# TABLE OF CONTENTS

MetroArchaeo 2021 Welcome Message........................................................................................................... 2
MetroArchaeo 2021 Committee.......................................................................................................................... 4
MetroArchaeo 2021 Plenary Speakers.................................................................................................................. 6
  Plenary Wednesday, October 20, 2021 - H 15:00.......................................................................................... 6
  Plenary Thursday, October 21, 2021 - H 09:00 ............................................................................................. 7
  Plenary Thursday, October 21, 2021 - H 14:30............................................................................................. 8
  Plenary Friday, October 22, 2021 - H 09:30 ................................................................................................. 9
October 21, 2021 - Chemical Investigation....................................................................................................... 10
Conference Venue............................................................................................................................................. 11
MetroArchaeo 2021 Patronages......................................................................................................................... 13
MetroArchaeo 2021 Sponsors............................................................................................................................ 14
Program Schedule - October 20, 2021........................................................................................................... 15
Program Schedule - October 21, 2021........................................................................................................... 16
Program Schedule - October 22, 2021........................................................................................................... 17
Technical Sessions - Wednesday, October 20................................................................................................. 18
Technical Sessions - Thursday, October 21.................................................................................................... 24
Technical Sessions - Friday, October 22......................................................................................................... 37
MetroArchaeo 2021 Welcome Message

On behalf of the Organizing Committee, we wish to welcome you to the 2021 IEEE International Conference on Metrology for Archaeology and Cultural Heritage - MetroArchaeo2021.

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.

MetroArchaeo2021 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. MetroArchaeo2021 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 editions held in Benevento (2015), Turin (2016), Lecce (2017), Cassino (2018), Florence (2019), Trento – virtual way (2020), this year MetroArchaeo has been organized in Milan. Due to the positive results of rules to limit the pandemia effects, we have concluded that it is safe to organise our annual meeting live in Milan and we strictly adopted the necessary safety measures according to National, Regional and University of Milan rules.

Milan is 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 Lombardia Region. The University of Milan 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.

Milan 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.

MetroArchaeo2021 hosts 21 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, MetroArcheo2021 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 four keynote lectures, which will be delivered by Daniela Comelli, Politecnico di Milano (Italy), Marta Castillejo, Instituto de Química Física Rocosolano, Spain, Patrizia Piacentini, Università degli Studi di Milano (Italy), David Watkinson, Conservation at Cardiff University, UK.

Two Tutorials will be held on “Mass Spectrometry Approaches for the characterization of materials used in cultural heritage objects” and “Speeding up the heritage research with Table Top Microscopes”.

A Round Table on “Gender equality in Cultural Heritage: which path towards inclusivity?” organized by IEEE Women in Engineering

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 2021 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 Milan! 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.

We are very pleased to finally be able meeting you live this year... See you in Milan!

On behalf of the Organizing Committee
Paola Fermo
Pasquale Daponte
MetroArchaeo 2021 Committee

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Maria Grazia D'Urso, University of Bergamo, Italy
Francesco Fontanella, University of Cassino and Southern Lazio, Italy
Stefano Gialanella, University of Trento, Italy
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Sabrina Grassini, Politecnico di Torino, Italy
Anna Gueli, University of Catania, Italy
Francesco Lamonaca, University of Calabria, Italy
Marco Laracca, University of Cassino and Southern Lazio, Italy
Giovanni Leucci, Istituto di Scienze del Patrimonio Culturale (ISPC-CNR), Italy
Paolo Liverani, University of Florence, Italy
Carmine Lubritto, Università degli Studi della Campania “Luigi Vanvitelli”, Italy
Marilena Maniaci, University of Cassino and Southern Lazio, Italy
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Francesca Modugno, University of Pisa, Italy
Paola Moscati, Istituto di Scienze del Patrimonio Culturale (ISPC-CNR), Italy
Giacomo Pardini, University of Salerno, Italy
Alessandra Pecci, University of Barcelona, Spain
Josefina Pérez-Arantegui, University of Zaragoza, Spain
Assunta Pelliccio, University of Cassino and Southern Lazio, Italy
Dario Petri, University of Trento, Italy
Concetta Pironti, University of Salerno, Italy
Emanuele Piuaggi, Sapienza Università di Roma, Italy
Eugenio Polito, University of Cassino and Southern Lazio, Italy
Gianluca Quarta, University of Salento, Italy
Maria Ricciardi, University of Salerno, Italy
Carmen Maria Rosskopf, University of Molise, Italy
Lucia Toniolo, Politecnico di Milano, Italy
Constantini Samara, Aristotle University of Thessaloniki, Greece
José Antonio Barrera Vera, University of Seville, Spain
MetroArchaeo 2021 Plenary Speakers

Plenary Wednesday, October 20, 2021 - H 15:00

Quantifying corrosion to inform treatment design for the preservation of heritage metals

David Watkinson
Conservation at Cardiff University, UK

ABSTRACT
Conservation aims to apply evidence based practices and management strategies to preserve our heritage. Since characterisation and experimental studies must supply the data that will make it possible to fulfil this goal, the nature and contextual value of the qualitative and quantitative data that will be used to do this is important. The relationship between measurement technique and the sample from which the data is being collected involves a complex set of intrinsic and extrinsic variables that will define how effectively the data output fulfils the end goal. This theme is discussed using a methodology that remotely quantifies oxygen consumption to determine the corrosion rate of archaeological and heritage metals. The data produced is used to examine the effectiveness of corrosion control treatments and to assign a scale for assessing the risk of corrosion for iron during storage and display. The impact of this on decision making and expectation, when choosing and applying preservation treatments and strategies, is discussed.

SPEAKER BIO
David Watkinson is Professor of Conservation at Cardiff University, where he teaches and researches conservation theory and practice, with emphasis on the corrosion and treatment of ferrous metals. His research into desiccated storage of unstable iron underpinned the conservation of Brunel’s steamship ss Great Britain, which was awarded the Gulbenkian Museum prize in 2006. In 2010 he was awarded the Plowden Medal for innovative research and contributions to the conservation profession. Having served on National and International committees within the conservation profession, including the Council of the International Institute for Conservation and The United Kingdom Institute for Conservation, he is currently a vice chair of the working party 21 Corrosion and Conservation of Heritage Artefacts in the European Federation of Corrosion.
A novel versatile hyperspectral camera for the study of cultural heritage objects: examples of applications at different spatial scales and in different spectral ranges

Daniela Comelli
Politecnico di Milano, Italy

ABSTRACT
In the heritage science field, hyperspectral imaging has become a popular method for the non-invasive investigation, documentation and diagnostics of cultural heritage. The method is often applied to study polychrome surfaces of small or medium size objects in museum collections, while more recently it has also been effectively implemented in outdoor applications on large mural surfaces.

In the present talk, we discuss the applications of a novel hyperspectral camera based on a Fourier Transform spectrometer, the translating wedge-based identical pulse encoding system (TWINS) [1]. The developed hyperspectral camera is compact and robust and displays high-collection throughput, a broad spectral coverage, and a minimum spectral resolution, which can be flexibly adjusted for each measurement, of 3 THz (4 nm at 600 nm).

We highlight the high-versatility of this new set-up, showing how the camera can be easily adapted for both remote imaging of artistic surfaces and for microscopy measurements. Through illustrative examples, ranging from pigment mapping in paintings to the study of artistic glass windows, we show how it can be employed for diffuse reflectance measurements in different spectral regions of the electromagnetic spectrum, for the study of photoluminescent materials and for detecting the spatial distribution of Raman fingerprints.

SPEAKER BIO
Daniela Comelli is the head of the ArtIS (Imaging and Spectroscopy for Art) research group at the Physics Department of Politecnico di Milano. Therein, the research activity is focused on the development of laser-based spectroscopy techniques for the in-situ study of works of art and the non-invasive characterization of organic and inorganic compounds relevant in the field of Conservation Science, including time-resolved fluorescence imaging, hyperspectral imaging, remote Raman mapping and micro-Raman spectroscopy.

Her research activity is proved by the publication of more than 100 scientific papers in international ISI journals and international conference proceedings (h-index: 24).
Measuring thicknesses in multilayer heritage substrates: a non-invasive photonic approach by nonlinear optical microscopy

Marta Castillejo
Instituto de Química Física Rocasolano (CSIC), Spain

ABSTRACT
The study of valuable historical objects and substrates with 3D structural and chemical characterization benefits from the availability of non-invasive techniques. Particularly, determination of the thickness of constituent and degradation layers is important to evaluate artistic styles, manufacturing techniques and to select adequate conservation strategies. Nonlinear optical microscopy has been recently introduced for the analysis of multilayer and multicomponent cultural heritage substrates. Nonlinear optical signals are generated via the interaction of the material of the sample with a tightly focused infrared femtosecond laser, where the high peak power and short time duration of the laser pulses favour nonlinear optical processes without unwanted side effects such as photobleaching and/or phototoxicity. Various modalities of the technique, i.e. Multi-Photon Excitation Fluorescence and Second and Third Harmonic Generation, allow state-of-the-art, non-invasive analysis of objects and samples with intrinsic micrometric lateral and axial resolution. In this lecture, I will present examples about the characterization and thickness determination, via MPEF microscopy, of varnish and paint layers on pictorial substrates and of grisailles and corrosion layers on historical glasses. The comparison with other more conventional techniques requiring sample-taking shows good consistency and agreement and illustrates the advantages of this new photonic approach.

SPEAKER BIO
Marta Castillejo obtained a PhD degree in Physics from Complutense University of Madrid in 1984. She is a Senior Research Scientist at Instituto de Química Física Rocasolano, CSIC, in Madrid, where she acts as Coordinator of the CSIC Interdisciplinary Platform “Open Heritage: Research and Society”. Her scientific activity encompasses a wide range of aspects of Laser Physics and Photonics, including fundamentals of laser-matter interactions and applications in Nanoscience and Heritage Science. She has authored more than 210 publications in peer-reviewed journals (ca. 5200 citations), 15 invited conference proceedings contributions and 6 chapters in collective books. She has acted as Editor of 4 Volumes of proceedings and has delivered more than 45 invited talks worldwide. Her record of international collaborations includes participation in numerous projects funded by EU framework programs, the coordination of bilateral program exchanges with Academic European Institutions and her activities as Academic Visitor at University Cergy-Pontoise, Observatoire de Paris Meudon in France, Department of...
Chemistry and Chemical Biology of Harvard University, Blackett Laboratory of Imperial College London and Istituto Nazionale di Ottica, CNR. She has long experience in training young scientists by lecturing in various Doctorate and Master Courses and by supervising 8 PhD Thesis. Marta Castillejo has been involved in the development and growth of European Research Infrastructures, including LASERLAB Europe, IPERION CH, PARTHENOS and the ongoing IPERION HS that precedes the launch of the future European Infrastructure for Heritage Science (E-RIHS). She acts as permanent member of the scientific committee of the international conference series Lasers in the Conservation of Artworks (LACONA), Non-destructive and Microanalytical Techniques in Art and Cultural Heritage (TECHNART), SPIE International Symposium on Optical Metrology (O3A) and Conference on Laser Ablation (COLA), all contributing to the impact of an international community of scientists and conservators on the success of lasers for applications in heritage and archaeology.

