Marche, Italy*

Alessandra Albiero, *CNR, Italy*

Roberto Gabrielli, *CNR, Italy*

Roberto Pierdicca, *(DICEA) Università Politecnica delle Marche, Italy*

Marina Paolanti, *(DII) Università Politecnica delle Marche, Italy*

Primo Zingaretti, *(DII) Università Politecnica delle Marche, Italy*

Savina Malinverni, *(DICEA) Università Politecnica delle Marche, Italy*

- 11:00** **Enabling Cultural Heritage Analysis by reasoning with figures of speech**

Flora Amato, *Univ. of Naples Federico II, Italy*

Francesco Moscato, *Univ. of Campania "Luigi Vanvitelli", Italy*

Vincenzo Moscato, *Univ. of Naples Federico II, Italy*

Antonio Picariello, *Univ. of Naples Federico II, Italy*

Francesco Pascale, *Univ. of Salerno, Italy*

- 11:20** **A Double-layer Approach for Historical Documents Archiving**
Marco Lombardi, *University of Salerno, Italy*
Francesco Pascale, *University of Salerno, Italy*
Domenico Santaniello, *University of Salerno, Italy*

11:40 - 12:00

COFFEE BREAK

Place: *Coffee Break Area, Cassino University Campus*

12:00 - 13:20

Special Session on Using multivariate analyses to interpret lithic variability: contributions and limitations

Chairs: Alice Leplongeon, *Muséum national d'Histoire naturelle, France*

Elena A.A. Garcea, *University of Cassino and Southern Latium, Italy*

Room: *Aula Magna, Cassino University Campus*

- 12:00** **Objectifying processes: The Multivariate analyses of the Acheulean Tools in the Western Europe**

Paula García-Medrano, *British Museum, UK*

Elías Maldonado-Garrido, *British Museum, UK*

Nick Ashton, *British Museum, UK*

Andreu Ollé, *(IPHES), Spain*

- 12:20** **Techno-morphometrical analysis of Central African Middle Stone Age bifacial industry :contributions and limitations of multivariate statistics**

Isis Mesfin, *Muséum national d'Histoire naturelle, France*

Alice Leplongeon, *Muséum national d'Histoire naturelle, France*

David Pleurdeau, *Muséum national d'Histoire naturelle, France*

- 12:40** **Raw material exploitation and lithic variability at the MSA site of Gotera, Southern Ethiopia: technological and quantitative approaches combined**

Elena Carletti, *"La Sapienza" University of Rome, Italy*

Marianna Fusco, *"La Sapienza" University of Rome, Italy*

Andrea Zerboni, *"La Sapienza" University of Rome, Italy*

Marina Gallinaro, *"A. Desio" Università degli Studi di Milano, Italy*

Enza Elena Spinapolice, *"La Sapienza" University of Rome, Italy*

13:00 Exploring lithic variability using multivariate analysis: a case study from southeastern Ethiopia

Alice Leplongeon, *Muséum national d'Histoire naturelle, France*

12:00 - 13:20

Special Session on Cultural Heritage: Measurement of Immeasurable Values - PART I

Chair: Magdalena Żmudzińska-Nowak, *Silesian University of Technology, Poland*

Room: B 2.07 Hall, *Cassino University Campus*

12:00 CULTURAL HERITAGE: Values, Approaches, Interpretation

Magdalena Żmudzińska-Nowak, *Silesian University of Technology, Poland*

12:20 Using modern techniques of digitalization in popularization of the Upper Silesia Heritage

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

12:40 Enforced oblivion. The heritage site and its intangible heritage tangled with the political narrative and social memory of the nations

Beata Piecha-van Schagen, *Coal Mining Museum, Poland*

13:00 Tools versus Ideas// Methods versus Imagination

Antonio Castelbranco, *Universidade de Lisboa, Portugal*

Oksana Turchanina, *Universidade de Lisboa, Portugal*

12:00 - 13:20

Special Session on Geomatic Techniques for Integrated 3D Data Acquisition, Metric Validation and Management - PART I

Chairs: Gabriele Bitelli, *Alma Mater Studiorum, University of Bologna, Italy*

Maria Grazia D'Urso, *University of Cassino and Southern Lazio, Italy*

Room: 1.09 Hall, *Cassino University Campus*

12:00 Crop marks detection through optical and multispectral imagery acquired by UAV

Vittorio Casella, *University of Pavia, Italy*

Marica Franzini, *University of Pavia, Italy*

Maria Elena Gorrini, *University of Pavia, Italy*

- 12:16 High resolution orthophotos and a digital surface model of the Roman city of Pollentia (Mallorca, Spain) using RPAS imagery, aerial images, and open data archives**
Eduard Angelats, *(CTTC/CERCA), Spain*
Miguel Ángel Cau Ontiveros, *(ICREA) (ERAAUB), Spain*
Catalina Mas Florit, *(ERAAUB), Spain*
- 12:32 High-resolution 3D survey and visualization of Mesopotamian artefacts bearing cuneiform inscriptions**
Chiara Francolini, *(DICAM) University of Bologna, Italy*
Gianni Marchesi, *(DiSci) University of Bologna, Italy*
Gabriele Bitelli, *(DICAM) University of Bologna, Italy*
- 13:48 3D information management system for the conservation of an old deserted military site**
Eva S. Malinverni, *(DICEA) Università Politecnica delle Marche, Italy*
Andrea A. Giuliano, *(DICEA) Università Politecnica delle Marche, Italy*
Fabio Mariano, *(DICEA) Università Politecnica delle Marche, Italy*
- 13:04 CLOSE-RANGE IMAGERY FOR RECONSTRUCTING ARCHAEOLOGICAL FINDINGS**
Maria Grazia D'Urso, *(DICeM) University of Cassino and Southern Lazio, Italy*
Constantino Luis Marino, *International Surveyance Company, Italy*
Andrea Rotondi, *(DICeM) University of Cassino and Southern Lazio, Italy*

