



ROMA TRE UNIVERSITY / OCTOBER 19-21, 2023

2023 IMEKO INTERNATIONAL CONFERENCE ON

**METROLOGY FOR ARCHAEOLOGY
AND CULTURAL HERITAGE**

**METRO
ARCHAEO**

PROCEEDINGS

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CONFERENCE PROGRAM

Friday, October 20

Session 1.1 - Digital tools in Cultural Heritage: 3D modelling and metaverse

Room: Department of Engineering DIEM - Sala Conferenze

- 1 ArcheoVerso: a cultural metaverse for enhancement, technologies, communities, services**
Saverio Giulio Malatesta (Sapienza Università di Roma), Laura Leopardi (Sapienza Università di Roma), Marco Raoul Marini (Sapienza Università di Roma) and Paolo Rosati (Sapienza Università di Roma)
- 6 Realverso Lucanum: a metaverse for innovative didactic and digital tourism**
Diego Sinitò (iInformatica Srl), Giulio Setzu (iInformatica Srl), Alessandro Verderame (iInformatica Srl), Antonio Ruoto (iInformatica Srl) and Vito Santarcangelo (iInformatica Srl)
- 11 XRM imaging for non-destructive age at death estimation of the incinerated teeth from the Motya Tophet**
Martina Trocchi (Department of Earth Science, Sapienza University of Rome), Luciano Fattore (Center for Research and Services Saperi&Co, Sapienza University of Rome), Flavio Cognigni (Department of Basic and Applied Sciences for Engineering, Sapienza University of Rome), Federico Cappella (Department "Italian Institute of Oriental Studies", Sapienza University of Rome), Marco Rossi (Research Center of Nanotechnologies for Engineering, Sapienza University of Rome), Giorgio Manzi (Department of Environmental Biology, Sapienza University of Rome) and Lorenzo Nigro (Department "Italian Institute of Oriental Studies", Sapienza University of Rome)
- 17 Perceiving Ancient Landscape in Digital Simulation. Preliminary Consideration on the Case of the Missing Auser River in Pisa (Tuscany, IT)**
Alberto Caroti (Università di Roma "La Sapienza")
- 22 Finite Element analysis of Vittoriano building based on InSAR data**
Hamed Dabiri (Department of Earth Sciences, Sapienza University of Rome & CERI Research Center), Jessica Clementi (Department of Earth Sciences, Sapienza University of Rome & CERI Research Center), Roberta Marini (Natural Hazards Control and Assessment (N HAZCA srl.)), Paolo Mazzanti (Department of Earth Sciences, Sapienza University of Rome & CERI Research Center), Gabriele Scarascia Mugnozza (Department of Earth Sciences, Sapienza University of Rome & CERI Research Center), Francesca Bozzano (Department of Earth Sciences, Sapienza University of Rome & CERI Research Center) and Dan Bompà (School of Sustainability, Civil and Environmental Engineering, University of Surrey, UK)
- 27 Digital Technologies and 3D Printing for the Communication of Archaeological Discovery: The case of the early-archaic wreck of the strait of Otranto**
Vincenzo Ria (Soprintendenza Nazionale per il patrimonio culturale subacqueo) and Barbara Davide (Soprintendenza Nazionale per il patrimonio culturale subacqueo)

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

Room: Aula B - Department of Mathematics and Physics

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

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

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Valentina Alemanno (Dept. SBAI, Sapienza University of Rome), Pierfrancesco Atanasio (Dept. SBAI, Sapienza University of Rome), Giancarlo La Penna (Dept. SBAI, Sapienza University of Rome), Chiara Mancini (Dept. SBAI, Sapienza University of Rome), Flavio Cognigni (Dept. SBAI, Sapienza University of Rome), Serena Silvestri (Dept. SBAI, Sapienza University of Rome), Anacleto Proietti (Dept. SBAI, Sapienza University of Rome), Marco Rossi (Dept. SBAI, Sapienza University of Rome), Alessandro Ciccola (Dept. of Chemistry, Sapienza University of Rome), Alessandro Nucara (Dept. of Physics, Sapienza University of Rome), Barbara Barbaro (Soprintendenza archeologia belle arti e paesaggio Viterbo e Etruria Meridionale), Paolo Binaco (Museo territoriale Lago di Bolsena) and Danilo Dini (Sapienza University of Rome, Dept. of Chemistry)

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Room: Aula C - Department of Mathematics and Physics

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Salvatore Piro (ISPC CNR Institute of Heritage Sciences, Italy), Daniela Zamuner (ISPC CNR Institute of Heritage Sciences, Italy), Daniele Verrecchia (National Research Council CNR ISPC) and Tommaso Leti Messina (ISPC CNR Institute of Heritage Sciences, Italy)
- 88 **Satellite automatic extraction and characterization of looting features in the Peruvian desert**
Alessia Brucato (Univeristy of Bari Aldo Moro, Institute of Heritage Science CNR), Rosa Lasaponara (Institute of Methodologies for Environmental Analysis CNR) and Nicola Masini (Institute of Heritage Science CNR)

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

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Nicola Masini (CNR-Istituto di Scienze del Patrimonio Culturale), Gabriella Strano (Ministero della Cultura - Colosseum Archaeological Park, Piazza S. Maria Nova, 53, 00186 Roma), Costanza Fiorentino (UniBas, Via Nazario Sauro 85, 85100 Potenza (PZ)), Domenico Conte (Digimat srl, Via Giovanni Agnelli, 75100 Matera (MT)), Nicodemo Abate (Consiglio Nazionale delle Ricerche - ISPC), Antonio Loperte (National Research Council – Institute of Methodologies for Environmental Analysis), Antonio Minervino Amodio (National Research Council – Institute of Heritage Science), Alfonsina Russo (Ministero della Cultura - Colosseum Archaeological Park, Piazza S. Maria Nova, 53, 00186 Roma (RM)), Angelo Donvito (Digimat srl, Via Giovanni Agnelli, 75100 Matera (MT)) and Rosa Lasaponara (CNR - IMAA)

POSTER SESSION 1

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- 207 **Study of wood samples positioning on two microwave planar coupled ring resonators for water content measurements**
Livio D'Alvia (Università Sapienza - DIMA), Ludovica Apa (Università Sapienza - DIMA), Emanuele Rizzuto (Università Sapienza - DIMA) and Zaccaria Del Prete (Università Sapienza - DIMA)
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Emanuele Brienza (Università Telematica Internazionale Uninettuno)