Plenary Friday, October 22, 2021 - H 09:30

Archaeology and hard sciences: the case of the Aga Khan Necropolis at Aswan, Egypt

Patrizia Piacentini

Università degli Studi di Milano

SPEAKER BIO

Patrizia Piacentini has been Professor of Egyptology and Egyptian Archeology at the University of Milan since 1993, where she is also scientific director of the Egyptological Library and Archives and coordinator of the PhD Program in Cultural Heritage Sciences. Since 2017, she is the Co-Director of the Egyptian-Italian Mission at West Aswan which excavates and studies a large necropolis that covers over a thousand years of history. She is a member of Scientific or Presidency Committees of numerous Egyptological Associations and Foundations, and representative for Italy of the International Association of Egyptologists. Author of numerous monographs and scientific articles, she has organized exhibitions on Ancient Egypt in various countries of the world and numerous congresses. She is the founder and director of the journal EDAL, Egyptian and Egyptological Documents Archives Libraries (Milan) and is a member of the scientific or editorial board of numerous journals, including Aegyptus (Milan).
October 21, 2021 - Chemical Investigation

On October 21st, we have the pleasure to invite you to participate in a series of chemical investigations that will be conducted by portable Raman and XRF spectroscopies on the monumental complex l'Aratura (also named Il Lavoro, 1912) by Enrico Butti (1847 - 1932), Milan, Monumental Cemetery, Besenzanica family sepulture.

Due to COVID restrictions, in order to join, it is necessary to book by sending an e-mail to: vittoria.guglielmi@unimi.it

Please, include in the e-mail a copy of your identity card, which is required because of organisational issues.

The appointment is at the Monumental Cemetery on October 21st at 12 AM.

The place is easily reachable by public transport (ask for information at the conference desktop).

The maximum number of people allowed is 10.

Book your place!
Conference Venue

UNIVERSITY OF MILAN
The Conference will be held at the University of Milan.
Address: Via Festa del Perdono, Milano

Also known as "La Statale", the University of Milan is, relatively speaking, one of Italy’s younger university institutions. It was founded in 1924 thanks to the tenacious efforts of doctor and gynaecologist Luigi Mangiagalli, who in creating La Statale, realised his long-held dream of building a university for Lombardy’s regional capital.

Conference Halls
Aula Magna, University of Milan
Sala Crociera, University of Milan
Sala Napoleonica, University of Milan
WELCOME PARTY
Wednesday, October 20 - 19:00 - 20:30
The MetroArchaeo 2021 Welcome Party will be held at the University of Milano, via Festa del Perdono.

GALA DINNER
Thursday, October 21 - 20:30 - 23:00
The MetroArchaeo 2021 Gala Dinner will be held at Osteria Mamma Rosa.
Address: Piazza Cincinnato 4, Milano
MetroArchaeo 2021 Patronages
MetroArchaeo 2021 Sponsors
## Program Schedule - October 20, 2021

### WEDNESDAY, OCTOBER 20

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>14:30 - 15:00</td>
<td>Opening Ceremony</td>
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</table>
| 15:00 - 16:00    | **Keynote Lecture** - Quantifying corrosion to inform treatment design for the preservation of heritage metals  
                   David Watkinson, Conservation at Cardiff University |
| 16:00 - 16:20    | Coffee Break                                                          |
| 16:20 - 18:00    | **Session 1.1**  
                   Special Session - Light-based techniques for analysis, diagnostics and conservation of historical-artistic and museum cultural heritage  
                   **Session 1.2**  
                   Special Session: Integrated digital survey methodologies for the knowledge and enhancement of architectural and urban heritage - PART 1  
                   **Session 1.3**  
                   Measurement and instrumentation in cultural heritage: from ancient instruments to advanced approaches |
| 18:00 - 18:45    | **Tutorial Session #1**  
                   Mass Spectrometry Approaches for the characterization of materials used in cultural heritage objects  
                   Matteo Casanova, Silvia Giordano, Shimadzu Italia  
                   **Tutorial Session #2**  
                   Speeding up the heritage research with Table Top Microscopes  
                   Massimo Tagliaferro, NanoVision |
| 19:00 - 20:30    | Welcome Party                                                          |
# Program Schedule - October 21, 2021

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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| 09:00 - 10:00| **Keynote Lecture** - A novel versatile hyperspectral camera for the study of cultural heritage objects: examples of applications at different spatial scales and in different spectral ranges  
              *Daniela Comelli, Politecnico di Milano, Italy*                             |
|              | Aula Magna  
              *Università di Milano*                                                      |
|              | Sala Crociera  
              *Università di Milano*                                                      |
|              | Sala Napoleonica  
              *Università di Milano*                                                      |
| 10:00 - 11:40| **Session 2.1** - Novel measuring methods, transduction principles and intercomparion in the cultural heritage  
              **Session 2.2** - Special Session - Integrated digital survey methodologies for the knowledge and enhancement of architectural and urban heritage - PART 2  
              **Session 2.3** - Special session - Archaeometry for archaeology: Provenancing and technological assessment of artifacts from archaeological sites and museums |
| 11:40 - 12:00| Coffee Break                                                              |
| 12:00 - 13:00| **Session 3.1** - Special session - Development and upgrade of instruments and methods in the cultural heritage field  
              **Session 3.2** - Special session - 3D and multispectral scanning analysis for cultural heritage applications |
|              | Lunch                                                                    |
| 14:30 - 15:30| **Keynote Lecture** - Measuring thicknesses in multilayer heritage substrates: a non-invasive photonic approach by nonlinear optical microscopy  
              *Marta Castillojo, Instituto de Química Física Rocasolano (CSIC), Spain*  |
| 15:30 - 16:30| Round Table  
              Gender equality in Cultural Heritage: which path towards inclusivity?     |
| 16:30 - 16:50| Coffee Break                                                              |
| 16:50 - 18:30| **Session 4.1** - Special session - IoT based systems for the structural health monitoring, architectural survey and the analysis of cultural heritage building and archaeological sites  
              **Session 4.2** - Special session - Non-invasive systems and techniques for "on-site" monitoring and diagnosis  
              **Session 4.3** - Geomatics and cultural heritage: Multi-source data for recording, modeling, visualization and metric documentation of historical sites, monuments, structures and past landscape - PART 1 |
| 20:30 - 23:00| Gala Dinner                                                               |
# Program Schedule - October 22, 2021

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Location</th>
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<tbody>
<tr>
<td>09:30 - 10:30</td>
<td><strong>Keynote Lecture - Archaeology and hard sciences: the case of the Aga Khan Necropolis at Aswan, Egypt</strong>&lt;br&gt;Patrizia Piacentini, <em>Università degli Studi di Milano</em></td>
<td>Aula Magna&lt;br&gt;Università di Milano&lt;br&gt;Sala Crociera&lt;br&gt;Università di Milano&lt;br&gt;Sala Napoleonica&lt;br&gt;Università di Milano</td>
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<tr>
<td>10:30 - 12:00</td>
<td><strong>Session 5.1</strong>&lt;br&gt;Geomatics and cultural heritage: Multi-source data for recording, modeling, visualization and metric documentation of historical sites, monuments, structures and past landscape - PART 2</td>
<td>Sala Crociera&lt;br&gt;Università di Milano</td>
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<td><strong>Session 5.2</strong>&lt;br&gt;Special session - Damage assessment: diagnosis and monitoring for the restoration, preventive conservation and maintenance of CH</td>
<td>Sala Napoleonica&lt;br&gt;Università di Milano</td>
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<td><strong>Session 5.3</strong>&lt;br&gt;Special session - Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage: From research to preservation - PART 1</td>
<td>Sala Napoleonica&lt;br&gt;Università di Milano</td>
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<td>12:00 - 13:30</td>
<td><strong>Coffee Break</strong>&lt;br&gt;Poster Session&lt;br&gt;Demo Session</td>
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<td>13:30 - 14:30</td>
<td>Lunch</td>
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<td>14:30 - 16:10</td>
<td><strong>Session 6.1</strong>&lt;br&gt;Special session - Analytical methods to investigate organic materials in cultural heritage: From archaeological biomaterials to modern art</td>
<td>Aula Magna&lt;br&gt;Università di Milano</td>
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<td><strong>Session 6.2</strong>&lt;br&gt;Special session - Recent advancements in dating methods</td>
<td>Sala Crociera&lt;br&gt;Università di Milano</td>
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<td></td>
<td><strong>Session 6.3</strong>&lt;br&gt;Special session - Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage: From research to preservation - PART 2</td>
<td>Sala Napoleonica&lt;br&gt;Università di Milano</td>
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<tr>
<td>16:10 - 16:30</td>
<td><strong>Coffee Break</strong></td>
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<td>16:30 - 17:50</td>
<td><strong>Session 7.1</strong>&lt;br&gt;Special session - Advancements in high resolution multi wavelength imaging techniques of painted surfaces</td>
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<td><strong>Session 7.2</strong>&lt;br&gt;General Session</td>
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<td></td>
<td><strong>Session 7.3</strong>&lt;br&gt;Special session - Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage: From research to preservation - PART 3</td>
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<tr>
<td>17:50 - 18:10</td>
<td>Closing and Award Ceremony</td>
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Technical Sessions - Wednesday, October 20

**14:00 - 18:00**
REGISTRATION
*Room*: Aula Magna, Università di Milano

**14:30 - 15:00**
OPENING SESSION – WELCOME ADDRESSES
*Room*: Aula Magna, Università di Milano

Paola Fermo, University of Milano, MetroArchaeo 2021 General Chair
Pasquale Daponte, University of Sannio, MetroArchaeo 2021 General Chair
Maria Pia Abbracchio, Deputy Vice-Rector, University of Milano
Laura Prati, Head of Chemistry Department, University of Milano

**15:00 - 16:00**
PLENARY SESSION
*Room*: Aula Magna, Università di Milano
*Chair*: Sabrina Grassini, Politecnico di Torino, Italy

Quantifying corrosion to inform treatment design for the preservation of heritage metals

David Watkinson, Conservation at Cardiff University

**16:00 - 16:20**
COFFEE BREAK
16:20 - 18:00  
SESSION 1.1  
Special Session - Light-based techniques for analysis, diagnostics and conservation of historical-artistic and museum cultural heritage  
Room: Aula Magna, Università di Milano  
Chairs: Valentina Venuti, University of Messina, Italy  
Giuseppe Paladini, University of Messina, Italy

16:20  Diagnostic investigation of the Cycle of the New Church of Sarria (Floriana, Malta) by Mattia Preti  
Valentina Venuti, University of Messina, Italy  
Francesco Caridi, University of Messina, Italy  
Emanuele Colica, University of Malta, Malta  
Vincenza Crupi, University of Messina, Italy  
Sebastiano D’Amico, University of Malta, Malta  
Sante Guido, University of Trento, Italy  
Domenico Majolino, University of Messina, Italy  
Giuseppe Paladini, University of Messina, Italy  
Giuseppe Mantella, Giuseppe Mantella Restauro Opere D’Arte, Italy

16:40  Multi–scale characterisation of late–medieval tournois of Frankish Greece provenance  
Giuseppe Paladini, University of Messina, Italy  
Giuseppe Acri, University of Messina, Italy  
Francesco Caridi, University of Messina, Italy  
Vincenza Crupi, University of Messina, Italy  
Pasquale Faenza, G. Rohlf Museum of the Calabrian Greek Language, Italy  
Domenico Majolino, University of Messina, Italy  
Valentina Venuti, University of Messina, Italy