13:20 - 14:30

LUNCH

Place: *Coffee Break Area, Cassino University Campus*

14:30 - 15:20

PRESENTATION OF DTC LAZIO

Excellence Research and Training Centre for Technologies applied to Cultural Heritage

Room: *Aula Magna, Cassino University Campus*

15:20 - 17:00

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

Chair: Marco Giorgio Bevilacqua, *University of Pisa, Italy*

Room: *Aula Magna, Cassino University Campus*

15:20 Computational Design for As-Built Modeling of Architectural Heritage in HBIM processes

Stefano Brusaporci, *University of L'Aquila, Italy*

Pamela Maiezza, *University of L'Aquila, Italy*

Alessandra Tata, *University of L'Aquila, Italy*

15:40 The Building Information Modelling for the documentation of an archaeological site

Ilaria Trizio, *Construction Technologies Institute, Italy*

Francesca Savini, *University of L'Aquila, Italy*

Alessandro Giannangeli, *Construction Technologies Institute, Italy*

16:00 Deepening the knowledge of military architecture in an urban context through digital representations integrated with geophysical surveys. The city walls of Cagliari (Italy).

Andrea Pirinu, *DICAAR University of Cagliari, Italy*

Roberto Balia, *DICAAR University of Cagliari, Italy*

Luca Piroddi, *DICAAR University of Cagliari, Italy*

Antonio Trogu, *DICAAR University of Cagliari, Italy*

Marco Utzeri, *DICAAR University of Cagliari, Italy*

Giulio Vignoli, *DICAAR University of Cagliari, Italy*

16:20 Documentation systems for a urban renewal proposal in developing territories: the digitalization project of Bethlehem Historical Center

Sandro Parrinello, *DICAr University of Pavia, Italy*

Francesca Picchio, *DICAr University of Pavia, Italy*

Raffaella De Marco, *DICAr University of Pavia, Italy*

16:40 Integrated BIM-GIS system for the enhancement of urban heritage

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

Assunta Pelliccio, *University of Cassino and Southern Lazio, Italy*

15:20 - 17:00**Special Session on Pondera Online: An international network for ancient and byzantine metrology****Chairs:** Charles Doyen, *FNRS / UCLouvain, Belgium*Maria Letizia Caldelli, *Sapienza - Università di Roma, Italy***Room:** *B 2.07 Hall, Cassino University Campus*

15:20**The Pondera Online Database**Doyen Charles, *INCAL / CEMA, Belgium***15:40****Weights from the Iberian Peninsula and Southern France (2nd c. BCE – 3rd c. CE)**Delanaye Lysiane, *INCAL / CEMA, Belgium***16:00****Ancient commercial weights of Athens: an overview of the corpus**Louise Willocx, *Université catholique de Louvain, Belgium***16:20****Sources for the study of the players involved in the production and uses of Roman weights (1st c. B.C.–III c. C.E.).**Delvigne Damien, *CEMA University of Louvain, Belgium*

15:20 - 17:00**Special Session on Full Coverage Geophysical Prospection on Protohistoric and Roman Central Settlements in Italy****Chair:** Frank Vermeulen, *Ghent University, Belgium***Room:** *1.09 Hall, Cassino University Campus*

15:20**Mapping Adriatic Landscapes project: geophysics and other prospecting methods in the discovery and re-discovery of pre-Roman settlements in northern Marche.**Federica Boschi, *University of Bologna, Italy***15:40****Non-invasive Survey Approaches to Pre-Roman Settlement Centres in Central Adriatic Italy**Wieke de Neef, *Department of Archaeology Ghent University, Belgium*Frank Vermeulen, *Department of Archaeology Ghent University, Belgium*

- 16:00** **Urban survey on abandoned Roman sites: integrating archaeological geophysics and other topographic approaches in central-Adriatic Italy**
Frank Vermeulen, *Department of Archaeology Ghent University, Belgium*
- 16:20** **Integrated Geophysical Survey to Reconstruct Historical Landscape in Undug Areas of the Roman Ancient Town of Nora, Cagliari, Italy**
Luca Piroddi, *(DICAAR) University of Cagliari, Italy*
Francesco Loddo, *(DICAAR) University of Cagliari, Italy*
Sergio Vincenzo Calcina, *(DICAAR) University of Cagliari, Italy*
Antonio Trogu, *(DICAAR) University of Cagliari, Italy*
Martina Cogoni, *(DICAAR) University of Cagliari, Italy*
Gaetano Ranieri, *(DICAAR) University of Cagliari, Italy*
- 16:40** **The Impact of High Resolution Ground-Penetrating Radar Survey on Understanding Roman Towns: case studies from Falerii Novi and Interamna Lirenas (Lazio, Italy)**
Lieven Verdonck, *Department of Archaeology Ghent University, Belgium*
Frank Vermeulen, *Department of Archaeology Ghent University, Belgium*
Martin Millett, *Faculty of Classics University of Cambridge, UK*
Alessandro Launaro, *Faculty of Classics University of Cambridge, UK*

17:00 - 17:20

COFFEE BREAK

Place: *Coffee Break Area, Cassino University Campus*

17:20 - 18:40

Special Session on Geomatic Techniques for Integrated 3D Data Acquisition, Metric Validation and Management - PART II

Chairs: Gabriele Bitelli, *Alma Mater Studiorum, University of Bologna, Italy*

Maria Grazia D'Urso, *University of Cassino and Southern Lazio, Italy*

Room: *Aula Magna, Cassino University Campus*

17:20 **Public Archaeology and Open Data: a New Deal for Supporting and Interpreting Excavations**