- 224 System design for precision weeding in secondary archaeological sites**
Mariagrazia Leccisi (Dipartimento di Scienze - Università degli Studi "Roma Tre"), Giuseppe Schirripa Spagnolo (Università Roma Tre - Dipartimento di Matematica e Fisica) and Fabio Leccese (Università degli Studi "Roma Tre")
- 230 Influence of environmental data on the degradation processes on the wall paints of the Archeological Site of Baia (Italy)**
Paola Cennamo (Department of Humanities, University of Naples Suor Orsola Benincasa), Roberta Scielzo (Department of Humanities, University of Naples Suor Orsola Benincasa), Giorgio Trojsi (Department of Humanities, University of Naples Suor Orsola Benincasa) and Elena Chianese (Department of Science and Technology, Parthenope, University of Naples,)
- 235 Protecting Archaeological Collection: The Importance of Microclimatic Monitoring and Diagnostic Investigations in the Preservation of the “Sala delle Madri”**
Antonio Spagnuolo (Energreenup srl), Carmela Vetromile (Energreenup srl), Antonio Masiello (Energreenup srl), Maria Francesca Alberghina (S.T.Art-Test di S. Schiavone & C.), Salvatore Schiavone (S.T.Art-Test di S. Schiavone & C.), Noemi Mantile (Dipartimento Scienze Ambientali Biologiche e Farmaceutiche Università Campania "L. Vanvitelli"), Giovanni Solino (Territorial planning, environment and ecology sector, local authority Province of Caserta) and Carmine Lubritto (Dipartimento Scienze Ambientali Biologiche e Farmaceutiche Università Campania "L. Vanvitelli")
- 240 A multidisciplinary investigation of an ancient kiln excavated at Costigliole Saluzzo: new archaeometric and archaeomagnetic results**
Yuri Leite Santos (Chemistry department, University of Turin), Evdokia Tema (Earth Sciences Department, University of Turin. ALP-CIMaN Alpine Palaeomagnetic Laboratory), Patrizia Davit (Chemistry department, University of Turin), Diego Elia (Historical Studies Department, University of Turin), Valeria Meirano (Historical Studies Department, University of Turin), Fulvio Fantino (TTA- Turin Thermoluminescence Analysis) and Monica Gulmini (Chemistry department, University of Turin)
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Marco Carpiceci (Sapienza Università di Roma, DiSDRA), Fabio Colonnese (Sapienza Università di Roma, DiSDRA), Antonio Schiavo (Sapienza Università di Roma, DiSDRA) and Rachele Zanone (Independent Researcher)
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Raffaele Martorana (Dipartimento di Scienze della Terra e del Mare, Università degli Studi di Palermo, 90123 Palermo, Italy), Patrizia Capizzi (Dipartimento di Scienze della Terra e del Mare, Università degli Studi di Palermo, 90123 Palermo, Italy), Calogero Giambrone (I.I.S.S. Archimede, Cammarata (AG), Italy), Valeria Genco (I.I.S.S. Archimede, Cammarata (AG), Italy) and Lisa Simonello (I.C. Giovanni XXIII, Cammarata (AG), Italy)

- 278 **Multi-spectral investigation on a sheet with dedication and drawing by Giorgio de Chirico (1929)**
Paola Fermo (Dipartimento di Chimica, Università di Milano), Paolo Baldacci (Archivio dell'Arte Metafisica), Davide Manzini (Madatec srl), Valeria Comite (Dipartimento di Chimica, Università di Milano), Chiara Andrea Lombardi (Dipartimento di Chimica, Università di Milano), Andrea Bergomi (Dipartimento di Chimica, Università di Milano), Mattia Borelli (Dipartimento di Chimica, Università di Milano) and Vittoria Guglielmi (Dipartimento di Chimica, Università degli Studi di Milano)
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- 288 **A Technique to Support the Restoration Activities of Archaeological Discoveries**
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- 294 **Electromagnetic survey to detect a section of the Messapian city walls in Ugento (Lecce)**
Dora Francesca Barbolla (ISPC-CNR), Lara De Giorgi (ISPC-CNR), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR), Ilaria Miccoli (ISPC-CNR), Giuseppe Scardozzi (ISPC-CNR), Chiara Torre (Università di Catania) and Giovanni Leucci (ISPC-CNR)
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Roberto Villalobos (Sapienza University of Rome, Department of History, Restoration and Representation of Architecture)
- 305 **Significant data and information in complex analysis of the architectural heritage, the Republican Museum of Itu, Brazil**
Maisa Almeida (Postdoctoral Fellow USP), Marcela Sousa (Postdoctoral Fellow UNICAMP) and Gustavo Vanini (Faculdade de Arquitetura e Urbanismo - Universidade de São Paulo)
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Francesca Di Palma (University of Bari 'Aldo Moro' / National Research Council – Institute of Heritage Science, Lecce), Roberto Gabrielli (National Research Council – Institute of Heritage Science, Rome), Ilaria Miccoli (National Research Council – Institute of Heritage Science, Lecce) and Giuseppe Scardozzi (National Research Council – Institute of Heritage Science, Lecce)
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Ilaria Miccoli (National Research Council –Institute of Heritage Science), Immacolata Ditaranto (National Research Council –Institute of Heritage Science), Pasquale Merola (National Research Council –Institute of Heritage Science) and Giuseppe Scardozzi (National Research Council –Institute of Heritage Science)
- 325 **Integrated use of aerial and ground-based close-range remote sensing techniques to support preventive archaeology: the case study of Ascoli Satriano (FG)**
Nicodemo Abate (Consiglio Nazionale delle Ricerche - ISPC), Italo Maria Muntoni (Soprintendenza Archeologia Belle Arti e Paesaggio delle province di Barletta-Andria-Trani e Foggia), Maria Sileo (CNR - ISPC), Luigi Capozzoli (CNR - IMAA), Gregory de Martino (CNR - IMAA), Rosa Lasaponara (CNR - IMAA) and Nicola Masini (CNR - ISPC)
- 330 **High resolution GPR survey to investigate the urban centres: the case of XX Settembre square of Fano (Fano, Italy)**
Salvatore Piro (ISPC CNR Institute of Heritage Sciences, Italy), Laura Cerri (Freelance archaeologist) and Oscar Mei (University of Urbino (Urbino, Italy))
- 335 **Geoarchaeological and geophysical investigation in Venusia (Basilicata, southern Italy): the test site of roman amphitheater**
Lara De Giorgi (ISPC-CNR), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR), Maurizio Lazzari (ISPC-CNR) and Giovanni Leucci (ISPC-CNR)