17:00  SR-FTIR microscopy for the study of residues on Palaeolithic stone tools: looking for a methodological protocol  
Clarissa Dominici, University of Siena, Italy  
Chiaramaria Stani, CERIC-ERIC, Italy  
Matteo Rossini, University of Siena, Italy  
Lisa Vaccari, Elettra Sincrotrone Trieste, Italy
17:20  Challenges in laser cleaning of cultural heritage stained glass
Evan Maina Maingi, University of Burgos, Spain
Valérie Treil, HERCULES Laboratory, University of Évora, Portugal
Maria Pilar Alonso Abad, University of Burgos, Spain
Luis A Angurel, CSIC-University of Zaragoza, Spain
Md Ashiqur Rahman, CSIC-University of Zaragoza, Spain
Remy Chapoulie, Bordeaux Montaigne University, France
Stephan Dubernet, Bordeaux Montaigne University, France
Nick Schiavon, HERCULES Laboratory, University of Évora, Portugal
German F de la Fuente, CSIC-University of Zaragoza, Spain

17:40  Short pulse laser irradiation: new possibilities for cleaning archaeological bones
Md Ashiqur Rahman, CSIC - University of Zaragoza, Spain
German F de la Fuente, CSIC - University of Zaragoza, Spain
Luis A Angurel, CSIC - University of Zaragoza, Spain
J M Carretero, Universidad de Burgos, Spain
Evan Maina Maingi, Universidad de Burgos, Spain
M Pilar Alonso Abad, Universidad de Burgos, Spain
Rodrigo Alonso Alcalde, Museo de la Evolución Humana, Spain
Remy Chapoulie, Bordeaux Montaigne University, France
Nick Schiavon, HERCULES Laboratory, University of Évora, Portugal

16:20 - 18:00
SESSION 1.2
Special Session - Integrated digital survey methodologies for the knowledge and enhancement of architectural and urban heritage - PART 1
Room: Sala Crociera, Università di Milano
Chairs: Assunta Pelliccio, University of Cassino, Italy
        Marco Giorgio Bevilacqua, University of Pisa, Italy

16:20  Virtual reconstruction of a ghost disco: the Woodpecker in Milano Marittima
Cristiana Bartolomei, Alma Mater Studiorum University of Bologna, Italy
Cecilia Mazzoli, Alma Mater Studiorum University of Bologna, Italy
Caterina Morganti, Alma Mater Studiorum University of Bologna, Italy
16:40  Towards a catalogue of Sardinian WWII Heritage. The protection of Quartu Sant’Elena and its territory
Andrea Pirinu, University of Cagliari, Italy
Raffaele Argiolas, University of Cagliari, Italy
Nicola Paba, University of Cagliari, Italy

17:00  TLS data and theoretical models for ribbed vault geometry analysis
Vincenzo Bagnolo, University of Cagliari, Italy
Raffaele Argiolas, University of Cagliari, Italy
Cristina Vanini, University of Cagliari, Italy

17:20  Ghost Village Revival: research and revitalization process of demolished historical settlement in Upper Lusatia, Poland
Magdalena Żmudzińska-Nowak, Silesian University of Technology, Poland
Elżbieta Rdzawska-Augustin, Silesian University of Technology, Poland
Tomasz Steidl, Silesian University of Technology, Poland

17:40  3D modelling workflows applied to the historical city: an assessment on quantitative and qualitative optimizations for the correspondence of hybrid Mesh-NURBS surfaces
Raffaella De Marco, University of Pavia, Italy
Francesca Galasso, University of Pavia, Italy

16:20 - 17:40
SESSION 1.3
Measurement and instrumentation in cultural heritage: from ancient instruments to advanced approaches
Room: Sala Napoleonica, Università di Milano
Chairs: Emma Angelini, Politecnico di Torino, Italy
Leonardo Iannucci, Politecnico di Torino, Italy

16:20  The frog thermometer, a challenge of Ferdinand II de’ Medici, Grand Duke of Tuscany
Emma Angelini, Politecnico di Torino, Italy
Andrea Gori, Museo Galileo - Firenze, Italy
Marco Parvis, Politecnico di Torino, Italy
16:40  Raman spectroscopic characterization of corrosion products of archaeological iron
Amina Vietti, Politecnico di Torino, Italy
Emma Angelini, Politecnico di Torino, Italy
Sabrina Grassini, Politecnico di Torino, Italy
Nicola Donato, University of Messina, Italy

17:00  Atmospheric corrosion of outdoor bronze artefacts: the case study of 'Katarsis', by Magdalena Abakanowicz
Leila Es Sebar, Politecnico di Torino, Italy
Leonardo Iannucci, Politecnico di Torino, Italy
Marco Parvis, Politecnico di Torino, Italy
Sabrina Grassini, Politecnico di Torino, Italy
Emma Angelini, Politecnico di Torino, Italy

17:20  Environmental monitoring solution for cultural heritage
Luca Lombardo, Politecnico di Torino, Italy
Marco Parvis, Politecnico di Torino, Italy
Sabrina Grassini, Politecnico di Torino, Italy
Emma Angelini, Politecnico di Torino, Italy

18:00 - 18:45
TUTORIAL SESSION #1
Room: Aula Magna, Università di Milano
Chair: Vittoria Guglielmi, University of Milano, Italy

Mass Spectrometry Approaches for the characterization of materials used in cultural heritage objects
Mattia Casanova, Silvia Giordano, Shimadzu Italia
18:00 - 18:45
TUTORIAL SESSION #2
Room: Sala Crociera, Università di Milano
Chair: Giuseppe Paladini, University of Messina, Italy

**Speeding up the heritage research with Table Top Microscopes**

Massimo Tagliaferro, NanoVision

19:00 - 20:30
WELCOME PARTY
Place: Università di Milano
Technical Sessions - Thursday, October 21

08:30 - 18:00
REGISTRATION
Room: Aula Magna, Università di Milano

09:00 - 10:00
PLENARY SESSION
Room: Aula Magna, Università di Milano
Chair: Paola Fermo, University of Milano, Italy

A novel versatile hyperspectral camera for the study of cultural heritage objects: examples of applications at different spatial scales and in different spectral ranges

Daniela Comelli, Politecnico di Milano, Italy

10:00 - 11:40
SESSION 2.1
Special Session - Novel measurement methods, transduction principles and intercomparison in the cultural heritage
Room: Aula Magna, Università di Milano
Chairs: Anna Maria Gueli, Università di Catania & INFN, Italy
       Carlo Trigona, Università di Catania

10:00   Evaluation of air pollutants in thermal-mineral springs: a case study of Agnano (Naples, Italy) and Contursi Terme (Salerno, Italy)
Concetta Pironti, University of Salerno, Italy
Maria Ricciardi, University of Salerno, Italy
Oriana Motta, University of Salerno, Italy
10:20  **Investigation on the deterioration of lead artifacts. A case study on piano keys and their degradation products**
Antonio Faggiano, University of Salerno, Italy
Maria Ricciardi, University of Salerno, Italy
Concetta Pironti, University of Salerno, Italy
Oriana Motta, University of Salerno, Italy
Ylenia Miele, University of Salerno, Italy
Prisco Prete, University of Salerno, Italy
Antonio Proto, University of Salerno, Italy

10:40  **Analysis of PAHs (polycyclic aromatic hydrocarbons) and other main components in black crusts collected from the Monumental Cemetery of Milan (Italy)**
Maria Ricciardi, University of Salerno, Italy
Antonio Faggiano, University of Salerno, Italy
Concetta Pironti, University of Salerno, Italy
Oriana Motta, University of Salerno, Italy
Maurizio Carotenuto, University of Salerno, Italy
Valeria Comite, University of Milan, Italy
Paola Fermo, University of Milan, Italy
Antonio Proto, University of Salerno, Italy

11:00  **A method to improve the color rendering accuracy in cultural heritage: preliminary results**
Dario Allegra, University of Catania, Italy
Giuseppe Furnari, University of Catania, Italy
Simona Gargano, University of Catania, Italy
Anna Gueli, University of Catania, Italy
Simone Parisi, University of Catania, Italy
Stefania Pasquale, University of Catania, Italy
Filippo Stanco, University of Catania, Italy
Giuseppe Stella, University of Catania, Italy
11:20  RE-SEMIRO project: an innovative network of wireless sensors for microclimate monitoring on the Royal Palace of Carditello
Antonio Spagnuolo, Energreenup srl, Italy
Carmela Vetromile, Energreenup srl, Italy
Antonio Masiello, Energreenup srl, Italy
Maria Francesca Alberghina, Start-test sas, Italy
Salvatore Schiavone, Start-test sas, Italy
Maria Rosa di Cicco, Università della Campania, Italy
Roberto Formato, Fondazione Real Sito di Carditello, Italy
Carmine Lubritto, Università della Campania, Italy

10:00 - 11:40
SESSION 2.2
Special Session - Integrated digital survey methodologies for the knowledge and enhancement of architectural and urban heritage - PART 2
Room: Sala Crociera, Università di Milano
Chairs: Assunta Pelliccio, University of Cassino, Italy
        Marco Giorgio Bevilacqua, University of Pisa, Italy

10:00  Integrated survey procedures for seismic protection of monumental liturgical furniture
Ilaria Trizio, Construction Technologies Institute-National Research Council, Italy
Francesca Savini, Construction Technologies Institute-National Research Council, Italy
Adriana Marra, Construction Technologies Institute-National Research Council, Italy
Giovanni Fabbrocino, University of Molise, Italy

10:20  Point cloud management for a holographic visualization
Cecilia Bolognesi, Politecnico of Milano, Italy
Simone Balin, Politecnico of Milano, Italy

10:40  Digital tools applied to cultural heritage of the modernist residential architecture of the second half of 20th century. Case study of General Jerzy Ziętek’s Villa in Ustroń, Poland
Jakub Bródka, Silesian University of Technology, Poland
Magdalena Wałek, Silesian University of Technology, Poland

11:00  Integrated Survey and 3D Processing on Enea CRESCO Platform: the Case Study of San Nicola in Carcere in Rome
Marco Puccini, ENEA TERIN ICT, Italy
Antonio Camassa, University Roma Tre, Italy
11:20  **3D multilevel approach for the seismic risk of historic centers**  
Marco Saccucci, University of Cassino and Southern Lazio, Italy  
Assunta Pellico, University of Cassino and Southern Lazio, Italy

**SESSION 2.3**  
**Special session - Archaeometry for archaeology: Provenancing and technological assessment of artifacts from archaeological sites and museums**  
**Room:** Sala Napoleonica, Università di Milano  
**Chairs:** Fabrizio Antonelli, University Iuav of Venice, Italy  
Lara Maritan, University of Padova, Italy  
Rebecca Piovesan, University Iuav of Venice, Italy