Giorgio Di Gangi, *University of Torino, Italy*

Enrico Borgogno Mondino, *University of Torino, Italy*

Chiara Maria Lebole, *University of Torino, Italy*

- 17:36** **EVALUATING A SLAM-BASED MOBILE MAPPING SYSTEM: A METHODOLOGICAL COMPARISON FOR 3D HERITAGE SCENE REAL-TIME RECONSTRUCTION**
Eva Savina Malinverni, *(DICEA) Università Politecnica delle Marche, Italy*
Roberto Pierdicca, *(DICEA) Università Politecnica delle Marche, Italy*
Carlo Alberto Bozzi, *(DICEA) Università Politecnica delle Marche, Italy*
Daniele Bartolucci, *Geomax s.r.l, Italy*
- 17:52** **3D survey and modelling of the main portico of the Cathedral of Monreale**
Mauro Lo Brutto, *University of Palermo, Italy*
Donatella Ebolese, *University of Palermo, Italy*
Leonarda Fazio, *University of Palermo, Italy*
Gino Dardanelli, *University of Palermo, Italy*
- 18:08** **Geomatic techniques for surveying and mapping an archaeological site**
Andrea Gennaro, *(DISUM) University of Catania, Italy*
Michele Mangiameli, *(DICAR) University of Catania, Italy*
Giovanni Muscato, *(DIEEI) University of Catania, Italy*
Giuseppe Mussumeci, *(DICAR) University of Catania, Italy*
Mariarita Sgarlata, *(DISUM) University of Catania, Italy*
- 18:24** **Pre-Bonifica maps of the Agro Pontino: an assessment**
Valerio Baiocchi, *DICEA Sapienza University, Italy*
Luca Alessandri, *GIA University of Groningen, The Netherlands*
Francesca Giannone, *Engineering Faculty Cusano University, Italy*
Jan Sevink, *IBED University of Amsterdam, The Netherlands*
Wouter van Gorp, *GIA University of Groningen, The Netherlands*
Martijn van Leusen, *GIA University of Groningen, The Netherlands*

17:20 - 18:40**Special Session on Cultural Heritage: Measurement of Immeasurable Values - PART II****Chair:** Magdalena Żmudzińska-Nowak, *Silesian University of Technology, Poland***Room:** B 2.07 Hall, *Cassino University Campus*

- 17:20** **The Museo dell'Arte della Lana in Stia: Culture and tradition of wool-making**
Andrea Gori, *Museo Galileo, Italy*
Emma Angelini, *Politecnico di Torino, Italy*

- 17:36** **“The loop of history and art – how reinterpretation creates relations?”**
Jerzy Wojewódka, *Silesian University of Technology Faculty of Architecture, Poland*
Julia Giżewska, *Silesian University of Technology Faculty of Architecture, Poland*
- 17:52** **Industrial heritage between identity and conflicts: analysis and possibilities for the industrial village of Rosignano Solvay in Tuscany**
Marco Giorgio Bevilacqua, *DESTeC Università di Pisa, Italy*
Stefania Landi, *DESTeC Università di Pisa, Italy*
Sonia Paone, *Dipartimento di Scienze Politiche Università di Pisa, Italy*
Giulia Zanaboni, *Italy*
- 18:08** **Emptiness as a testimony of an orphaned heritage.**
Karolina Chodura, *Silesian University of Technology, Poland*
- 18:24** **Vernacular immeasurable heritage - searching for uniqueness in the old way of building**
Elżbieta Rdzawska-Augustin, *Silesian University of Technology, Poland*

17:20 - 18:40

Special Session on Non-invasive systems and techniques for "on site" monitoring and diagnosis - PART II

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

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

Room: 1.09 Hall, *Cassino University Campus*

- 17:20** **Photogrammetric survey to support Non Destructive Tests at St. Alexander Catacombs in Rome**
Marialuisa Mongelli, *Department of Energy technologies ICT DIVISION ENEA, Italy*
Irene Bellagamba, *Department of Energy technologies ICT DIVISION ENEA, Italy*
Antonio Perozziello, *Department of Energy technologies ICT DIVISION ENEA, Italy*
Samuele Pierattini, *Department of Energy technologies ICT DIVISION ENEA, Italy*
Silvio Migliori, *Department of Energy technologies ICT DIVISION ENEA, Italy*
Andrea Quintiliani, *Department of Energy technologies ICT DIVISION ENEA, Italy*
Giovanni Bracco, *Department of Energy technologies ICT DIVISION ENEA, Italy*
Angelo Tatì, *Department of Energy technologies USER DIVISION ENEA, Italy*
Paola Calicchia, *Institute of Marine Engineering CNR-INM, Italy*

- 17:36** **Frequency Domain Analysis of the Minerva Medica Temple by means of the Motion Magnification Methodology**
Vincenzo Antonio Fioriti, *ENEA, Italy*
Ivan Roselli, *ENEA, Italy*
Gerardo De Canio, *ENEA, Italy*
- 17:52** **Non-Destructive Survey Systems on Masonry: The Case of the Walls in the Archaeological Site of Canne della Battaglia**
Eduardo Caliano, *Istemi s.a.s, Italy*
Carmine Napoli, *Istemi s.a.s, Italy*
Nicolino Messuti, *Istemi s.a.s, Italy*
Rosangela Faieta, *Istemi s.a.s, Italy*
- 18:08** **Structural Health Monitoring System for Masonry Historical Construction**
Francesco Lamonaca, *University of Sannio, Italy*
Renato S. Olivito, *University of Calabria, Italy*
Saverio Porzio, *University of Calabria, Italy*
Domenico Luca Carnì, *University of Calabria, Italy*
Carmelo Scuro, *University of Calabria, Italy*
- 18:24** **Low density archaeometry with low energy using X-ray radiography and microtomography**
Ricardo Tadeu Lopes, *PEN/COPPE/UFRJ, Brazil*
Soraia Rodrigues Azeredo, *PEN/COPPE/UFRJ, Brazil*
Roberto Cesareo, *University di Sassari, Italy*
Regulo F. Jordan, *Museo Señora de Cao and Fundacion Wiese, Peru*
Arabel Fernandez, *Museo Señora de Cao and Fundacion Wiese, Peru*
Angel Bustamante, *Universidad Nacional Mayor de San Marcos, Peru*