- 339 Scientific Examination for the Investigation of the Painting Technique of Contemporary Mural Paintings: “The Angry Christ” by Alfonso Ossorio in Victorias, Negros Occidental, Philippines**
Jem Erika Nique (Alma Mater Studiorum - Università di Bologna), Emilio Catelli (Alma Mater Studiorum - Università di Bologna), Zohreh Chahardoli (Alma Mater Studiorum - Università di Bologna) and Rocco Mazzeo (Alma Mater Studiorum - Università di Bologna)
- 345 ERT AND MAGNETIC SURVEYING: THE CASE STUDY OF KHAYRABADTEPA SATTELMENT (SOUTHERN UZBEKISTAN)**
Azamat Zakirov (Center for Advanced Technologies), Ilyas Yanbukhtin (Center for Advanced Technologies), Timur Mamarozikov (Center for Advanced Technologies), Ilkhom Alimukhamedov (Center for Advanced Technologies), Farangiz Omonova (Center for Advanced Technologies), Ulugbek Musaev (Center for Advanced Technologies) and Otabek Aripjanov (Institute of Art Studies)
- 350 From excavation to digital use, reconstructing and returning the past to small communities: the case of the medieval fortress of Cervara di Roma**
Giulia Chellini (DigiLab Sapienza University of Rome), Saverio Giulio Malatesta (DigiLab Sapienza University of Rome), Mariflora Caruso (DigiLab Sapienza University of Rome), Paola La Torre (DigiLab Sapienza University of Rome), Paolo Rosati (DigiLab Sapienza University of Rome) and Roberta Manzollino (DigiLab Sapienza University of Rome)
- 356 From TLS data into H-FEM model based on the quad-mesh: the case study of romanian church**
Vincenzo Saverio Alfio (Polytechnic of Bari), Domenica Costantino (Polytechnic of Bari), Sorin Herban (Politehnic University of Timisoara), Massimiliano Pepe (University G. D’Annunzio of Chieti-Pescara) and Alfredo Restuccia Garofalo (Polytechnic of Bari)

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

Room: Department of Engineering DIEM - Sala Conferenze

- 361 Archaeological prospection methodology at Teotihuacan (Mexico): study of a neighbourhood in the centre of the city**
Alessandra Pecci (ERAAUB, IAUB, INSA-UB, UNIVERSITAT DE BARCELONA), Luis Barba (Laboratorio de Prospección Arqueológica, IIA, UNAM), Agustin Ortiz Butron (Laboratorio de Prospección Arqueológica, IIA, UNAM), Jorge Blancas (Laboratorio de Prospección Arqueológica, IIA, UNAM), Itzayana Bernal (UNAM) and Natalia Moragas (ERAAUB, IAUB, UNIVERSITAT DE BARCELONA)
- 366 Bioclimatic study of Feng Shui principles in the ancient Chinese village of Chuandixia**
Filippo Calcerano (National Research Council), Letizia Martinelli (National Research Council), Elena Verticchio (National Research Council), Luciano Cessari (National Research Council) and Elena Gigliarelli (National Research Council)
- 371 Archaeological data and reliability criteria. A GIS measurement proposal for the study of the Mignone Valley**
Federica Vacatello ("Sapienza" Università di Roma)
- 376 Digital approaches to ancient metrology: new insights into methods and tools for measuring and designing marble in Late Antiquity**
Giulia Marsili (Department of History and Culture, University of Bologna, Italy) and Claudia Lamanna (University of Bologna, Department of Cultural Heritage)
- 382 Design Analysis: Research experiences from Alexandrian manuals to Imperial Architecture**
Silvia Bertacchi (Alma Mater Studiorum University of Bologna), Francisco Juan-Vidal (Universitat Politècnica de València, Instituto Universitario de Restauración del Patrimonio) and Filippo Fantini (Alma Mater Studiorum University of Bologna)
- 388 MirrorLAB: narrative patterns between collections of antiquities and urban landscapes**
Lorenzo Fei (Università Roma Tre), Francesco Freddolini (Sapienza Università di Roma), Federica Grigoletto (Sapienza Università di Roma), Vincenzo Maria Lacolla (Università Roma Tre), Laura Leopardi (Sapienza Università di Roma), Saverio Giulio Malatesta (Sapienza Università di Roma), Leonora Marzullo (Università Roma Tre), Maria Onori (Sapienza Università di Roma), Giorgio Ortolani (Università Roma Tre), Antonio Pugliano (Università Roma Tre) and Paolo Rosati (Sapienza Università di Roma)

Session 3.2 - Non-destructive Imaging Techniques for the Characterization of Cultural Heritage

Room: Aula B - Department of Mathematics and Physics

- 393 The Application of Reflectance Transformation Imaging (RTI) and Multispectral analysis on Ancient Egyptian Coffin-lids at the Israel Museum, Jerusalem: a New Analytic Approach to Workshop Identification**
Daniela Galazzo (University of Haifa), Shirly Ben Dor (University of Haifa) and Assaf Yasur-Landau (University of Haifa)
- 398 Active infrared thermography for the analysis of ancient books**
Giovanni Caruso (ISPC-CNR), Noemi Orazi (Università di Roma Tor Vergata), Stefano Paoloni (University of Rome "Tor Vergata"), Ugo Zammit (University of Rome "Tor Vergata") and Fulvio Mercuri (University of Rome "Tor Vergata")
- 403 Optical NDT supporting the restoration of a marble sculpture on the facade of the Gesù Nuovo church in Naples**
Massimo Rippa (ISASI-CNR), Vito Pagliarulo (ISASI-CNR), Chiara Saltarelli (University Suor Orsola Benincasa), Maria Rosaria Vigorito (University Suor Orsola Benincasa), Gianluca Coda (ISASI-CNR), Pasquale Mormile (ISASI-CNR), Andrea Carpentieri (University Suor Orsola Benincasa, UNINA) and Melania Paturzo (ISASI-CNR)
- 408 Development of a Quantitative Multimodal Imaging Technique for In-situ Study of Iron Archaeological Artefacts**
Elodie Granget (Haute Ecole Arc Conservation-Restauration Neuchâtel, HES-SO), Ocson Reginald Cocen (Haute Ecole Arc Conservation-Restauration Neuchâtel, HES-SO), Mahdieh Shakoorioskooie (Laboratory for Neutron Scattering and Imaging at the Paul Scherrer Institute), Zhan Qianru (Laboratory for Neutron Scattering and Imaging at the Paul Scherrer Institute), Marian Nida Lumongsod-Thompson (Tribology and Interfacial Chemistry (TIC) Group, SCI-STI-SM, Institute of Materials, EPFL), Anders Kaestner (Laboratory for Neutron Scattering and Imaging at the Paul Scherrer Institute), David Mannes (Laboratory for Neutron Scattering and Imaging at the Paul Scherrer Institute) and Laura Brambilla (Haute Ecole Arc Conservation-Restauration Neuchâtel, HES-SO)
- 414 Gellan gum hydrogels as such and ionic-liquid doped as modulable micro-invasive tools for cultural heritage studies**
Rocco Cancelliere (Department of Chemical Science and Technologies, University of Rome "Tor Vergata"), Leonardo Severini (Department of Chemical Science and Technologies, University of Rome "Tor Vergata"), Eleonora Kratter Thaler (Department of Chemistry, University of Milan), Claudia Mazzuca (Department of Chemical Science and Technologies, University of Rome "Tor Vergata"), Vittoria Guglielmi (Department of Chemistry, University of Milan), Patrizia Mussini (Patrizia Mussini) and Laura Micheli (Department of Chemical Science and Technologies, University of Rome "Tor Vergata")
- 419 Thermal texturing for ancient codes 4D exploration**
Noemi Orazi (Dip. Ingegneria Industriale, Università di Roma Tor Vergata), Eva Pietroni (ISPC-CNR), Fulvio Mercuri (Dip. Ingegneria Industriale, Università di Roma Tor Vergata), Daniele Ferdani (ISPC-CNR), Enzo D'Annibale (ISPC-CNR), Giovanni Caruso (ISPC-CNR), Diego Ronchi (ISPC-CNR), Stefano Paoloni (Dip. Ingegneria Industriale, Università di Roma Tor Vergata) and Ugo Zammit (Dip. Ingegneria Industriale, Università di Roma Tor Vergata)
- 424 Absolute dating of three ancient kilns excavated at Canosa di Puglia through archaeomagnetism**
Evdokia Tema (Dipartimento di Scienze della Terra) and Italo Maria Muntoni (Soprintendenza archeologia, belle arti e paesaggio per le province di Barletta-Andria-Trani e Foggia)