10:00  **The study of ancient archaeological finds through X-ray tomography: the case of the “Tintinnabulum” from the Museum of Anthropology and Ethnography of Torino**  
Luisa Vigorelli, Polytechnic of Torino, INFN, Italy  
Alessandro Re, University of Torino, INFN, Italy  
Laura Guidorzi, University of Torino, INFN, Italy  
Rosa Brancaccio, University of Bologna, Italy  
Cristina Bortolin, University of Torino, INFN, Italy  
Novella Grassi, University of Torino, INFN, Italy  
Giorgia Mila, University of Torino, INFN, Italy  
Nadia Pastrone, INFN, Italy  
Roberto Sacchi, University of Torino, INFN, Italy  
Sabrina Grassini, University of Torino, Italy  
Gianluigi Mangiapane, University of Torino, Italy  
Rosa Boano, University of Torino, Italy  
Alessandro Lo Giudice, University of Torino, INFN, Italy
Non-destructive magnetic and chemical characterization of granite column shafts traded in the Mediterranean area: the case of Piazza dei Miracoli in Pisa (Italy) and Basilica of Saint-Martin d’Ainay in Lyon (France)

Pierre Rochette, Aix-Marseille Université, France
Claudia Sciuto, University of Pisa, Italy
Simona Raneri, National Research Council, Institute of Chemistry and Organometallic Compounds, Italy
Anton Sutter, Opera della Primaziale Pisana, Italy
Ada Rovazzani, Opera della Primaziale Pisana, Italy
Luigi Folco, University of Pisa, Italy
Jean Paul Ambrosi, Aix-Marseille Université, France
Valérie Andrieu, Aix-Marseille Université, France
Jérôme Gattacceca, Aix-Marseille Université, France
Andreas Hartmann-Virnich, Aix-Marseille Université, France

Minero-petrographic characterization of white marble Roman finds from P.A. Garda Museum (Ivrea, TO)

Elena Storta, University of Torino, Italy
Alessandro Borghi, University of Torino, Italy
Paola Mantovani, Museo Civico P.A. Garda, Italy
Angela Deodato, Museo Civico P.A. Garda, Italy
Luigi Perotti, University of Torino, Italy
Alessandro Sani, Soprintendenza Archeologia, Belle Arti e Paesaggio per la Città Metropolitana di Torino, Italy

Glass-gems from the National Archaeological Museum in Aquileia: a PIXE/PIGE compositional study

Daniela Di Martino, University of Milano Bicocca, INFN, Italy
Elisabetta Gagetti, University of Milano, Italy
Giulia Marcucci, University of Milano Bicocca, Italy
Quentin Lemasson, NewAGLAE, Ministère de la Culture/Chimie ParisTech, France
Maria Pia Riccardi, University of Pavia, Italy

A provenance study on the lapis lazuli collection from the Regional Museum of Natural Sciences in Turin

Laura Guidorzi, University of Torino, Italy
Alessandro Re, University of Torino, Italy
Debora Angelici, TecnArt S.r.l., Italy
Quentin Lemasson, Centre de Recherche et de Restauration des Musées de France
Claire Pacheco, Centre de Recherche et de Restauration des Musées de France
Laurent Pichon, Centre de Recherche et de Restauration des Musées de France
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<th>Time</th>
<th>Session Title</th>
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<th>Chairs</th>
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<tr>
<td>11:40 - 12:00</td>
<td><strong>COFFEE BREAK</strong></td>
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<td>12:00 - 13:00</td>
<td><strong>CHEMICAL INVESTIGATION - L’ARATURA</strong></td>
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<td>12:00 - 13:00</td>
<td><strong>SESSION 3.1</strong></td>
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<td><strong>Special session - Development and upgrade of instruments and methods in the cultural heritage field</strong></td>
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<td><strong>Room</strong>: Aula Magna, Università di Milano</td>
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<td><strong>Chairs</strong>: Alessandro Re, Università di Torino and INFN, Italy</td>
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<td>Alessandro Lo Giudice, Università di Torino and INFN, Italy</td>
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<td>12:00</td>
<td><strong>Comparison of the analytical performances of X-ray fluorescence devices</strong></td>
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<td>Maurizio Chiti, LNF - INFN, Italy</td>
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<td>Raffaella Donglia, LNF - INFN, Italy</td>
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<td>Adolfo Esposito, LNF - INFN, Italy</td>
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<td>Marco Ferretti, CNR - Istituto di Scienze del Patrimonio Culturale, Italy</td>
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<td>Astrik Gorghinian, LNF - INFN, Italy</td>
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<td>Simone Porcinai, Opificio delle Pietre Dure, Italy</td>
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<td>12:20</td>
<td><strong>Study of the edge distortion effect in thermographic detection in semi-transparent Cultural Heritage</strong></td>
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<td>Sofia Ceccarelli, Università degli Studi di Roma Tor Vergata, Italy</td>
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<td>Giovanni Caruso, CNR-ITABC, Italy</td>
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<td>Fulvio Mercuri, Università degli Studi di Roma Tor Vergata, Italy</td>
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</table>
12:40  **Implementation of a non-destructive neutron imaging technique for inhomogeneous materials characterization**  
Giulia Marcucci, University of Milano Bicocca, INFN, Italy  
Antonella Scherillo, ISIS Neutron and Muon Source, UK  
Anna Fedrigo, ISIS Neutron and Muon Source, UK  
Davide Raspino, ISIS Neutron and Muon Source, UK  
Daniela Di Martino, University of Milano Bicocca, INFN, Italy  
Maria Pia Riccardi, University of Pavia, Italy  
Costanza Cucini, Université de Technologie Belfort Montbéliard, France

12:00 - 13:20  
**SESSION 3.2**  
Special session - 3D and multispectral scanning analysis for cultural heritage applications  
**Room:** Sala Crociera, Università di Milano  
**Chair:** Paolo di Stefano, University of L’Aquila, Italy  
Emanuele Guardiani, University of L’Aquila, Italy

12:00  **Digital survey and reconstruction for enhancing epigraphic readings with erode surface**  
Marco Limongiello, University of Salerno, Italy  
Fausta Fiorillo, Politecnico di Milano, Italy  
Luigi Vecchio, University of Salerno, Italy  
Sara Antinozzi, University of Salerno, Italy

12:20  **Focus-stacking system for 3D acquisition of sculptures and archaeological manufacts**  
Claudia Daffara, University of Verona, Italy  
Sara Mazzocato, University of Verona, Italy  
Dario Ambrosini, University of L’Aquila, Italy

12:40  **Measurement of constant radius swept features in cultural heritage**  
Luca Di Angelo, University of L’Aquila, Italy  
Paolo Di Stefano, University of L’Aquila, Italy  
Anna Morabito, University of Salento, Italy
13:00  A computer-based method for the accurate analysis of the trilobate spouts found in the cathedral of Amiternum
Luca Di Angelo, University of L’Aquila, Italy
Paolo Di Stefano, University of L’Aquila, Italy
Alfonso Forgione, University of L’Aquila, Italy
Emanuele Guardiani, University of L’Aquila, Italy
Caterina Pane, University of L’Aquila, Italy

13:00 - 14:30
LUNCH

14:30 - 15:30
PLENARY SESSION
Room: Aula Magna, Università di Milano
Chair: Lucia Toniolo, Politecnico di Milano, Italy

Measuring thicknesses in multilayer heritage substrates: a non-invasive photonic approach by nonlinear optical microscopy
Marta Castillejo, Instituto de Química Física Rocasolano (CSIC), Spain

15:30 - 16:30
ROUND TABLE
Room: Aula Magna, Università di Milano

Gender equality in Cultural Heritage: which path towards inclusivity?
A WIE event in the frame of IEEE MetroArchaeo 2021.
Organized by Dajana Cassioli, Paola Fermo, Sabrina Grassini, Roberta Di Pace, Leila Es Sebar.

In line with the objectives of the WIE Commitment Chart “Steering girls to STEM”, the purpose of the round table is to identify guidelines and prospects for growth and good practices that increase the inclusion of the women in the multidisciplinary world of the conservation of Cultural Heritage (material science, engineering, metrology, archaeology, conservation etc.).
16:30 - 16:50
COFFEE BREAK

16:50 - 18:30
SESSION 4.1
Special session - IoT based systems for the structural health monitoring, architectural survey and the analysis of cultural heritage building and archaeological sites
Room: Aula Magna, Università di Milano
Chairs: Francesco Lamonaca, University of Calabria, Italy
        Gabriele Milani, Politecnico di Milano, Italy

16:50 A novel fast and low-cost masonry monitoring strategy and application on arches
Gabriel Stockdale, Masonry Methods, Inc., USA
Yu Yuan, Politecnico di Milano, Italy
Gabriele Milani, Politecnico di Milano, Italy

17:10 Radar Interferometric Experimental Reconstruction of Three-Dimensional Displacement Vectors and Mode Shapes for Masonry Constructions
Anna Castellano, Polytechnic University of Bari, Italy
Domenico Camassa, Polytechnic University of Bari, Italy
Aguinaldo Fraddosio, Polytechnic University of Bari, Italy
Mario Daniele Piccioni, Polytechnic University of Bari, Italy

17:30 Preliminary study of a mathematical model for the creation of a SHM system against river flooding
Carmelo Scuro, University of Calabria, Italy
Giuseppe Ali, University of Calabria, Italy
Francesco Demarco, University of Calabria, Italy
Francesco Lamonaca, University of Calabria, Italy
Renato S. Olivito, University of Calabria, Italy
Domenico Luca Carni, University of Calabria, Italy

17:50 Preliminary study on a novel Optimal Placed Sensors method based on Genetic Algorithm
Carmelo Scuro, University of Calabria, Italy
Francesco Demarco, University of Calabria, Italy
Renato S. Olivito, University of Calabria, Italy
Peixuan Wang, Politecnico di Milano, Italy
Gabriele Milani, Politecnico di Milano, Italy
Shengcai Li, Yangzhou University, China

18:10 Simulation and Fast vulnerability analysis of a Chinese masonry pagoda
Peixuan Wang, Politecnico di Milano, Italy
Gabriele Milani, Politecnico di Milano, Italy
Carmelo Scuro, University of Calabria, Italy
Francesco Demarco, University of Calabria, Italy
Renato S. Olivito, University of Calabria, Italy
Shengcai Li, Yangzhou University, China

16:50 - 18:30
SESSION 4.2
Special Session - Non-invasive systems and techniques for "on-site" monitoring and diagnosis
Room: Sala Crociera, Università di Milano
Chair: Livio D'Alvia, Sapienza University of Rome, Italy

16:50 Non-invasive techniques for characterization of original Roman mosaic fragments
Cristiana Radulescu, Romanian Chemical Society and Valahia University of Targoviste, Romania
Rodica Mariana Ion, Valahia University of Targoviste, Romania
Ioana Daniela Dulama, Valahia University of Targoviste, Romania
Anca Irina Gheboianu, Valahia University of Targoviste, Romania
Ioan Alin Bucurica, Valahia University of Targoviste, Romania