20:00 - 23:00

GALA DINNER

Place: *La Cocincina Restaurant*

Technical Program - Wednesday, October 24

08:30 - 16:00

REGISTRATION

Room: 1.11 - Welcome Area, Cassino University Campus

09:00 - 10:00

PLENARY OPENING SESSION

Chair: Elena A.A. Garcea, *University of Cassino and Southern Lazio, Italy*

Room: Aula Magna, Cassino University Campus

**Why, what and how can archaeobotany measure the past?
Cultural landscapes of the Mediterranean and Saharan areas**

Anna Maria Mercuri
University of Modena and Reggio Emilia, Italy

10:00 - 11:40

General Session - PART II

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

Eugenio Polito, *University of Cassino and Southern Lazio, Italy*

Room: Aula Magna, Cassino University Campus

10:00

In situ corrosion monitoring campaign of a weathering steel urban building

Elisabetta Di Francia, *Politecnico di Torino, Italy*

Andrea Bussetto, *Politecnico di Torino, Italy*

Tilde De Caro, *CNR, Italy*

Marco Parvis, *Politecnico di Torino, Italy*

Emma Angelini, *Politecnico di Torino, Italy*

Sabrina Grassini, *Politecnico di Torino, Italy*

- 10:17** **Looking for the full scan: S. Zenone chapel**
Marco Carpiceci, *Sapienza University Rome, Italy*
Andrea Angelini, *Institute for the Technologies Applied to Cultural Heritage National Research Council of Italy, Italy*
- 10:34** **DOC: A Dictionary of Occitan based on Ontology formalism**
Francesco Colace, *Università degli Studi di Salerno, Italy*
Sabrina Galano, *Università degli Studi di Salerno, Italy*
Marco Lombardi, *Università degli Studi di Salerno, Italy*
Francesco Pascale, *Università degli Studi di Salerno, Italy*
Nicoletta Gagliardi, *Università degli Studi di Salerno, Italy*
Domenico Santaniello, *Università degli Studi di Salerno, Italy*
- 10:51** **I-MEDIA-CITIES: Automatic Metadata Enrichment of Historic Media Content**
Alexander Loos, *Fraunhofer Institute for Digital Media Technology Metadata Department, Germany*
Christian Weigel, *Fraunhofer Institute for Digital Media Technology Metadata Department, Germany*
- 11:08** **Corrosion products of Cu-based coins from the River Tiber (Rome) analysed by micro-Raman spectroscopy**
Tilde de Caro, *CNR-ISMN, Italy*
- 11:25** **Dating of three kilns from Catalonia, general considerations on archaeomagnetic dating**
Albert Egea, *Universitat Autònoma de Barcelona, Spain*
Lluís Casas, *Universitat Autònoma de Barcelona, Spain*
Anna Anglisano, *Universitat Autònoma de Barcelona, Spain*
Carlota Auguet, *Universitat Autònoma de Barcelona, Spain*
Marc Prat, *Universitat Autònoma de Barcelona, Spain*
Josep Burch, *Universitat Autònoma de Barcelona, Spain*

10:00 - 11:40

DEMO SESSION

Room: B 2.07 Hall, Cassino University Campus

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

DEMO1 - Reflectance Transformation Imaging

Tomasz Łojewski

DEMO2 - Microfading tests

Tomasz Łojewski

10:00 - 11:40

Special Session on Metrological approaches to the study of ancient and medieval written Heritage - PART II

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

Room: 1.09 Hall, Cassino University Campus

10:00 Parchment disinfection treatment by ionizing radiation

Monia Vadrucchi, *ENEA, Italy*

Cristina Cicero, *University of Rome Tor Vergata, Italy*

Fabio Borgognoni, *ENEA, Italy*

Gabriele Ceres, *University of Rome Tor Vergata, Italy*

Luciana Migliore, *University of Rome Tor Vergata, Italy*

Fulvio Mercuri, *University of Rome Tor Vergata, Italy*

Noemi Orazi, *University of Rome Tor Vergata, Italy*

Stefano Paoloni, *University of Rome Tor Vergata, Italy*

Nicoletta Perini, *University of Rome Tor Vergata, Italy*

Alessandro Rubechini, *Archivio Segreto Vaticano, Città del Vaticano*

10:25 Revealing metals inside a roman ink from a cemetery of the Roman city of Este – 1st century A.D.

Mirta Sabilia, *International Atomic Energy Agency, Austria*

10:50 A signature of Pomponio Leto in the Oratory of SS. Annunziata in Cori (Latina)? The contribution of high-definition laser scanner in the study of scratched inscriptions (graffiti)

Giovanni Caratelli, *(ITABC) (CNR), Italy*

11:15 Study of ancient egyptian artefacts by nondestructive laser based techniques

Luisa Caneve, *FSN-TECFIS-Diagnostic and Metrology Laboratory ENEA, Italy*
Valeria Spizzichino, *FSN-TECFIS-Diagnostic and Metrology Laboratory ENEA, Italy*
Emiliano Antonelli, *Consorzio Croma, Italy*

11:40 - 12:00

COFFEE BREAK

Place: *Coffee Break Area, Cassino University Campus*

12:00 - 13:00

POSTER SESSION

Chairs: Marco Laracca, *University of Cassino and Southern Lazio, Italy*
Cristina Corsi, *University of Cassino and Southern Lazio, Italy*

Room: *B 2.11 Hall, Cassino University Campus*

PS 1 - Hypothesis of virtual reconstruction for the Sphinxes Frieze at the Trajan's Forum in Rome