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

Room: Aula C - Department of Mathematics and Physics

- 429 3D metric Survey of the Mezzagnone Arab bath. From point clouds to 2D drawings and parametric model**
Alessandro Spadaro (Postgraduate School of Architectural Heritage and Landscape, Politecnico di Torino), Filiberto Chiabrando (Dep. Architecture and Design, Politecnico di Torino) and Lorenzo Teppati Losé (Dep. Architecture and Design, Politecnico di Torino)

- 435 **Comparison of two technologies in 3D surveying of Real Estate Assets and Cultural Heritage**
Giulia Fiorini (DICAM Alma Mater Studiorum University of Bologna – Department of Classic Sapienza University of Rome), Maria Alessandra Tini (DICAM Alma Mater Studiorum University of Bologna), Francesco Montelli (Operai dell'Arte APS) and Gabriele Bitelli (DICAM Alma Mater Studiorum University of Bologna)
- 441 **War-scapes testimonial gradient: a multi-criteria approach as a proactive tool for choosing future practices of enhancement**
Joel Aldrighettoni (Engineer, Architect, PhD), Barbara Marana (University of Bergamo) and Maria Grazia D'Urso (Department of Engineering and Applied Sciences, University of Bergamo)
- 447 **Unveiling the Hidden Past: exploring the historical evolution of Borbona (Rieti, Italy) through archaeological surveys and geophysical prospections**
Cecilia Giorgi (CNR ISPC), Marilena Cozzolino (Università del Molise), Vincenzo Gentile (Università del Molise) and Paolo Mauriello (Università del Molise)
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Session 3.4 - Inorganic, organic, and hybrid materials for the conservation and consolidation of cultural heritage

Room: Aula 1 - Department of Sciences

- 452 **Recycled bacterial nanocellulose membranes as novel green gels for the cleaning of cultural heritage surfaces**
Erica Sonaglia (Department of Chemical Engineering Materials and Environment, Sapienza University of Rome, Rome, Italy), Maria Paola Bracciale (Department of Chemical Engineering Materials and Environment, Sapienza University of Rome, Rome, Italy) and Maria Laura Santarelli (Department of Chemical Engineering Materials and Environment, Sapienza University of Rome, Rome, Italy)
- 457 **Cellulose ethers and nanoconsolidants: preliminary observations on the suitability of the use of cellulose derivatives in the synthesis of nanolime particles**
Penka Girginova (HERCULES Laboratory, University of Évora) and Cristina Galacho (HERCULES Laboratory & Chemistry and Biochemistry Department of School of Sciences and Technology, University of Évora)
- 462 **Electrochemistry and vibrational spectroscopy in investigation of protective coatings for bronze artworks**
Angelja Kjara Surca (National Institute of Chemistry, Hajdrihova 19, 1000 Ljubljana, Slovenia) and Mohor Mihelčič (National Institute of Chemistry, Hajdrihova 19, 1000 Ljubljana, Slovenia)
- 468 **Analysis of materials of wax Christ-children from the Monastery of Santa Rosa in Viterbo**
Arianna Ceci (University of Tuscia - DIBAF Dept.), Luca Lanteri (University of Tuscia - DEIM Dept.), Claudia Pelosi (University of Tuscia - DEIM Dept.), Paola Pogliani (University of Tuscia - DIBAF Dept.) and Sabrina Sottile (University of Tuscia - DIBAF Dept.)
- 474 **Novel, effective and safe coatings for the protection of copper-based artefacts**
Gabriella Di Carlo (CNR-ISMN)
- 479 **Synthesis of titania nanoparticles in W/O microemulsion: moving the production toward a green approach**
Eleonora Marconi (Istituto Nazionale di Fisica Nucleare) and Luca Tortora (Università Roma Tre)
- 485 **Monoazo and Isoindoline Yellow reactivity in presence of Pb, Ti, Zn-based white substrates**
Agnese De Carlo (Department of Science, Roma Tre University; National Institute for Nuclear Physics INFN.), Valerio Graziani (National Institute for Nuclear Physics INFN), Paolo Branchini (National Institute for Nuclear Physics INFN) and Luca Tortora (Department of Science, Roma Tre University; National Institute for Nuclear Physics INFN.)
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Session 3.5 - Non-Invasive Systems and Techniques for "On-Site" Monitoring and Diagnosis

Room: Aula 2 - Department of Sciences

- 491 **Handheld laser-induced breakdown spectroscopy, portable energy dispersive X-ray fluorescence spectroscopy and Graph Clustering applied to the identification and inner stratigraphy of archaeological metallic artifacts**
Giorgio Saverio Senesi (CNR - Istituto per la Scienza e Tecnologia dei Plasmi (ISTP) - Sede di Bari), Sara Mattiello (CNR - Istituto per la Scienza e Tecnologia dei Plasmi (ISTP) - Sede di Bari), Vincenzo Palleschi (CNR - Istituto di Chimica dei Composti Organo-Metallici (CNR-ICCOM), U.O.S. di Pisa), Bruno Cocciaro (CNR - Istituto di Chimica dei Composti Organo-Metallici (CNR-ICCOM), U.O.S. di Pisa), Girolamo Fiorentino (Laboratory of Archeobotany and Paleoecology, Department of Cultural Heritage, University of Salento) and Olga De Pascale (CNR - Istituto per la Scienza e Tecnologia dei Plasmi (ISTP) - Sede di Bari)
- 496 **Digitalization of Bernini's drawing Tondo depicting St. Joseph with the baby Jesus. Increasing knowledge and monitoring surface cracks**
Beatrice Calosso (ENEA), Marialuisa Mongelli (ENEA) and Sara Pettisano (Pisa University)
- 502 **In situ characterization of prehistoric rock paintings: the Côa Valley (Portugal)**
Jose Santiago Pozo Antonio (Universidade de Vigo), Teresa Rivas (Universidade de Vigo), Pablo Barreiro (Universidade de Vigo), Vera Caetano (University of Coimbra), Fernando Carrera (Rock Art Conservation and Management) and Lara Bacelar Alves (University of Coimbra)
- 508 **Preventive conservation plan for a group of bronze sculptures from the Gori Art Collection**
Sara Croci (Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy), Leila Es Sebar (Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy), Caterina Gori (Collezione Gori, Fattoria di Celle, Santomato, Pistoia, Italy), Leonardo Iannucci (Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy), Emma Angelini (Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy) and Sabrina Grassini (Department of Applied Science and Technology, Politecnico di Torino, Turin, Italy)
- 514 **Processing of shaking table test data of a historic masonry structure by graph-based methods**
Vincenzo Fioriti (ENEA), Antonino Cataldo (ENEA), Alessandro Colucci (ENEA), Chiara Ormando (ENEA), Fernando Saitta (ENEA), Domenico Palumbo (ENEA) and Ivan Roselli (ENEA)