17:10 Non-invasive analyses of a multi-stratified archaeological and historical site: the Crypta Balbi case-study
Vincenzo Fioriti, ENEA CR Casaccia, Italy
Ivan Roselli, ENEA CR Casaccia, Italy
Angelo Tati, ENEA CR Casaccia, Italy
Alessandro Colucci, ENEA CR Casaccia, Italy
Massimiliano Baldini, ENEA CR Casaccia, Italy
Alessandro Picca, ENEA CR Casaccia, Italy
Antonino Cataldo, ENEA CR Casaccia, Italy
Sara Forliti, ENEA CR Casaccia, Italy
Mauro Marzullo, Museo Nazionale Romano, Italy
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<th>Time</th>
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<th>Authors</th>
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<tr>
<td>17:30</td>
<td>Permittivity of wood as a function of moisture for cultural heritage applications: a preliminary study</td>
<td>Livio D’Alvia, Sapienza University of Rome, Italy&lt;br&gt;Emanuele Piuzzi, Sapienza University of Rome, Italy&lt;br&gt;Andrea Cataldo, University of Salento, Italy&lt;br&gt;Zaccaria Del Prete, Sapienza University of Rome, Italy</td>
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<td>17:50</td>
<td>Application of a non-invasive measurement technique to detect anomalies in frescoes at the US Capitol</td>
<td>Amelia Vignola, The Catholic University of America, USA&lt;br&gt;Francesco Corvaro, Università Politecnica delle Marche, Italy&lt;br&gt;Joseph Vignola, The Catholic University of America, USA&lt;br&gt;Diego Turo, The Catholic University of America, USA&lt;br&gt;Barbara Marchetti, Università degli studi E-Campus, Italy&lt;br&gt;Matteo Vitali, Università Politecnica delle Marche, Italy</td>
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<td>18:10</td>
<td>Measurement of temperature gradients during Er:YAG laser irradiation of poly(vinyl alcohol)</td>
<td>Chiara Chillè, CNR-Istituto di Fisica Applicata “Nello Carrara”, Italy&lt;br&gt;Juri Agresti, CNR-Istituto di Fisica Applicata “Nello Carrara”, Italy&lt;br&gt;Daniele Ciofini, CNR-Istituto di Fisica Applicata “Nello Carrara”, Italy&lt;br&gt;Andrea A. Mencaglia, CNR-Istituto di Fisica Applicata “Nello Carrara”, Italy&lt;br&gt;Iacopo Osticioli, CNR-Istituto di Fisica Applicata “Nello Carrara”, Italy&lt;br&gt;Salvatore Siano, CNR-Istituto di Fisica Applicata “Nello Carrara”, Italy</td>
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**SESSION 4.3**

**Special session - Geomatics and cultural heritage: Multi-source data for recording, modeling, visualization and metric documentation of historical sites, monuments, structures and past landscape - PART 1**

**Room:** Sala Napoleonica, Università di Milano

**Chairs:** Maria Grazia D’Urso, University of Bergamo, Italy<br>Gabriele Bitelli, University of Bologna, Italy
16:50  From 3D surveying to replica, a resource for the valorisation of museum artifacts. The case of the bas-relief of Giovanni da Legnano in Bologna.
Gabriele Bitelli, University of Bologna, Italy
Valentina Alena Girelli, University of Bologna, Italy
Massimo Medica, Musei Civici d'Arte Antica/Istituzione Bologna Musei, Italy
Maria Alessandra Tini, University of Bologna, Italy

17:10  A 3D approach to investigate the burials: the virtual reconstruction of tb. 22 of necropolis of Piovego (PD)
Francesca Adesso, University of Padua, Italy
Emanuela Faresin, University of Padua, Italy
Giuseppe Salemi, University of Padua, Italy

17:30  Terrestrial laser scanning for 3D archaeological documentation. The prehistoric Cave of Sa Miniera de Santu Josi (Sardinia, Italy)
Ilenia Marini, Sapienza, University of Rome, Italy
Chiara Caradonna, University of Sassari, Italy
Maria Grazia Melis, University of Sassari, Italy
Carla Nardinocchi, Sapienza, University of Rome, Italy

17:50  Scans-to BIM for the Cultural Heritage: first results of a study case for a medieval church and its urban context
Maria Grazia D'Urso, University of Bergamo, Italy
Noemi Valdambrini, Professional Architect
Barbara Marana, University of Bergamo, Italy
Valerio Manzari, University of Cassino and Southern Lazio, Italy

18:10  Quantitative GIS-based analysis of archaeological data of the archaic state of Tell Mardikh/Ebla (3rd millennium BC): the Big-DEA project
Luca Peyronel, University of Milan Statale, Italy
Emanuele Mandanici, University of Bologna, Italy
Simone Mantellini, University of Bologna, Italy
Agnese Vacca, University of Milan Statale, Italy
Gabriele Bitelli, University of Bologna, Italy
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<tr>
<td>20:30 – 23:00</td>
<td>GALA DINNER</td>
<td>Osteria Mamma Rosa</td>
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<td>Piazza Cincinnato 4, Milano</td>
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Technical Sessions - Friday, October 22

09:00 - 13:00
REGISTRATION
Room: Aula Magna, Università di Milano

09:20 - 10:20
PLENARY SESSION
Room: Aula Magna, Università di Milano
Chair: Paola Fermo, University of Milano, Italy

Archaeology and hard sciences: the case of the Aga Khan Necropolis at Aswan, Egypt
Patrizia Piacentini, Università degli Studi di Milano

10:20 - 11:40
SESSION 5.1
Special session - Geomatics and cultural heritage: Multi-source data for recording, modeling, visualization and metric documentation of historical sites, monuments, structures and past landscape - PART 2
Room: Aula Magna, Università di Milano
Chairs: Maria Grazia D'Urso, University of Bergamo, Italy
Gabriele Bitelli, University of Bologna, Italy

10:20 Ancient landscape reconstruction using archive data from the Pontine Plain (Italy): the Caprolace lagoon case study
Luca Alessandri, University of Groningen, Netherlands
Valerio Baiocchi, Sapienza University of Rome, Italy
Felicia Monti, Sapienza University of Rome, Italy
Hendrik Feiken, University of Groningen, Netherlands
Martijn Van Leusen, University of Groningen, Netherlands
10:40 From point cloud to video projection mapping: knowing modern architecture by using light projection
Andrea Martino, Università IUAV di Venezia, Italy
Caterina Balletti, Università IUAV di Venezia, Italy

11:00 The survey, the representation and the structural modeling of the S. Angelo roman bridge on the Savuto river (Scigliano, Calabria, Italy) for diagnostics and conservation aims
Serena Artese, University of Calabria, Italy
Manuela De Ruggiero, University of Calabria, Italy
Armando Taliano Grasso, University of Calabria, Italy
Alessandro Manna, University of Calabria, Italy
Raffaele Zinno, University of Calabria, Italy

11:20 A method to improve the accuracy of sparse UAV point cloud applied to the Amphitheater of Pompeii
Salvatore Barba, University of Salerno, Italy
Alessandro Di Benedetto, University of Salerno, Italy
Margherita Fiani, University of Salerno, Italy
Lucas Matias Gujski, University of Salerno, Italy

10:20 - 12:00
SESSION 5.2
Special session - Damage assessment: diagnosis and monitoring for the restoration, preventive conservation and maintenance of CH
Room: Sala Crociera, Università di Milano
Chairs: Natalia Rovella, University of Bologna, Italy
Luciana Randazzo, University of Calabria, Italy

10:20 A metabarcoding approach for the study of biodeterioration of ancient wall paintings in an Italian cave
Paola Cennamo, University of study Suor Orsola Benincasa, Italy
Daniele De Luca, University of Naples Federico II, Italy

10:40 Decay Assessment of Stone-Built Cultural Heritage: The Case Study of the Cosenza Cathedral Façade (South Calabria, Italy)
Antonio Donato, University of Calabria, Italy
Luciana Randazzo, University of Calabria, Italy
Michela Ricca, University of Calabria, Italy
11:00 **Traffic-induced vibrations on cultural heritage in urban area: the case of Villa Farnesina in Rome**

Antonio Costanzo, 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
Virginia Lapenta, Accademia dei Lincei, Italy
Massimo Musacchio, Istituto Nazionale di Geofisica e Vulcanologia, Italy
Antonio Sgamellotti, Accademia dei Lincei, Italy
Maria Fabrizia Buongiorno, Istituto Nazionale di Geofisica e Vulcanologia, Italy

11:20 **Corrosion products characterisation aimed at restoration of Bronze Age metal artefacts from Garda Lake**

Maria Labate, Università degli Studi di Torino, Italy
Carmela Sirello, Restauro Archeologico e Conservazione Opere d’Arte, Italy
Cristina Longhi, Soprintendenza Archeologia, Belle Arti e Paesaggio per Bergamo e Brescia
Maurizio Aceto, Università degli Studi del Piemonte Orientale, Italy
Lorenza Operti, Università degli Studi di Torino, Italy
Angelo Agostino, Università degli Studi di Torino, Italy

11:40 **Development of a new procedure for the assessment of particulate matter (PM) carbonaceous fraction on stone materials exposed to atmospheric pollution**

Andrea Bergomi, Università degli Studi di Milano, Italy
Valeria Comite, Università degli Studi di Milano, Italy
Cristina Della Pina, Università degli Studi di Milano, Italy
Cecilia Cavaterra, Università degli Studi di Milano, Italy
Vorne Luigi Gianelle, Università degli Studi di Milano, Italy
Paola Fermo, Università degli Studi di Milano, Italy
### SESSION 5.3

**Special session - Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage: From research to preservation - PART 1**

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<td>10:20</td>
<td><strong>Integrated use of GPR and TDR for volumetric water content evaluation in wood structures</strong>&lt;br&gt;Integrated use of GPR and TDR for volumetric water content evaluation in wood structures&lt;br&gt;Filippo Comisi, University of Catania, Italy&lt;br&gt;Lara De Giorgi, National Research Council, Italy&lt;br&gt;Giovanni Leucci, National Research Council, Italy</td>
<td>Filippo Comisi, University of Catania, Italy&lt;br&gt;Lara De Giorgi, National Research Council, Italy&lt;br&gt;Giovanni Leucci, National Research Council, Italy</td>
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<td>10:40</td>
<td><strong>Non Invasive diagnosis at the Basilica of Santa Croce (Lecce - Italy)</strong>&lt;br&gt;Non Invasive diagnosis at the Basilica of Santa Croce (Lecce - Italy)&lt;br&gt;Anna Rita Carrozzo, National Research Council, Italy&lt;br&gt;Filippo Comisi, University of Catania, Italy&lt;br&gt;Lara De Giorgi, National Research Council, Italy&lt;br&gt;Giovanni Leucci, National Research Council, Italy&lt;br&gt;Lucrezia Longhitano, University of Catania, Italy</td>
<td>Anna Rita Carrozzo, National Research Council, Italy&lt;br&gt;Filippo Comisi, University of Catania, Italy&lt;br&gt;Lara De Giorgi, National Research Council, Italy&lt;br&gt;Giovanni Leucci, National Research Council, Italy&lt;br&gt;Lucrezia Longhitano, University of Catania, Italy</td>
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<td>11:00</td>
<td><strong>High resolution integrated geophysical investigations to enhance the knowledge of Tusculum archaeological site (Roma, Italy)</strong>&lt;br&gt;High resolution integrated geophysical investigations to enhance the knowledge of Tusculum archaeological site (Roma, Italy)&lt;br&gt;Salvatore Piro, National Research Council, Italy&lt;br&gt;Valeria Beolchini, EEHAR CSIC Roma, Italy&lt;br&gt;L. Peña-Chocarro, Escuela Española de Historia y Arqueología en Roma, Italy&lt;br&gt;Antonio Pizzo, EEHAR CSIC Roma, Italy</td>
<td>Salvatore Piro, National Research Council, Italy&lt;br&gt;Valeria Beolchini, EEHAR CSIC Roma, Italy&lt;br&gt;L. Peña-Chocarro, Escuela Española de Historia y Arqueología en Roma, Italy&lt;br&gt;Antonio Pizzo, EEHAR CSIC Roma, Italy</td>
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<td>11:20</td>
<td><strong>From historical surveys to innovative MT-InSAR techniques: structural monitoring of 20th century heritage buildings in Rome</strong>&lt;br&gt;From historical surveys to innovative MT-InSAR techniques: structural monitoring of 20th century heritage buildings in Rome&lt;br&gt;Annalisa Mele, University of Naples Federico II, Italy&lt;br&gt;Ilaria Giannetti, University of Rome Tor Vergata, Italy&lt;br&gt;Fabio Di Carlo, University of Rome Tor Vergata, Italy&lt;br&gt;Andrea Miano, University of Naples Federico II, Italy&lt;br&gt;Manuela Bonano, CNR - Institute for Electromagnetic Sensing of the Environment, Italy&lt;br&gt;Riccardo Lanari, CNR - Institute for Electromagnetic Sensing of the Environment, Italy&lt;br&gt;Andrea Prota, University of Naples Federico II, Italy&lt;br&gt;Alberto Meda, University of Rome Tor Vergata, Italy</td>
<td>Annalisa Mele, University of Naples Federico II, Italy&lt;br&gt;Ilaria Giannetti, University of Rome Tor Vergata, Italy&lt;br&gt;Fabio Di Carlo, University of Rome Tor Vergata, Italy&lt;br&gt;Andrea Miano, University of Naples Federico II, Italy&lt;br&gt;Manuela Bonano, CNR - Institute for Electromagnetic Sensing of the Environment, Italy&lt;br&gt;Riccardo Lanari, CNR - Institute for Electromagnetic Sensing of the Environment, Italy&lt;br&gt;Andrea Prota, University of Naples Federico II, Italy&lt;br&gt;Alberto Meda, University of Rome Tor Vergata, Italy</td>
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11:40 **Fusion and integration of heterogeneous close range remote sensing and geophysical data. The case of Grumentum**
Nicola Masini, CNR-ISPC (Istituto di Scienze del Patrimonio Culturale), Italy
Francesca Sogliani, University of Basilicata, Italy
Maria Sileo, CNR-ISPC, Potenza, Italy
Nicodemo Abate, CNR-IMAA, Italy
Maria Danese, CNR-ISPC, Potenza, Italy
Valentino Vitale, CNR-ISPC, Potenza, Italy
Rosa Lasaponara, CNR-IMAA, Italy
Salvatore Piro, CNR-ISPC, Italy