Samuele Pierattini, *ICT DIVISION ENEA, Italy*
Marialuisa Mongelli, *ICT DIVISION ENEA, Italy*
Irene Bellagamba, *ICT DIVISION ENEA, Italy*
Beatrice Calosso, *ICT DIVISION ENEA, Italy*
Luciano De Martino, *ICT DIVISION ENEA, Italy*
Antonio Perozziello, *ICT DIVISION ENEA, Italy*
Daniele Visparelli, *ICT DIVISION ENEA, Italy*
Giovanni Bracco, *ICT DIVISION ENEA, Italy*
Andrea Quintiliani, *ICT DIVISION ENEA, Italy*
Silvio Migliori, *ICT DIVISION ENEA, Italy*
Marina Milella, *Mercati di Traiano, Museo dei Fori Imperiali, Italy*
Lucrezia Ungaro, *Mercati di Traiano, Museo dei Fori Imperiali, Italy*

PS 2 - Use of the transmissibility function H for ambient vibration measurements of an archeological building

Ivan Roselli, *Department for Sustainability ENEA, Italy*
Vincenzo Fioriti, *Department for Sustainability ENEA, Italy*
Gerardo De Canio, *Department for Sustainability ENEA, Italy*

PS 3 - Compensating for Density Effect in Permittivity-Based Moisture Content Measurements on Historic Masonry Materials

Emanuele Piuzei, *Sapienza University of Rome, Italy*
Erika Pittella, *Sapienza University of Rome, Italy*
Stefano Pisa, *Sapienza University of Rome, Italy*
Andrea Cataldo, *University of Salento, Italy*
Egidio De Benedetto, *University of Salento, Italy*
Giuseppe Cannazza, *University of Salento, Italy*
Paolo D'Atanasio, *ENEA, Italy*
Alessandro Zambotti, *ENEA, Italy*
Livio D'Alvia, *Sapienza University of Rome, Italy*
Zaccaria Del Prete, *Sapienza University of Rome, Italy*

PS 4 - WENDY: a Wireless Environmental Monitoring Device Prototype

Livio D'Alvia, *Sapienza University of Rome, Italy*
Zaccaria Del Prete, *Sapienza University of Rome, Italy*

PS 5 - Comparison between Routing Protocols for Wide Archeological Site

F. Leccese, *Science Department of Università degli Studi "Roma Tre", Italy*
M. Cagnetti, *Science Department of Università degli Studi "Roma Tre", Italy*
S. Giarnetti, *Science Department of Università degli Studi "Roma Tre", Italy*
E. Petritoli, *Science Department of Università degli Studi "Roma Tre", Italy*
I. Luisetto, *Science Department of Università degli Studi "Roma Tre", Italy*
S. Tuti, *Science Department of Università degli Studi "Roma Tre", Italy*
M. Leccisi, *Science Department of Università degli Studi "Roma Tre", Italy*
R. Đurović-Pejčev, *Institute of Pesticides and Environmental Protection, Serbiay*
T. Đorđević, *Institute of Pesticides and Environmental Protection, Serbiay*
A. Tomašević, *Institute of Pesticides and Environmental Protection, Serbiay*
V. Bursić, *Institute of Pesticides and Environmental Protection, Serbiay*
V. Arenella, *Fonderie Digitali s.r.l, Italy*
P. Gabriele, *Fonderie Digitali s.r.l, Italy*
A. Pecora, *Istituto per la microelettronica e microsistemi (IMM) of Consiglio Nazionale delle Ricerche, Italy*
L. Maiolo, *Istituto per la microelettronica e microsistemi (IMM) of Consiglio Nazionale delle Ricerche, Italy*
E. De Francesco, *SeTeL s.r.l, Italy*
G. Schirripa Spagnolo, *Dipartimento di Matematica e Fisica of Università degli Studi "Roma Tre", Italy*
R. Quadarella, *RoTechnology s.r.l, Italy*
L. Bozzi, *RoTechnology s.r.l, Italy*
C. Formisano, *Systemdesign s.r.l, Italy*

PS 6 - The ArchaeoTrack Project: Use of Ground-Penetrating Radar for Preventive Conservation of Buried Archaeology Towards the Development of a Virtual Museum

Luca Bianchini Ciampoli, *Dept. of Engineering Roma Tre University, Italy*
Andrea Benedetto, *Dept. of Engineering Roma Tre University, Italy*
Fabio Tosti, *University of West London, UK*

PS 7 - A 3D topographic network for the study and maintenance of the Insula III of Herculaneum

Andrea D'Andrea, *Università degli Studi di Napoli "L'Orientale", Italy*
Antonella Coralini, *Università degli Studi di Bologna, Italy*
Angela Bosco, *Università degli Studi di Salerno, Italy*
Andrea Fiorini, *Università degli Studi di Bologna, Italy*
Rosario Valentini, *Università degli Studi di Napoli "L'Orientale", Italy*

PS 8 - The digital surface model processing for detection and mapping of preparatory sketches for frescoes

Jakub Markiewicz, *Warsaw University of Technology, Poland*
Magda Pilarska, *Warsaw University of Technology, Poland*
Agnieszka Kaliszewska, *Systems Research Institute Polish Academy of Science, Poland*
Rafał Bieńkowski, *Systems Research Institute Polish Academy of Science, Poland*

PS 9 - Integrated geomatic survey and virtual reality navigation engines for the historical-architectural analysis. The paradigmatic case of a "Modern Age" fortification: the Fortezza Vecchia in Livorno.