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

Room: Department of Engineering DIEM - Sala Conferenze

- 520 **Phyigital sculptures for archaeological dissemination: The head of Sant'Elena**
Michele Russo (History, Representation and Restoration of Architecture, Sapienza University of Rome), Luca James Senatore (History, Representation and Restoration of Architecture, Sapienza University of Rome), Raffaella Giuliani (Pontificia Commissione di Archeologia Sacra) and Rocco Bochicchio (Soprintendenza Speciale Archeologia, Belle Arti e Paesaggio di Roma)
- 526 **Multi-technique approach to unveil the composition, fabrication, and potential provenance of a unique pre-Roman glass collection (IV-I BC)**
Suset Barroso-Solares (University of Valladolid), Estefania Estalayo (Department of Analytical Chemistry, University of the Basque Country (UPV/EHU)), Elvira Rodriguez-Gutierrez (University of Valladolid), Violeta Hurtado-Garcia (University of Valladolid), Ricardo Vicente-Rojas (University of Valladolid), Oscar Fadon (University of Valladolid), Julene Aramendia (Department of Analytical Chemistry, University of the Basque Country (UPV/EHU)), Jose Carlos Coria-Noguera (Centro de Estudios Vacceos "Federico Wattenberg", Faculty of Philosophy and Literature, University of Valladolid), Quentin Lemasson (Centre de Recherche et de Restauration des Musées de France, C2RMF), Claire Pacheco (Centre de Recherche et de Restauration des Musées de France, C2RMF), Angel Carmelo Prieto (University of Valladolid), Carlos Sanz-Minguez (Centro de Estudios Vacceos "Federico Wattenberg", University of Valladolid, Valladolid, Spain), Juan Manuel Madariaga (Department of Analytical Chemistry, University of the Basque Country (UPV/EHU), Bilbao, Spain) and Javier Pinto (University of Valladolid)
- 532 **The ancient Stone Ship. Integrated investigations on the original morphology of the Tiber Island, between legend and material consistency**
Emanuela Chiavoni (Università Sapienza di Roma), Francesca Porfiri (Università Sapienza di Roma) and Gaia Lisa Tacchi (Università Sapienza di Roma)
- 537 **Survey and analysis of the Fossanova Abbey**
Roberto Barni (Sapienza Dipartimento di storia disegno e restauro dell'architettura) and Carlo Inglese (Sapienza Dipartimento di storia disegno e restauro dell'architettura)

543 Integrated survey for the modeling of complex environments. La Grotta di San Michele Arcangelo a Olevano sul Tusciano, Salerno

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

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

Room: Aula B - Department of Mathematics and Physics

549 Characterization of Roman Amphora Sherds Using Terahertz Time-of-Flight Tomography

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

554 Terahertz imaging super-resolution for documental heritage

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

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

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

564 Terahertz Identification of Characters Written in Iron-Gall Ink on Stacked Paper

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

570 A THz Scanner to Detect Moisture on Wood Samples

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

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

Room: Aula C - Department of Mathematics and Physics

576 IAEA fosters the development and applications of accelerator-based analytical techniques for Heritage Science

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

581 Morphological Analysis of the Kheireddine Palace converted into the Museum of Tunis City

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

- 587 **The Role of Photogrammetry in the Conservation Management of Al Mahatta Museum, Sharjah, UAE**
Ahmad Badr Aldin Fattal (University of Sharjah), Rami Al-Ruzouq (University of Sharjah) and Eslam Nofal (University of Sharjah)
- 593 **LONG-LASTING METHODS TO PREVENT BIODETERIORATION OF STONE MONUMENTS: NEW SILICA NANOSYSTEM COUPLED TO NATURAL BIOCIDES**
Flavia Bartoli (Institute of Heritage Science (CNR-ISPC), Italy.), Zohreh Hosseini (Department of Sciences, University of Roma Tre, Italy.), Alma Kumbaric (Department of Sciences, University of Roma Tre, Italy.) and Giulia Caneva (Department of Sciences, University of Roma Tre, Italy.)
- 598 **Microwave transducers for moisture content characterization of cultural heritage materials**
Giovanni Gugliandolo (University of Messina), Alessio Altadonna (University of Messina), Adriana Arena (University of Messina), Marina Arena (University of Messina), Luigi Calabrese (University of Messina), Giuseppe Campobello (University of Messina), Giovanni Crupi (University of Messina), Daniela Iannazzo (University of Messina), Francesca Passalacqua (University of Messina), Fabio Todesco (University of Messina), Maria Gabriella Xibilia (University of Messina) and Nicola Donato (University of Messina)

Session 4.4 - Advancement in surface treatments and analyses in the field of conservation science
Room: Aula 1 - Department of Sciences

- 603 **Monitoring of protective products on Peperino stone using portable devices**
Giuseppe Capobianco (Università Sapienza Ingegneria Materiali e Materie prime), Claudia Pelosi (University of Tuscia - DEIM Dept.), Luca Lanteri (University of Tuscia - DEIM Dept.), Giuseppe Bonifazi (DICMA Sapienza - University of Rome), Oriana Trotta (DICMA Sapienza - University of Rome) and Silvia Serranti (DICMA Sapienza - University of Rome)
- 609 **The use of micaceous pigments for the chromatic reintegration of the gilded stuccoes in the Lante della Rovere chapel of Palazzo Orsini at Bomarzo**
Elena Testa (University of Tuscia - DIBAF Dept.), Luca Lanteri (University of Tuscia - DEIM Dept.), Giuseppe Capobianco (Sapienza - University of Rome), Giuseppe Bonifazi (Sapienza - University of Rome), Silvia Serranti (Sapienza - University of Rome), Francesca Montozzi (University of Tuscia - DIBAF Dept.), Paola Pogliani (University of Tuscia - DIBAF Dept.) and Claudia Pelosi (University of Tuscia - DEIM Dept.)
- 615 **Nano-hydroxyapatite for the conservation of Serena stone**
Maduka Lankani Weththimuni (Department of Chemistry, University of Pavia), Giacomo Fiocco (Arvedi Laboratory of Non-Invasive Diagnostics, CISRiC, University of Pavia), Francesca Volpi (Department of Musicology and Cultural Heritage, University of Pavia), Marco Malagodi (Department of Musicology and Cultural Heritage, University of Pavia) and Maurizio Licchelli (Department of Chemistry, University of Pavia)
- 620 **Unveiling Hidden Insights of Ancient Roman wall paintings in Cremona: In-Depth Knowledge Beyond the Surface with Spectroscopic Analysis**
Francesca Volpi (University of Pavia), Michela Albano (University of Pavia), Giacomo Fiocco (University of Pavia), Maduka Weththimuni (University of Pavia) and Marco Malagodi (University of Pavia)
- 625 **The Roman mosaic in the Nymphaeum of Villa Giulia in Rome. Characterization of the deteriorogen agents and preliminary experimentation of eco-sustainable products**
Miriam Lamonaca (Museo Nazionale Etrusco di Villa Giulia)