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<td>12:00</td>
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<td><strong>LIVE DEMO SESSION</strong></td>
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**Room:** Università di Milano  
**Chairs:** Mauro Francesco La Russa, University of Calabria, Italy  
Antonio Donato, University of Calabria, Italy

**PST1** Geophysical survey in the area of aguglia d’agosta (Priolo Gargallo, Sicily)  
Lara De Giorgi, National Research Council, Italy  
Giovanni Leucci, National Research Council, Italy  
Giovanni Fragalà, National Research Council, Italy  
Daniele Malfitana, National Research Council, Italy

**PST2** Non-destructive diagnosis of a hypogean mill  
Anna Rita Carrozzo, National Research Council, Italy  
Lara De Giorgi, National Research Council, Italy  
Giovanni Leucci, National Research Council, Italy  
Lucrezia Longhitano, University of Catania, Italy

**PST3** Geophysical surveys in archaeological sites in Baucina (Palermo)  
Giovanni Leucci, National Research Council, Italy  
Antonino Cubito, SIGEO snc  
Lara De Giorgi, National Research Council, Italy  
Santi Pappalardo, SIGEO snc
PST4  **Mapping of complex bedrock structure at the Manfredi Castle (Supersano, Lecce – South Italy)**
Anna Rita Carrozzo, National Research Council, Italy
Filippo Comisi, University of Catania, Italy
Lara De Giorgi, National Research Council, Italy
Giovanni Leucci, National Research Council, Italy
Lucrezia Longhitano, University of Catania, Italy

PST5  **The Project SAGAcE: a new instrumentation for gradiometric survey**
Alberto Bucciero, National Research Council, Italy
Lara De Giorgi, National Research Council, Italy
Giovanni Leucci, National Research Council, Italy

PST6  **HBIM to recovery the trulli in Apulia (Southern Italy)**
Maurizio Delli Santi, CNR - ISPC, Italy

PST7  **Integrated Archaeological and Geophysical Surveys in the Historical Center of Augusta (Eastern Sicily, Italy)**
Giuseppe Cacciaguerra, National Research Council, Italy
Lara De Giorgi, National Research Council, Italy
Giovanni Fragalà, National Research Council, Italy
Giovanni Leucci, National Research Council, Italy

PST8  **Development of Storage and Assessment methods suited for organic Archaeological artefacts (StAr) – JPI-CH project**
Erika Ribechini, University of Pisa, Italy
Jeanette Jacqueline Lucejko, University of Pisa, Italy
Marco Mattonai, University of Pisa, Italy
Francesca Modugno, University of Pisa, Italy
Gilles Chaumat, ARC-Nucléart, CEA-Grenoble, France
Susan Braovac, Museum of Cultural History, University of Oslo, Norway
Calin C. Steindal, Museum of Cultural History, University of Oslo, Norway
Magdalena Zborowska, Poznan University of Life Science, Poland
Henryk P. Dąbrowski, Archaeological Museum in Biskupin, Poland
Mariusz Fejfer, Archaeological Museum in Biskupin, Poland
PST9 Pigments identification and analysis of the state of conservation of the decorative elements of the castle of Coca (XV-XVI AC, Segovia, Spain) by Raman Spectroscopy
Suset Barroso-Solares, University of Valladolid, Spain
Irene Mediavilla-Martinez, University of Valladolid, Spain
Carlos Sanz-Velasco, University of Valladolid, Spain
Angel Carmelo Prieto, University of Valladolid, Spain
Javier Pinto, University of Valladolid, Spain

PST10 Multianalytical approach to characterize composition and degradation processes of synthetic high-fashion textiles from the Nanni Strada Design Studio archives
Tommaso Nacci, University of Pisa, Italy
Deborah Roversi, University of Pisa, Italy
Ilaria Degano, University of Pisa, Italy
Barbara Ferriani, Barbara Ferriani srl, Italy
Nanni Strada, Nanni Strada Design Studio
Francesca Modugno, University of Pisa, Italy

PST11 Cleaning archaeological bones: Influence of solvents and water on microhardness
Noé Valtierra, Istitut Català de Paleoecologia Humana i Evolució Social, Spain
Lloyd A. Courtenay, University of Salamanca, Spain
Albert Fabregat-Sanjuan, Universitat Rovira i Virgili, Spain
Lucía López-Polín, Institut Català de Paleoecologia Humana i Evolució Social, Spain

PST12 Terrestrial and UAV based infrared thermography for mapping and investigating the humidity of historical buildings. The case of the Castle in Calvello
Nicodemo Abate, CNR - Istituto di Metodologie per l'Analisi Ambientale, Italy
Rosa Lasaponara, CNR - Istituto di Metodologie per l'Analisi Ambientale, Italy
Nicola Masini, CNR - Istituto di Scienze del Patrimonio Culturale, Italy

PST13 Spectroscopic investigation on a XVII-XVIII century terracotta slab from Calabria, Southern Italy
Francesco Caridi, University of Messina, Italy
Giuseppe Acri, University of Messina, Italy
Giuseppe Paladini, University of Messina, Italy
Valentina Venuti, University of Messina, Italy
Vincenza Crupi, University of Messina, Italy
Pasquale Faenza, G. Rohlf Museum of the Calabrian Greek Language, Italy
Domenico Majolino, University of Messina, Italy
**PST14**  A Proposed Framework For Affordable CAM Replication In Cultural Heritage  
Georgios Korres, New York University Abu Dhabi, Arab Emirates  
Christos Anagnostopoulos, Aegaean University, Greece  
Mohamad Eid, New York University Abu Dhabi, Arab Emirates

**PST15**  Non-invasive and multi-analytical approach to discovering "Old Believer Faith icons": A fruitful cooperation between Gomel (BL), Palermo (IT) and Wroclaw (PL)  
Maria Luisa Saladino, University of Palermo, Italy  
Fabrizio Lo Celso, University of Palermo, Italy  
Francesco Armetta, University of Palermo, Italy  
Veronica Ciaramitaro, University of Palermo, Italy  
Gabriella Chirco, University of Palermo, Italy  
Vladimir Gaishun, Francisk Skorina Gomel State University, Republic of Belarus  
Dmitry Kovalenko, Francisk Skorina Gomel State University, Republic of Belarus  
Alina Semchenko, Francisk Skorina Gomel State University, Republic of Belarus  
Petr Tsalko, Vetka Museum of Old Believer Faith and Belarusian Traditions, Republic of Belarus  
Dariusz Hreniak, Polish Academy of Sciences, Poland

**PST16**  Rehydroxylation: a promising technique for ceramic dating  
Francesco Maspero, Università degli Studi di Milano Bicocca, Italy  
Anna Galli, Università degli Studi di Milano Bicocca, Italy  
Laura Panzeri, Università degli Studi di Milano Bicocca, Italy  
Marco Martini, Università degli Studi di Milano Bicocca, Italy

**PST17**  Structural feature investigation of wooden artifacts through imaging techniques: a step forward in the preservation of historical musical instruments  
Giacomo Fiocco, Università di Pavia, Italy  
Sofia Ceccarelli, Università degli Studi di Roma Tor Vergata, Italy  
Michela Albano, Università di Pavia, Italy  
Tommaso Rovetta, Università di Pavia, Italy  
Marco Malagodi, Università di Pavia, Italy  
Noemi Orazi, Università degli Studi di Roma Tor Vergata, Italy  
Stefano Paoloni, Università degli Studi di Roma Tor Vergata, Italy

**PST18**  Thermally Transferred Optically Stimulated Luminescence, TT-OSL: a study on the responsible traps  
Giulia Tamburini, Università degli Studi di Milano Bicocca, Italy  
Anna Galli, Università degli Studi di Milano Bicocca, Italy  
Laura Panzeri, Università degli Studi di Milano Bicocca, Italy  
Marco Martini, Università degli Studi di Milano Bicocca, Italy
PST19  **Characterization of stone tesserae from "The Indian Triumph of Dionysus" Mosaic (Casignana, Reggio Calabria, Italy)**  
Natalia Rovella, University of Calabria, Italy  
Marianna Musella, University of Calabria, Italy  
Donatella Barca, University of Calabria, Italy

PST20  **Structural health monitoring system design for historical heritage building**  
Domenico Luca Carnì, University of Calabria, Italy  
Carmelo Scuro, University of Calabria, Italy  
Renato S. Olivito, University of Calabria, Italy  
Francesco Lamonaca, University of Calabria, Italy  
Giuseppe Ali, University of Calabria, Italy  
Simone Calà, University of Calabria, Italy

PST21  **Portable Spectroscopic Techniques for the Non-invasive Identification of two historical yellow pigments: Applications and Practical Challenges**  
Veronica Ciaramitaro, University of Palermo, Italy  
Francesco Armetta, University of Palermo, Italy  
Viviana Mollica Nando, CNR - Istituto per i Processi Chimico Fisici Laboratorio di Tecniche Spettroscopiche, Italy  
Rosa Celeste Ponterio, CNR - Istituto per i Processi Chimico Fisici Laboratorio di Tecniche Spettroscopiche, Italy  
Maria Luisa Saladino, University of Palermo, Italy