Andrea Piemonte, *University of Pisa, Italy*
Denise Ulivieri, *University of Pisa, Italy*
Federico Capriuoli, *University of Pisa, Italy*
Gabriella Caroti, *University of Pisa, Italy*
Stefano Bennati, *University of Pisa, Italy*

PS 10 - Stone artefacts from Roman age in the Southern Latium

Gianluca De Rosa, *University of Cassino and Southern Latium, Italy*
Eugenio Polito, *University of Cassino and Southern Latium, Italy*

PS 11 - 3d Photomodelling Techniques and Use of Drone. The Case of the Middle Valley of Sinni (Southern Basilicata, Italy)

Valentino Vitale, *University of Basilicata, Italy*

PS 12 - Conservation Framework Research for Sui Daxing and Tang Chang'an City Site

Wei Di, *Xi'an University of Architecture and Technology, China*
Yuan Yue, *Xi'an University of Architecture and Technology, China*

PS 13 - TLS and photogrammetry for 3D modelling of a low relief: case study of ancient archive, Palazzo Bo, Padua

Andrea Masiero, *University of Padova, Italy*
Alberto Guarnieri, *University of Padova, Italy*
Francesca Fissore, *University of Padova, Italy*
Marco Piragnolo, *University of Padova, Italy*
Francesco Pirotti, *University of Padova, Italy*
Antonio Vettore, *University of Padova, Italy*

PS 14 - Quality Assessment of 3D Models Generated Through Photogrammetry and Google Tango Project for Archeological Applications

Nima Zarrinpanjeh
Nima Akhavan
Navid Bafkar

PS 15 - Monitoring of shoreline: UAV and ROV

Vincenzo Barrile, *DICEAM Mediterranea University, Italy*
Antonino Fotia, *DICEAM Mediterranea University, Italy*
Rosa Celeste Ponterio, *IPCF - Messina CNR, Italy*
Aliotta Francesco, *IPCF - Messina CNR, Italy*

PS 16 - Mapping of archaeological evidences and 3D models for the historical reconstruction of archaeological sites

Maria Grazia D'Urso, *University of Cassino and Southern Lazio, Italy*
Ester Corsi, *University of Cassino and Southern Lazio, Italy*
Cristina Corsi, *University of Cassino and Southern Lazio, Italy*

PS 17 - Intertwining technical identities : new data on the the Halaf-Ubaid Transition in northern Mesopotamia and the northern Levant

Johnny Samuele Baldi, *DAHA Ifpo, Lebanon*

PS 18 - Metrological aspects in the Nubian pottery from the collection of the University of Cassino and Southern Latium

Bruna Maria Andreoni, *University of Cassino and Southern Latium, Italy*

PS 19 - Revealing metals inside a roman ink from a cemetery of the Roman city of Este – 1st century A.D.

Mirta Sibilja, *International Atomic Energy Agency, Austria*

PS 20 - Comparison and deformation analysis of five 3D models of the Paleolithic wooden point from the Ljubljana River

Enej Gucek Puhar, *University of Ljubljana, Slovenia*

Miran Eric, *Institute for the Protection of Cultural Heritage of Slovenia, Slovenia*

Katja Kavkler, *Institute for the Protection of Cultural Heritage of Slovenia, Slovenia*

Anja Cramer, *Romisch-Germanisches Zentralmuseum Archaeological Research Institute, Germany*

Kristijan Celec, *INTRI d.o.o., Slovenia*

Lidija Korat, *Slovenian National Building and Civil Engineering Institute, Slovenia*

Ales Jakli, *University of Ljubljana, Slovenia*

Franc Solina, *University of Ljubljana, Slovenia*

PS 21 - Writer identification in medieval manuscripts with deep neural network

Alessandro Bria, *University of Cassino and Southern Lazio, Italy*

Nicole Dalia Cilia, *University of Cassino and Southern Lazio, Italy*

Claudio De Stefano, *University of Cassino and Southern Lazio, Italy*

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

Claudio Marrocco, *University of Cassino and Southern Lazio, Italy*

Mario Molinara, *University of Cassino and Southern Lazio, Italy*

Alessandra Scotto Di Freca, *University of Cassino and Southern Lazio, Italy*

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

PS 22 - Spatial analysis of the Khartoum Variant Site 8-B- 10C (8th-6th mill. BC) at Sai Island (Sudan): Preliminary results

Elena A.A. Garcea, *University of Cassino and Southern Lazio, Italy*

Vincenzo Spagnolo, *University of Siena, Italy*

PS 23 - ARCA 2.0: Automatic Recognition of Color for Archaeology through a Web-Application

Filippo Luigi Maria Milotta, *University of Catania, Italy*

Camillo Quattrocchi, *University of Catania, Italy*

Filippo Stanco, *University of Catania, Italy*

Davide Tanasi, *University of South Florida, Florida*

Stefania Pasquale, *INFN CHNet Catania, Italy*

Anna Maria Gueli, *University of Catania, Italy*

PS 24 - Pondera et metra exaequare. On the relations between weight(s) and volume(s) in the Greek and Roman world.

Carla Cioffi, *Università degli Studi Roma Tre, Italy*

PS 25 - Bleaching degree evaluation for quartz fractions of different size extracted from historical mortars

Anna Maria Gueli, *PH3DRA, Italy*

Stefania Pasquale, *PH3DRA, Italy*

Giuseppe Stella, *PH3DRA, Italy*

13:00 - 14:10

LUNCH

Place: *Coffee Break Area, Cassino University Campus*

14:10 - 14:30

AWARD CEREMONY

Room: *Aula Magna, Cassino University Campus*

14:30 - 16:10

Special Session on Non-Destructive Analytical Approaches applied to the Study of Ancient Stone Materials

Chairs: *Giulio Lucarini, University of Cambridge, UK*

Andrea Manzo, University of Naples L'Orientale, Italy

Room: *Aula Magna, Cassino University Campus*

14:30

Between the sea and the river: Geochemical characterization of the obsidian artefacts from Mahal Teglinos (Kassala, Sudan), 4th - 2nd millennia BC

Giulio Lucarini, University of Cambridge, UK

Donatella Barca, University of Calabria, Italy

Andrea Manzo, University of Naples L'Orientale, Italy

14:50

Petrographic and geochemical characterization of white marbles from San Francesco da Paola's portal (CS-Italy)