Session 4.5 - Microclimate for Cultural Heritage: Conservation in Indoor Environments
Room: Aula 2 - Department of Sciences

- 631 **Indoor Climate Characterisation of the Quarantine Room of NTNU University Library**
Giulia Boccacci (Department of Earth Sciences, Sapienza University of Rome), Francesca Frasca (Department of Physics, Sapienza University of Rome), Chiara Bertolin (Department of Mechanical and Industrial Engineering, Norwegian University of Science and Technology), Claudio Chimenti (Department of Biology and Biotechnologies "Charles Darwin", Sapienza University of Rome), Erlend Lund (Library Section for Collections, Resources and Digital Services, NTNU University Library), Tonje Dahlin Sæter (Library Section for Collections, Resources and Digital Services, NTNU University Library) and Anna Maria Siani (Department of Physics, Sapienza University of Rome)

- 637 Environmental tendency from the retrofit to current time: a case study in Rome, Italy**
Beatrice Bartolucci (Department of Earth Science, Sapienza University of Rome (Italy)), Francesca Frasca (Department of Physics, Sapienza University of Rome (Italy)), Chiara Bertolin (Department of Mechanical and Industrial Engineering, Norwegian University of Science and Technology (Trondheim, Norway)), Gabriele Favero (Department of Environmental Biology, Sapienza University of Rome (Italy)) and Anna Maria Siani (Department of Physics, Sapienza University of Rome (Italy))
- 643 Cluster Analysis to identify Microclimate Patterns in a Multi-room Film Archive**
Lisa Vergelli (Sapienza Università di Roma), Francesca Frasca (Sapienza Università di Roma), Chiara Bertolin (Norwegian University of Science and Technology, Trondheim, Norway, Dept. of Mechanical and Industrial Engineering), Gabriele Favero (Sapienza Università di Roma) and Anna Maria Siani (Sapienza Università di Roma)
- 648 The diagnostic study of the plaster casts of the Trajan's Column in the Museum of Roman Civilisation (Rome)**
Lisa Vergelli (Sapienza Università di Roma), Francesca Frasca (Sapienza Università di Roma), Chiara Bertolin (Norwegian University of Science and Technology, Trondheim, Norway, Dept. of Mechanical and Industrial Engineering), Gabriele Favero (Sapienza Università di Roma) and Anna Maria Siani (Sapienza Università di Roma)

Saturday, October 21

Session 5.1 - How do we measure scientific reliability? Semantic approaches and software solutions for 3D virtual reconstruction in archaeology

Room: Aula 1 - Department of Sciences

- 653 Documentation and Evaluation of Virtual Reconstructions**
Marc Grellert (Technische Universität Darmstadt, FG Digitales Gestalten), Markus Wacker (HTW Dresden, Fakultät Informatik/Mathematik), Jonas Bruschke (HTW Dresden, Fakultät Informatik/Mathematik), Wolfgang Stille (Technische Universität Darmstadt, hessian.ai) and Daniel Beck (Technische Universität Darmstadt, hessian.ai)
- 659 Reconstruction beyond Representation in Notre-Dame de Paris**
Anais Guillem (UMR 3495 MODÈLES ET SIMULATIONS POUR L'ARCHITECTURE ET LE PATRIMOINE CNRS), Antoine Gros (UMR 3495 MODÈLES ET SIMULATIONS POUR L'ARCHITECTURE ET LE PATRIMOINE CNRS), Abergel Violette (UMR 3495 MODÈLES ET SIMULATIONS POUR L'ARCHITECTURE ET LE PATRIMOINE CNRS) and Livio De Luca (UMR 3495 MODÈLES ET SIMULATIONS POUR L'ARCHITECTURE ET LE PATRIMOINE CNRS)
- 665 Virtual Reconstruction as a Scientific Inquiry Tool: the Late Antique Wall of Aquileia (M2) Using the Extended Matrix**
Nicola Delbarba (Università degli Studi di Verona)
- 671 A new section of the Extended Matrix methodology: Transformation Stratigraphic Unit (TSU)**
Eleonora Scopinaro (Institute of Heritage Science, National Research Council of Italy (ISPC-CNR)), Simone Berto (Institute of Heritage Science, National Research Council of Italy (ISPC-CNR)) and Emanuel Demetrescu (Institute of Heritage Science, National Research Council of Italy (ISPC-CNR))
- 677 A Landscape Matrix: the EM tool for the analysis of the via Appia**
Matteo Lombardi (Università degli Studi di Ferrara)
- 682 "Building and reconstructing contexts". Interdisciplinary approach to the enhancement of Phoenician-Punic archaeological elements exhibited in the Museum of Cádiz (SW, Spain)**
Pablo Sicre-González (Universidad de Cádiz - Grupo de Investigación HUM509), Ana María Niveau-de-Villedary Y Mariñas (Universidad de Cádiz - Grupo de Investigación HUM509), Juan Ignacio Vallejo Sánchez (Museo Provincial de Cádiz, Junta de Andalucía – Grupo de Investigación HUM509) and María Auxiliadora Llamas Márquez (Museo Provincial de Cádiz, Junta de Andalucía, Cádiz)

- 688 **The Virtual Recreation of Mani's Auto de Fe (1562): Methodology and Approach to an Historical Event**
Antonio Rodríguez Alcalá (Universidad Anahuac Mayab), John F. Chuchiak IV (Missouri State University), Zoraida Raimúndez Ares (Universidad Complutense de Madrid), Maria Felicia Rega (Sapienza Università di Roma), Luis Díaz de León (Universidad Autónoma de Yucatán) and Hans B. Erikson (Missouri State University)
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Session 5.2 - Nuclear Techniques for Cultural Heritage