PST22  **Benchmark Based Selection Of Point Cloud Registration Algorithms For Cultural Heritage 3D Digitization**  
Georgios Korres, New York University Abu Dhabi, Arab Emirates  
Mohamad Eid, New York University Abu Dhabi, Arab Emirates  
Christos Anagnostopoulos, Aegean University, Greece

PST23  **A procedure to monitor the critical aspects of the sampling in the authenticity tests by TL**  
Anna Maria Gueli, University of Catania, Italy  
Giuseppe Stella, University of Catania, Italy  
Stefania Pasquale, University of Catania, Italy  
Giuseppe Politi, University of Catania, Italy  
Carlo Trigona, University of Catania, Italy
PST24 Identification of natural dyes in historical tapestries, a LC-MS/MS approach
Anna Baroni, University of Milano, Italy
Valeria Comite, University of Milano, Italy
Vittoria Guglielmi, University of Milano, Italy
Mattia Casanova, Shimadzu Italia S.r.l.
Paolo Redegalli, Shimadzu Italia S.r.l.
Paola Fermo, University of Milano, Italy

PST25 Development of a novel probe for measuring emissivity and temperature during Raman spectroscopy
Chiara Calvagna, IFAC-CNR, Italy
Andrea Azelio Mencaglia, IFAC-CNR, Italy
Iacopo Osticioli, IFAC-CNR, Italy
Daniele Ciofini, IFAC-CNR, Italy
Salvatore Siano, IFAC-CNR, Italy

PST26 Analysis of the distribution of titanium oxide nanoparticles on paintings
Stefania Pasquale, University of Catania, Italy
Giuseppe Politi, University of Catania, Italy
Lucilla Pronti, INFN-Laboratori Nazionali di Frascati, Italy
Martina Romani, INFN-Laboratori Nazionali di Frascati, Italy
Giacomo Viviani, INFN-Laboratori Nazionali di Frascati, Italy
Mariangela Cestelli Guidi, INFN-Laboratori Nazionali di Frascati, Italy
Marco Angelucci, INFN-Laboratori Nazionali di Frascati, Italy
Anna Maria Gueli, University of Catania, Italy

PST27 Seismic behaviour and 3D reconstruction of Cultural Heritage: the Column of the Hera Lacinia Temple in Capo Colonna (Calabria, Southern Italy)
Antonio Costanzo, Istituto Nazionale di Geofisica e Vulcanologia, Italy
Antonio Giulio Cosentino, Associazione Nazionale dei Carabinieri di Brugherio, Italy
Pierdomenico Del Gaudio, Istituto Nazionale di Geofisica e Vulcanologia, Italy
Gregorio Aversa, Museo Archeologico Nazionale di Crotone, Italy
Francesco Pascuzzi, Corpo Nazionale dei Vigili del Fuoco, Italy

PST28 Terrestrial laser scanning for the modelling of indoor archaeological areas: two case-studies from Reggio Calabria, Italy
Dario Giuffrida, CNR, Istituto per i processi chimico-fisici, Italy
Viviana Mollica Nardo, CNR, Istituto per i processi chimico-fisici, Italy
Daniela Neri, Comune di Reggio Calabria – Macroarea Cultura e Turismo, Italy
Giovanni Cucinotta, Comune di Reggio Calabria – Macroarea Cultura e Turismo, Italy
Irene Vittoria Calabrò, Comune di Reggio Calabria – Macroarea Cultura e Turismo, Italy
Loredana Pace, Comune di Reggio Calabria – Macroarea Cultura e Turismo, Italy
Rosina Celeste Ponterio, CNR, Istituto per i processi chimico-fisici, Italy

**PST29** Processing of XRF elementary data from the painted ceramic surface with innovative tools
Gabriella Chirco, University of Palermo, Italy
Giacomo Chiari, Getty Conservation Institute (Retired)
Delia F. Chillura Martino, University of Palermo, Italy

**PST30** Chemical Analysis of prehistoric pottery complex of Valcorrente - Sicily (Italy)
Anna Maria Gueli, University of Catania, Italy
Orazio Palio, University of Catania, Italy
Maria Turco, Soprintendenza ai Beni Culturali di Catania, Italy
Stefania Pasquale, University of Catania, Italy
Giuseppe Stella, University of Catania, Italy
Quentin Lemasson, Centre de Recherche et de Restauration des Musées de France
Claire Pacheco, Centre de Recherche et de Restauration des Musées de France
Laurent Pichon, Centre de Recherche et de Restauration des Musées de France
Brice Moignard, Centre de Recherche et de Restauration des Musées de France
Giuseppe Politi, University of Catania, Italy

**PST31** Investigation of archaeological amphorae from the Egadi battles
Francesco Armetta, University of Palermo, Italy
Veronica Ciaramitaro, University of Palermo, Italy
Małgorzata Sójka, University of Wrocław, Poland
Maria Luisa Saladino, University of Palermo, Italy
Eugeniusz Zych, University of Wrocław, Poland

**PST32** Integration of geomatics acquisition and multi-source data for visualization and documentation of the finds in the Pauciuri archaeological site (Malvito, Calabria, Italy)
Serena Artese, University of Calabria, Italy
Sylvie Crogiez-Petrequin, Université de Tours, France
Federica Caputo, Université de Tours, France
Armando Taliano Grasso, University of Calabria, Italy
Raffaele Zinno, University of Calabria, Italy

**PST33** Technical observations about a possible new portion of the Aqua Iulia Roman aqueduct in the municipality of Ciampino (Italy)
Diego Blanco, Archeogeos, archeologia & geofisica, Italy
Luca Alessandri, Groningen Institute of Archaeology, University of Groningen, Netherlands
Valerio Baiocchi, Sapienza University of Rome, Italy
Pier Sebastiani Del Grande, Archeo.val. SRLS
Gabriella Serio, Soprintendenza Archeologia, Belle Arti e Paesaggio per l'area metropolitana di Roma e della Provincia di Rieti, Italy
Claudio Alimonti, Sapienza University of Rome, Italy

PST34 OSL dating of mortars from constructive phases of the old chapel San Breixo de Ouvigo (NW Spain)
Jorge Sanjurjo-Sanchez, University of A Coruña, Spain
Rebeca Blanco-Rotea, University of Santiago de Compostela, Spain
Jose Carlos Sánchez-Pardo, University of Santiago de Compostela, Spain
David Freire-Lista, University of Trás-os-Montes e Alto Douro, Portugal

PST35 Analysis of twelve wooden spear throwers covered with gilded copper from the Moche tomb of the Lady of Cao
Angel Bustamante, Universidad Nacional Mayor de San Marcos, Perù
Roberto Cesareo, University of Sassari, Italy
Regulo Franco J., PACEB Museo Cao (Fundación Wiese), Perú
Arabel Fernandez, Ministry of Culture, Lima, Perú

PST36 Analysis of the famous Moche head "Cabeza de Mono Dorada"
Roberto Cesareo, University of Sassari, Italy
Angel Bustamante, Universidad Nacional Mayor de San Marcos, Perù

13:30 - 14:30
LUNCH

14:30 - 15:50
SESSION 6.1
Special session - Analytical methods to investigate organic materials in cultural heritage: From archaeological biomaterials to modern art
Room: Aula Magna, Università di Milano
Chairs: Francesca Modugno, University of Pisa, Italy
Paola Fermo, Università degli Studi di Milano, Italy
14:30  **Soft Ionization mass spectrometry of lipid residues in archaeological findings: ESI vs APCI**
Francesco Saliu, DISAT-University of Milano Bicocca, Italy

14:50  **A combined analytical and Bayesian approach to explore infant feeding practices in past populations**
Carlo Cocozza, Ludwig-Maximilians-Universität München, Max Planck Institute for the Science of Human History, Germany
Ricardo Fernandes, Max Planck Institute for the Science of Human History, Germany, University of Oxford, UK, Masaryk University, Czech Republic
Paola Francesca Rossi, Parco Archeologico di Ostia Antica, Italy
Valeria Amoretti, Parco Archeologico di Pompei, Italy
Simona Altieri, Università della Campania, Italy
Maria Rosa Di Cicco, Università della Campania, Italy
Mary Anne Tafuri, Università La Sapienza, Italy
Carmine Lubritto, Università della Campania, Italy

15:10  **Historical proteinaceous-based pictorial binders' analysis: a novel proteomic minimally invasive approach**
Elena Carolina Lucia Rigante, Università degli Studi di Bari Aldo Moro, Italy
Cosima Damiana Calvano, Università degli Studi di Bari Aldo Moro, Italy
Tommaso R. I. Cataldi, Università degli Studi di Bari Aldo Moro, Italy
Luigia Sabbatini, Università degli Studi di Bari Aldo Moro, Italy

15:30  **The combination of RPLC-ESI-FTMS/MS and m-CPBA epoxidation for the location and geometry assignment of double bonds in unsaturated fatty acyl chains of drying oils**
Davide Coniglio, Università degli Studi di Bari Aldo Moro, Italy
Cosima Damiana Calvano, Università degli Studi di Bari Aldo Moro, Italy
Maria Masiello, Università degli Studi di Bari Aldo Moro, Italy
Ilario Losito, Università degli Studi di Bari Aldo Moro, Italy
Luigia Sabbatini, Università degli Studi di Bari Aldo Moro, Italy
Tommaso R. I. Cataldi, Università degli Studi di Bari Aldo Moro, Italy

14:30 - 16:10
**SESSION 6.2**
**Special session - Recent advancements in dating methods**
**Room:** Sala Crociera, Università di Milano
**Chairs:** Anna Galli, Università di Milano Bicocca, Italy
           Marco Martini, Università di Milano Bicocca, Italy
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<td>14:30</td>
<td><strong>New perspectives on an &quot;old&quot; technique: Lipari obsidian and Neolithic communities investigated by Fission Track Dating</strong>&lt;br&gt;Letizia Bonizzoni, University of Milan, Italy&lt;br&gt;Maria Clara Martinelli, Parco Archeologico delle Isole Eolie, Museo Luigi Bernabò Brea, Italy&lt;br&gt;Mauro Coltelli, Istituto Nazionale di Geofisica e Vulcanologia, Italy&lt;br&gt;Marco Manni, Istituto Nazionale di Geofisica e Vulcanologia, Italy&lt;br&gt;Maria Laura Balestrieri, IGG-CNR, Italy&lt;br&gt;Massimo Oddone, University of Pavia, Italy&lt;br&gt;Alessandra Guglielmetti, University of Milan, Italy</td>
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<td>14:47</td>
<td><strong>Evaluating the potential of mortar luminescence dating for building archaeology</strong>&lt;br&gt;Petra Urbanova, Universita di Padova, Italy, Universite Bordeaux Montaigne-CNRS, France</td>
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<td>15:05</td>
<td><strong>Evaluation of ATR-FTIR spectroscopy for distinguish anthropogenic and geogenic calcite</strong>&lt;br&gt;Sara Calandra, University of Florence, Italy&lt;br&gt;Emma Cantisani, Consiglio nazionale delle ricerche, Italy&lt;br&gt;Barbara Salvadori, Consiglio nazionale delle ricerche, Italy&lt;br&gt;Serena Barone, Istituto Nazionale di Fisica Nucleare, Italy&lt;br&gt;Lucia Liccioli, Istituto Nazionale di Fisica Nucleare, Italy&lt;br&gt;Mariaelena Fedi, Istituto Nazionale di Fisica Nucleare, Italy&lt;br&gt;Carlo Alberto Garzonio, University of Florence, Italy</td>
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<td>15:22</td>
<td><strong>Isotope imaging of ultra-traces by LA-fs HR-ICP-MS for U-series dating (U/Th) of archaeological biominerals: how far can we go?</strong>&lt;br&gt;Asmodée Galy, IRAMAT-CRP2A, Université Bordeaux Montaigne, France&lt;br&gt;Loïc Martin, Royal Society Newton International Fellow, Scottish Universities Environmental Research Centre, UK&lt;br&gt;Fanny Claverie, Universite de Pau et des Pays de l’Adour, France&lt;br&gt;Edwige Pons-Branchu, Université Paris-Saclay, France&lt;br&gt;Chantal Tribolo, IRAMAT-CRP2A, Université Bordeaux Montaigne, France&lt;br&gt;Christophe Pecheyran, Universite de Pau et des Pays de l’Adour, France&lt;br&gt;Norbert Mercier, IRAMAT-CRP2A, Université Bordeaux Montaigne, France</td>
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<td>15:38</td>
<td><strong>The metrology of luminescence dating</strong>&lt;br&gt;Antoine Zink, Centre de recherche et de restauration des musées de France</td>
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15:55  The activities of the LAMBDA (Laboratory of Milano Bicocca university for Dating and Archaeometry): what's new?
Laura Panzeri, Università di Milano-Bicocca, Italy
Anna Galli, Università di Milano-Bicocca, Italy
Francesco Maspero, Università di Milano-Bicocca, Italy
Miriam Saleh, Università di Milano-Bicocca, Italy
Marco Martini, Università di Milano-Bicocca, Italy