Stefania Bosco, University of Calabria, Italy

Mauro Francesco La Russa, University of Calabria, Italy

Andrea Macchia, YOUTH in CONSERVATION of CULTURAL HERITAGE, YOCOCU, Italy

Michela Ricca, University of Calabria, Italy

Donatella Barca, University of Calabria, Italy

- 15:10** **Characterization and weathering of archaeological glasses from late antique Sicily**
Anna M. Gueli, *University of Catania & INFN CHNet CT, Italy*
Quentin Lemasson, *Centre de Recherche et de Restauration des Musées de France, France*
Giuseppe Stella, *University of Catania, Italy*
Stefania Pasquale, *INFN CHNet CT, Italy*
Brice Moignard, *Centre de Recherche et de Restauration des Musées de France, France*
Giuseppe Politi, *University of Catania & INFN CT, Italy*
Davide Tanasi, *University of South Florida, United State of America*
Claire Pacheco, *Centre de Recherche et de Restauration des Musées de France, France*
Stephan Hassam, *University of South Florida, United State of America*
Laurent Pichon, *Centre de Recherche et de Restauration des Musées de France, France*
- 15:30** **An integrated approach for the study of the masonry evidence in Santa Maria in Padovetere archaeological site (Ferrara)**
Manlio Montuori, *University of Ferrara, Italy*
- 15:50** **The archaeometric approach applied to pottery artefacts: the case-study of Vibo Valentia finds (Southern Italy)**
Natalia Rovella, *University of Calabria, Italy*
Donatella Barca, *University of Calabria, Italy*
Gino Mirocle Crisci, *University of Calabria, Italy*
Mauro Francesco La Russa, *University of Calabria, Italy*
Francesco Cuteri, *Museo Territoriale della Ceramica, Italy*
Maria Teresa Iannelli, *Soprintendenza Archeologia, Belle Arti e Paesaggio per la Città' Metropolitana Di Reggio Calabria e la Provincia Di Vibo Valentia, Italy*
Paola Vivacqua, *Soprintendenza Archeologia, Belle Arti e Paesaggio per la Città' Metropolitana Di Reggio Calabria e la Provincia Di Vibo Valentia, Italy*
Andrea Macchia, *YOUTH in CONSERVATION OF CULTURAL HERITAGE YOCOCU, Italy*

14:30 - 16:10

Special Session on Archaeopalynology for the reconstruction of environmental and cultural landscapes

Chairs: Assunta Florenzano, *University of Modena and Reggio Emilia, Italy*

Sebastián Pérez-Díaz, *Spanish National Research Council, CSIC, Spain*

Room: B 2.07 Hall, *Cassino University Campus*

- 14:30** **Palynology narrates climate, environment and society changes in the human history**
Alessia Masi, Sapienza University Rome, Italy, Max Planck Institute for the Science of Human History Jena, Germany
- 14:46** **Reconstruction of mosaic landscapes in the Balearic Islands, Western Mediterranean**
Gabriel Servera-Vives, Universitat de les Illes Balears Palma, Spain
Llorenç Picornell-Gelabert, Universitat de les Illes Balears Palma, Spain
- 15:02** **The “Vasca Inferiore di Noceto”: palynological data for the reconstruction of the Po Plain landscape in the Bronze Age**
Eleonora Clò, Università di Modena e Reggio Emilia, Italy
Marta Mazzanti, Università di Modena e Reggio Emilia, Italy
Paola Torri, Università di Modena e Reggio Emilia, Italy
Rossella Rinaldi, Università di Modena e Reggio Emilia, Italy
Maria Chiara Montecchi, Università di Modena e Reggio Emilia, Italy
Anna Maria Mercuri, Università di Modena e Reggio Emilia, Italy
Mauro Cremaschi, Università Statale di Milano, Italy
- 15:18** **Archeobotanical investigations in the ancient city of Gonfienti, Italy (Bronze Age, Iron Age)**
Francesco Ciani, University of Florence, Italy
Davide Attolini, University of Florence, Italy
Cristina Bellini, University of Florence, Italy
Miria Mori Secci, University of Florence, Italy
Tiziana Gonnelli, University of Florence, Italy
Pasquino Pallecchi, Soprintendenza Archeologia, Belle Arti e Paesaggio per la città metropolitana di Firenze e le province di Pistoia e Prato, Italy
Marta Mariotti Lippi, University of Florence, Italy

15:34 Woodland-use in Tyrrhenian southern Tuscany during the Middle Ages (mid-7th-13th century AD)

Mauro Paolo Buonincontri, *University of Siena, Italy*

Pierluigi Pieruccini, *University of Turin, Italy*

Carmine Lubritto, *University of Campania "Luigi Vanvitelli", Italy*

Marta Rossi, *University of Siena, Italy*

Davide Susini, *University of Siena, Italy*

Paola Ricci, *University of Campania "Luigi Vanvitelli", Italy*

Giovanna Bianchi, *University of Siena, Italy*

Gaetano Di Pasquale, *University of Naples "Federico II", Italy*

16:50 Palynological approach to reconstruct cultural landscape evolution: case studies from South Italy

Assunta Florenzano, *Università di Modena e Reggio Emilia, Italy*

14:30 - 16:10

General Session - PART III

Chairs: Assunta Pelliccio, *University of Cassino and Southern Lazio, Italy*

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

Room: 1.09 Hall, Cassino University Campus

14:30 On the Suppression of Mixed Gaussian and Impulsive Noise in Color Images

Damian Kusnik, *Silesian University of Technology Institute of Informatics, Poland*

Bogdan Smolka, *Silesian University of Technology Institute of Automatic Control, Poland*

14:50 The Environmental Monitoring Campaign of the Museum of the Faculty of Archaeology of the Sohag University (Egypt)