Room: Aula 3 - Department of Sciences

- 694 **When a painting is a history on the rock. A methodological approach to rock art studies through the case of El Alto-Ancasti's Mountain**
Lucas Ignacio Gheco (Centro de Estudios sobre Patrimonios y Ambiente (CEPyA), EAYP-EHyS.)
- 699 **An innovative neutron spectroscopic imaging technique: mapping the elements distribution inside the bulk of archaeological artefacts**
Giulia Marcucci (Dipartimento di Fisica "G. Occhialini", Università degli Studi di Milano Bicocca and INFN, Sezione di Milano Bicocca), Antonella Scherillo (ISIS Neutron and Muon Source, Didcot, UK), Maria Pia Riccardi (Dip. di Scienze della Terra e dell'Ambiente and Arvedi Laboratorio, Università degli Studi di Pavia), Costanza Cucini (Laboratoire "Métallurgies et Cultures" CNRS, IRAMAT, Université de Technologie Belfort Montbéliard), Marco Tizzoni (Laboratoire "Métallurgies et Cultures" CNRS, IRAMAT, Université de Technologie Belfort Montbéliard) and Daniela Di Martino (Dipartimento di Fisica "G. Occhialini", Università degli Studi di Milano Bicocca and INFN, Sezione di Milano Bicocca)
- 704 **Quantitative criteria to configure and characterise portable X-ray fluorescence spectrometers**
Eleni Konstantakopoulou (Polytechnic School, Aristotle University of Thessaloniki), Annalaura Casanova Muncchia (Consiglio Nazionale delle Ricerche Istituto di Scienze del Patrimonio Culturale (CNR-ISPC)), Roberto Ferretti (Department of Mathematics and Physics, Roma Tre University), Simone Porcinai (Ministero della Cultura Opificio delle Pietre Dure) and Marco Ferretti (Consiglio Nazionale delle Ricerche Istituto di Scienze del Patrimonio Culturale (CNR-ISPC))
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Session 5.3 - Organic components in archaeological findings and works of art: current challenges in their identification and characterization

Room: Aula 4 - Department of Sciences

- 709 **Proteomics and spectroscopic analyses for the molecular characterization of collagen-based animal glues**
Georgia Ntasi (University of Naples Federico II, Department of Chemical Sciences), Brunella Cipolletta (University of Naples Federico II, Department of Chemical Sciences), Carmen Aprea (University of Naples Federico II, Department of Chemical Sciences), Laura Dello Ioio (Dello Ioio Restauri, Vico Equense, Naples), Celia Duce (University of Pisa, Department of Chemistry and Industrial Chemistry), Emanuele Crisci (University of Pisa, Department of Chemistry and Industrial Chemistry), Emilia Bramanti (CNR Pisa, Institute of Chemistry of Organo Metallic Compounds), Alessandro Vergara (University of Naples Federico II, Department of Chemical Sciences), Ilaria Bonaduce (University of Pisa, Department of Chemistry and Industrial Chemistry) and Leila Birolo (University of Naples Federico II, Department of Chemical Sciences)
- 714 **A pre-restoration minero-petrographic, chemical and microbiological analysis of the sculpture "Real Infante Carlo Tito di Borbone"**
Piergiulio Cappelletti (Dip. di Scienze della Terra, dell'Ambiente e delle Risorse, Università degli Studi di Napoli Federico II), Francesco Izzo (Dip. di Scienze della Terra, dell'Ambiente e delle Risorse, Università degli Studi di Napoli Federico II), Concetta Rispoli (Dip. di Scienze della Terra, dell'Ambiente e delle Risorse, Università degli Studi di Napoli Federico II), Antonino Pollio (Dip. di Biologia, Università degli Studi di Napoli Federico II), Antonino De Natale (Dip. di Biologia, Università degli Studi di Napoli Federico II), Mariagioia Petraretti (Dip. di Biologia, Università degli Studi di Napoli Federico II), Andrea Carpentieri (Dip. di Scienze Chimiche, Università degli Studi di Napoli Federico II), Leila Birolo (Dip. di Scienze Chimiche, Università degli Studi di Napoli Federico II), Giarita Ferraro (Dip. di Scienze Chimiche, Università degli Studi di Napoli Federico II), Anna Manzone (Restoration Laboratory, Royal Palace of Caserta, of the Ministry of Culture) and Alessandro Vergara (Dip. di Scienze Chimiche, Università degli Studi di Napoli Federico II)

- 719 Wine production and consumption in context: organic residue analysis in the so-called thermopolium V 4, 6-8 at Pompeii**
Alessandra Pecci (ERAAUB, IAUB, INSA-UB, UNIVERSITAT DE BARCELONA), Simona Mileto (ERAAUB, Universitat de Barcelona), Silvia Ritondale (Scuola Interateneo di Specializzazione in Beni Archeologici - SISBA - DISU), Valeria Amoretti (Parco Archeologico di Pompei), Luana Toniolo (Parco Archeologico di Pompei) and Daniela Cottica (Università Ca' Foscari Venezia, Dipartimento di Studi Umanistici)
- 725 The challenge of extracting proteins from potteries**
Brunella Cipolletta (Department of Chemical Sciences, University of Naples Federico II, Naples, Italy), Myriam Fiore (Department of Chemical Sciences, University of Naples Federico II, Naples, Italy), Georgia Ntasi (Department of Chemical Sciences, University of Naples Federico II, Naples, Italy), Massimo Botto (National Research Council of Italy (CNR), Institute of Heritage Sciences (ISPC)), Leila Birolo (Department of Chemical Sciences, University of Naples Federico II, Naples, Italy) and Livia Tirabassi (Department of Archaeology, Ghent University, Ghent, Belgium)
- 730 INTERPRETING SOILS. ARCHAEOLOGY AND CHEMICAL ANALYSIS: ORGÈRES SITE (LA THUILE, AO - ITALY)**
Chiara Maria Lebole (Università di Torino, Dipartimento di Studi Storici), Giorgio Di Gangi (Università di Torino, Dipartimento di Studi Storici), Gabriele Sartorio (Ufficio archeologia, didattica e valorizzazione, Regione Autonoma Valle d'Aosta), Marco Ginepro (Dipartimento di Chimica, Università di Torino) and Giulia Costamagna (Dipartimento di Chimica, Università di Torino)