14:30 - 16:10
SESSION 6.3
Special session - Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage: From research to preservation - PART 2
Room: Sala Napoletana, Università di Milano
Chairs: Giovanni Leucci, UISPC-CNR, Italy
Salvatore Piro, ISPC-CNR, Italy

14:30  Preliminary results from GPR survey at the Roman villa of Caddeddi (Siracusa, Italy)
Denise Cali, University of South Florida, USA
Lara De Giorgi, National Research Council, Italy
Ivan Ferrari, National Research Council, Italy
Francesco Giuri, National Research Council, Italy
Stephan Hassam, University of South Florida, USA
Giovanni Leucci, National Research Council, Italy
Davide Tanasi, University of South Florida, USA
Paolino Trapani, University of Catania, Italy

14:50  Integrated use of multi-temporal multi-sensor and multiscale Remote Sensing data for the understanding of archaeological contexts: the case study of Metaponto, Basilicata
Nicodemo Abate, CNR-IMAA, Italy
Dimitris Roubis, CNR-ISPC, Italy
Valentino Vitale, CNR-ISPC, Italy
Maria Sileo, CNR-ISPC, Italy
Francesca Sogliani, University of Basilicata, Italy
Nicola Masini, CNR-ISPC, Italy
Rosa Lasaponara, CNR-IMAA, Italy
15:10 Warscape biography: from historical air-photos to Lidar data. The revealing of the Great War’s permanences on the contemporary landscapes
Joel Aldrighettoni, University of Trento, Italy
Alessandra Quendolo, University of Trento, Italy

15:30 Marine archaeological investigation in the submerged Roman site of Baiae using parametric sub-bottom profiler system. Phlegrean Fields Archaeological Park (Naples, Italy)
Crescenzo Violante Violante, Institute of Cultural Heritage ISPC-CNR, Italy
Enrico Gallocchio, Phlegrean Fields Archaeological Park, Italy
Fabio Pagano, Phlegrean Fields Archaeological Park, Italy

15:50 GPR 3D model in the area of the San Nicola church, Misterbianco (Sicily)
Patrizia Capizzi, Università di Palermo, Italy
Raffaele Martorana, University of Palermo, Italy
Carla Bottari, Istituto Nazionale di Geofisica e Vulcanologia, Italy
Alessandro Canzoneri, University of Palermo, Italy
Riccardo Civico, Istituto Nazionale di Geofisica e Vulcanologia, Italy

16:10 - 16:30 COFFEE BREAK

16:30 - 17:50 SESSION 7.1
Special session - Advancements in high resolution multi wavelength imaging techniques of painted surfaces
Room: Aula Magna, Università di Milano
Chairs: Nicola Ludwig, Università degli Studi di Milano, Italy
        Marco Gargano, Università degli Studi di Milano, Italy
        Emanuela Grifoni, Università degli Studi di Milano, Italy
16:30  **Documenting Cultural Heritage in very hostile fruition contexts: the synoptic visualization of Giottesque frescoes in Milan by Multispectral and 3D Close-range Imaging**  
Emanuela Grifoni, University of Milan, Italy  
Marco Gargano, University of Milan, Italy  
Jacopo Melada, University of Milan, Italy  
Matteo Interlenghi, DeepTrace Technologies S.R.L., Italy  
Castiglioni Isabella, University of Milan-Bicocca, Milan, Italy  
Serena Romano Gosetti di Sturmeck, University of Lausanne, Switzerland  
Nicola Ludwig, University of Milan, Italy

16:50  **Quantitative evaluation of the Reflectance Transformation Imaging and Normal Integration technique in profilometric application**  
Marco Gargano, University of Milan, Italy  
Eleonora Verni, University of Milan, Italy  
Giacomo Fiocco, University of Pavia, Italy  
Emanuela Grifoni, University of Milan, Italy  
Giuilia Lippolis, Politecnico di Torino, Italy  
Nicola Ludwig, University of Milan, Italy  
Marco Malagodi, University of Pavia, Italy  
Tommaso Rovetta, University of Pavia, Italy  
Marco Pisani, Istituto Nazionale di Ricerca Metrologica, Italy  
Massimo Zucco, Istituto Nazionale di Ricerca Metrologica, Italy

17:10  **Thermographic techniques and infrared reflectography, innovative results with pulsed lighting**  
Nicola Ludwig, University of Milan, Italy  
Jacopo Melada, University of Milan, Italy  
Marco Gargano, University of Milan, Italy

17:30  **Mapping large surfaces of cultural heritage buildings by infrared thermography**  
Gianluca Cadelano, ISAC CNR, Italy  
Giovanni Ferrarini, ITC-CNR, Italy  
Alessandro Bortolin, ISAC CNR, Italy  
Paolo Bison, CNR-ITC, Italy
16:30 - 17:50
SESSION 7.2
General Session
Room: Sala Crociera, Università di Milano
Chairs: Valeria Comite, University of Milan, Italy
       Michela Ricca, University of Calabria, Italy

16:30  RestArt method: innovative high-precision mechatronic-based procedure for fragmented stone statues restoration
       Pietro Nardelli, Architect
       Martina Pavan, MA.CO.RE'. s.r.l., Italy
       Giulia Pompa, MA.CO.RE'. s.r.l., Italy
       Silvia Borghini, Museo Nazionale Romano, Italy
       Vincenzo Fioriti, ENEA, Italy
       Angelo Tatì, ENEA, Italy
       Alessandro Colucci, ENEA, Italy
       Massimiliano Baldini, ENEA, Italy
       Alessandro Picca, ENEA, Italy
       Ivan Roselli, ENEA, Italy

16:50  Raman Spectroscopy Study of Ancient Vaccaei (s. IV-I BC) Glass Beads found at the Necropolis of “Las Ruedas” (Padilla de Duero, Valladolid, Spain)
       Javier Pinto, University of Valladolid, Spain
       Suset Barroso-Solares, University of Valladolid, Spain
       Jorge Souto, University of Valladolid, Spain
       Elvira Rodríguez, University of Valladolid, Spain
       Carlos Sanz-Minguez, University of Valladolid, Spain
       Angel Carmelo Prieto, University of Valladolid, Spain

17:10  Change in colouration of medieval fresco painting – a study of frescoes from St. George’s Cathedral of Yuryev Monastery
       Olga Philippova, Joint Institute for Nuclear Research, Russia
       Andrey Dmitriev, Joint Institute for Nuclear Research, Russia
       Tatiana Tsarevskaya, State Institute for Art Studies, Russia
       Svetlana Dmitrieva, Dubna State University, Russia

17:30  Real-time detection of salts content in waterlogged archaeological wood by evanescent field dielectrometry (EFD): preliminary results
       Sveva Longo, CNR-ISPC, Italy
       Enza Fazio, University of Messina, Italy
**SESSION 7.3**

Special session - Multiscale and multitemporal high resolution remote sensing and non-destructive testing for archaeology and monumental heritage: From research to preservation - PART 3

**Room:** Sala Napoleonica, Università di Milano

**Chairs:** Giovanni Leucci, UISPC-CNR, Italy
           Salvatore Piro, ISPC-CNR, Italy

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**16:30**  **Proximity remote sensing: preliminary results at the Batia Church (Tortorici, Sicily)**

Sebastiano D'Amico, University of Malta, Malta
Emanuele Colica, University of Malta, Malta
Luciano Galone, University of Malta, Malta
Raffaele Persico, University of Calabria, Italy
Valentina Venuti, University of Messina, Italy
Francesco Caridi, University of Messina, Italy
Salvatore Foti, Centro Storia Patria, Italy
Claudia Cantarella, Comune di Tortorici, Italy

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**16:50**  **Integrated geophysical and geomatics study at Xrobb l-Ghagin archaeological site: preliminary results**

Emanuele Colica, University of Malta, Malta
Sebastiano D'Amico, University of Malta, Malta
Luciano Galone, University of Malta, Malta
David Cardona, Heritage Malta
Joseph Caruana, Heritage Malta
Katya Straud, Heritage Malta
Giovanni Leucci, CNR, Italy
Daniela Farrugia, University of Malta, Malta
Pauline Galea, University of Malta, Malta

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**17:10**  **Integrated geophysical and geomatic studies at Ghar Dalam Cave, Malta's oldest prehistoric site**

Luciano Galone, University of Malta, Malta
Emanuele Colica, University of Malta, Malta
Sebastiano D'Amico, University of Malta, Malta
17:30  Preliminary geophysical investigation in the archaeological site of Bocca delle Menate (Comacchio, FE)
Enzo Rizzo, University of Ferrara, Italy
Rachele Dubbini, University of Ferrara, Italy
Luigi Capuzzoli, CNR-IMAA, Italy
Gregory De Martino, CNR-IMAA, Italy
Giacomo Fornasari, University of Ferrara, Italy
Leonardo Farinatti, University of Ferrara, Italy
Enrico Ferrari, University of Ferrara, Italy
Jessica Clementi, University of Ferrara, Italy
Francesca Romano Fiano, University of Ferrara, Italy
Matteo Lombardi, University of Ferrara, Italy

17:50 - 18:10  CLOSING AND AWARD CEREMONY
Room: Aula Magna, Università di Milano

Paola Fermo, University of Milano, MetroArchaeo 2021 General Chair
Pasquale Daponte, University of Sannio, MetroArchaeo 2021 General Chair
Anna Galli, Associazione Italiana di Archeometria, AlAr
Marco Martini, Associazione Italiana di Archeometria, AlAr
Mauro Francesco La Russa, University of Calabria
Antonio Donato, University of Calabria