Ahmed Elsayed, *Politecnico di Torino, Italy*

Luca Lombardo, *Politecnico di Torino, Italy*

Marco Parvis, *Politecnico di Torino, Italy*

Emma Angelini, *Politecnico di Torino, Italy*

Sabrina Grassini, *Politecnico di Torino, Italy*

15:10 Measuring and leveling roman aqueducts to estimate their flows

Claudio Alimonti, *Sapienza University Rome, Italy*

Valerio Baiocchi, *Sapienza University Rome, Italy*

Giorgia Bonanotte, *Sapienza University Rome, Italy*

Gabor Molnar, *MTA-ELTE Geological, Geophysical and Space Science Research Group, Hungary*

15:30 Analysis of items recommendations methods for heritage sites

Wael Jradi, *Cesi and University of Rouen, France*

Mourad Messaadia, *Cesi, France*

Anne Louis, *Cesi, France*

Laurent Heutte, *University of Rouen, France*

15:50 Indoor geolocation based on earth magnetic field

Salim Alioua, *CESI, France*

Mourad Messaadia, *CESI, France*

Mohamed-Amin Benatia, *CESI, France*

Souleymen SAHNOUN, *SITU8ED, France*

Andi Smart, *University of Exeter, UK*

16:10 - 16:30

COFFEE BREAK

Place: *Coffee Break Area, Cassino University Campus*

16:30 - 17:50

Special Session on Dating and Provenance of Ancient Artifacts: Methods, Applications and Future Perspectives

Chairs: Enzo Ferrara, *Istituto Nazionale di Ricerca Metrologica, Italy*

Lluís Casas, *Universitat Autònoma de Barcelona, Spain*

Room: *Aula Magna, Cassino University Campus*

16:30 Dating of three kilns from Catalonia, general considerations on archaeomagnetic dating

Albert Egea, *Universitat Autònoma de Barcelona, Spain*

Lluís Casas, *Universitat Autònoma de Barcelona, Spain*

Anna Anglisano, *Universitat Autònoma de Barcelona, Spain*

Carlota Auguet, *Universitat Autònoma de Barcelona, Spain*

Marc Prat, *Universitat Autònoma de Barcelona, Spain*

Josep Burch, *Universitat Autònoma de Barcelona, Spain*

- 16:55** **Provenance of marbles from Baths of Nero (Pisa, Italy)**
Marco Lezzerini, *Università di Pisa, Italy*
Germana Sorrentino, *Università di Pisa, Italy*
Stefano Columbu, *Università di Pisa, Italy*
Claudia Rizzitelli, *Belle Arti e Paesaggio per le province di Pisa e Livorno, Italy*
Maria Letizia Gualandi, *Università di Pisa, Italy*
- 17:20** **Archaeomagnetic dating of two baked clay structures excavated at Libarna, Northern Italy**
Evdokia Tema, *Università degli Studi di Torino, Italy*
Enzo Ferrara, *INRiM, Italy*
Alessandro Quercia, *Soprintendenza Archeologia belle arti e paesaggio per la città metropolitana di Torino, Italy*
Barbara Strano, *Cooperativa Archeologia, Italy*
Simone Giovanni Lerma, *Soprintendenza Archeologia belle arti e paesaggio per le province di Alessandria, Asti e Cuneo, Italy*

16:30 - 17:50**Special Session on Measuring in the past: ancient instruments**

Chairs: Margherita Bongiovanni, *Politecnico di Torino, Italy*

Emma Angelini, *Politecnico di Torino, Italy*

Room: B 2.07 Hall, Cassino University Campus

- 16:30** **Rings, Armillae and Other Spherical Instruments. The representation of the Sky in three dimensions**
Giancarlo Truffa, *Independent Scholar, Italy*
- 16:55** **The Jacquard loom between Science and Technology**
Emma Angelini, *Politecnico di Torino, Italy*
Andrea Gori, *Museo Galileo, Italy*
- 17:20** **Curioni and the experimental measurements on the strength of materials in the Scuola di applicazione per gli ingegneri of Turin**
Federica Stella, *Politecnico di Torino, Italy*
Margherita Bongiovanni, *Politecnico di Torino, Italy*
Mauro Borri-Brunetto, *Politecnico di Torino, Italy*

16:30 - 17:50

Special Session on Technological information and learning patterns in pottery production

Chairs: Elena A.A. Garcea, *University of Cassino and Southern Latium, Italy*

Giulia D'Ercole, *Ludwig Maximilians-University Munich, Germany*

Room: 1.09 Hall, *Cassino University Campus*

16:30 The Emergence of Pottery in the Middle Nile Valley: Technology and Function of Early Holocene Complexes from Sudan

Giulia D'Ercole, *Institute of Egyptology and Coptology Ludwig-Maximilians University, Germany*

Elena A.A. Garcea, *Institute of Egyptology and Coptology Ludwig-Maximilians University, Germany*

16:50 Setting the technological patterns in the Neolithic pottery production of central Apulia

Italo M. Muntoni, *Soprintendenza Archeologia, Belle Arti e Paesaggio per le Province di BAT e FG Foggia, Italy*

Martina Torre, *Università di Bologna, Italy*

Giacomo Eramo, *Università di Bari Aldo Moro, Italy*

17:10 Exploring the function of Neolithic underground ovens through an integrate methodology

Cecilia Conati Barbaro, *Sapienza Università di Roma, Italy*

Vanessa Forte, *University of Cambridge Cambridge, UK*

Giacomo Eramo, *Università di Bari Aldo Moro, Italy*

Chiara La Marca, *Sapienza Università di Roma, Italy*

Italo Maria Muntoni, *Soprintendenza Archeologia, Belle Arti e Paesaggio per le Province di Barletta, Italy*

17:30 Spatial data analysis for the study of clay sources distribution in Crete during Minoan times.

Rafał Bieńkowski, *Academy of Sciences, Poland*

Agnieszka Kaliszewska, *Academy of Sciences, Poland*

Joanna Szarkowska, *Warsaw University, Poland*

17:50 - 18:00

CLOSING CEREMONY

Room: *Aula Magna, Cassino University Campus*