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

Room: Aula 6 - Department of Sciences

- 736 Archaeometric investigations on ancient funerary stone elements from the National Archaeological Museum of Adria (Rovigo, Italy)**
Simone Dilaria (Department of Cultural Heritage, University of Padova), Luigi Germinario (Department of Geosciences, University of Padova), Chiara Giroto (Department of Cultural Heritage, University of Padova), Claudio Mazzoli (Department of Geosciences, University of Padova), Caterina Previato (Department of Cultural Heritage, University of Padova), Giovanna Falezza (Soprintendenza archeologia, belle arti e paesaggio per le province di Verona, Rovigo e Vicenza), Alberta Facchi (Museo Archeologico Nazionale di Adria (RO), Polo museale del Veneto) and Jacopo Bonetto (Department of Cultural Heritage, University of Padova)
- 742 Study and restoration of the Sacra Conversazione by Lorenzo Berrettini and experimental tests to evaluate the application of diammonium phosphate as consolidant for the wall painting**
Antonio Paucecch (University of Tuscia - DIBAF Dept.), Luca Lanteri (University of Tuscia - DEIM Dept.), Francesca Montozzi (University of Tuscia - DIBAF Dept.), Paola Pogliani (University of Tuscia - DIBAF Dept.) and Claudia Pelosi (University of Tuscia - DEIM Dept.)
- 748 From the context knowledge to Assessment of the Architectural Heritage decay: the case of Santa Maria di Vezzolano rectory (AT)**
Francesca Alberghina (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria), Valentina Barberis (Regional Directorate of Piedmont Museums, Ministry of Culture), Patrizia Capizzi (Department of Earth and Marine Sciences (DiSTeM), University of Palermo), Giulia Comello (Regional Directorate of Piedmont Museums, Ministry of Culture), Giuseppe Milazzo (Regional Directorate of Piedmont Museums, Ministry of Culture), Luciana Randazzo (Department of Earth and Marine Sciences (DiSTeM), University of Palermo) and Salvatore Schiavone (S.T.Art-Test di S. Schiavone & C sas)
- 753 Surface and stratigraphic analysis of black crusts using Laser Induced Breakdown Spectroscopy**
Andrea Bergomi (University of Milan), Valeria Comite (University of Milan), Cristina Della Pina (University of Milan), Paula Maria Carmona Quiroga (Istituto de Química Física Rocasolano), Laura Maestro-Guijarro (Istituto de Química Física Rocasolano), Mohamed Oujja (Istituto de Química Física Rocasolano), Ana Crespo Ibanez (Istituto de Estructura de la Materia), Chiara Andrea Lombardi (University of Milan), Mattia Borelli (University of Milan), Marta Castillejo (Istituto de Química Física Rocasolano) and Paola Fermo (University of Milan)

- 758 Promising surface-active ionic liquid coatings for underwater cultural heritage conservation**
Marika Luci (University of Messina and Stazione zoologica Anton Dohrn - Calabria Marine Centre), Filomena De Leo (University of Messina), Clara Urzì (University of Messina), Christian Galasso (Stazione zoologica Anton Dohrn - Calabria Marine Centre), Nadia Ruocco (Stazione zoologica Anton Dohrn - Calabria Marine Centre), Donatella De Pascale (Stazione zoologica Anton Dohrn), Sandra Lo Schiavo (University of Messina), Michela Ricca (University of Calabria), Silvestro Antonio Ruffolo (University of Calabria) and Mauro Francesco La Russa (University of Calabria)
- 763 Decay assessment approach of building stones from cultural heritage in freshwater reservoirs**
Ada Saez (Instituto de Geociencias - CSIC Spanish Research Council and UCM Complutense University of Madrid), Natalia Perez-Ema (Instituto de Geociencias - CSIC Spanish Research Council and UCM Complutense University of Madrid) and Monica Alvarez de Burgo (Instituto de Geociencias - CSIC Spanish Research Council and UCM Complutense University of Madrid)
- 769 Preliminary assessment of wave energy hazards in a shallow underwater water cultural heritage site**
George Alexandrakis (Coastal & Marine Research Lab, Foundation for Research and Technology - Hellas), Stelios Petrakis (Institute of Oceanography, Hellenic Centre for Marine Research (HCMR)) and Nikolaos Kampanis (Coastal & Marine Research Lab, Foundation for Research and Technology - Hellas)

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

Room: Aula 7 - Department of Sciences

- 774 Cultural heritage safeguard through multi-parameter air quality monitoring**
Mattia Borelli (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia), Andrea Bergomi (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia), Valeria Comite (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia), Vittoria Guglielmi (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia), Chiara Andrea Lombardi (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia), Maria Grazia Perrone (XEArPro Srl., Via delle Primule, 16, 20815, Cogliate (MB), Italia) and Paola Fermo (Dipartimento di Chimica, Università degli Studi di Milano, Via Golgi, 19, 20133, Milano, Italia)
- 779 Air quality assessment in cultural heritage: the case study of the Amalfi Cathedral (Amalfi, Salerno, Italy)**
Daniele Sofia (DIIN-Department of Industrial Engineering, University of Salerno), Maria Ricciardi (DCB – Department of Chemistry and Biology, University of Salerno), Oriana Motta (Department of Medicine and Surgery, University of Salerno) and Antonio Proto (DCB – Department of Chemistry and Biology, University of Salerno)
- 785 Protecting Art and People: Environmental Monitoring of Beata Vergine dei Miracoli Sanctuary for Health and Heritage Conservation**
Antonio Spagnuolo (Energreenup srl), Andrea Bergomi (Department of Chemistry, University of Milan), Carmela Vetromile (Energreenup srl), Antonio Masiello (Energreenup srl), Noemi Mantile (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, University of Campania), Mattia Borelli (Department of Chemistry, University of Milan), Chiara Andrea Lombardi (Department of Chemistry, University of Milan), Valeria Comite (Department of Chemistry, University of Milan), Paola Fermo (Department of Chemistry, University of Milan) and Carmine Lubritto (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, University of Campania)
- 790 Preventive conservation of the pictorial evidence in the church of Sotterra (Paola, Italy): a microclimatic investigation in a hypogean environment**
Maria Antonietta Zicarelli (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria), Michela Ricca (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria), Silvestro Antonio Ruffolo (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria), Raffaella Greca (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria) and Mauro Francesco La Russa (Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria)

796 A metrological approach to the study of ancient architecture. The cases of the Grotta dell'Arsenale and the villas of Gradola and Damecuta in Capri

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

802 Investigation on a prototype integrated system for strengthening and monitoring architectural heritage

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

Session 6.1 - Size matters. High-resolution survey of small artifacts: acquisition strategies and methodologies, level of detail, dissemination - Artificial Intelligence for Cultural Heritage: Tools and applications

Room: Aula 1 - Department of Sciences

808 The Dynamic Collections project: providing structured online access to digital replicas

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

813 The survey of the "precious one of Constance". Tools and techniques for three-dimensional restitution of complex surfaces at sub-millimetre resolution

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

819 Ponte San Lorenzo, a case study for the comparison of image-based survey tools. NeRF as an alternative to photogrammetry

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

824 A deep learning experiment for semantic segmentation of overlapping characters in palimpsests

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

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

Room: Aula 3 - Department of Sciences

829 Revealing and unveiling the polychromy of the Camponeschi Monument in L'Aquila

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

835 A natural resins reference collection to identify organic compounds in archaeological samples

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

840 Alpine archaeology and everyday life at high altitudes: from the excavation to the laboratory (Orgères-La Thuile, AO, Italy)

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

845 Scribes and Writing Practices in Egypt's Ala Veterana Gallica: A Preliminary Study of Inks from a Military Roll

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

851 Leafing through time: Ink Analysis of the longest Qur'ān on Papyrus

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

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

Room: Aula 4 - Department of Sciences

856 XRF investigation of the Monument to the Fallen of the Great War by Francesco Jerace in San Ferdinando (Reggio Calabria, Italy)

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

861 X-ray fluorescence analysis of bronze sculptures by Giuseppe Renda

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

866 Assessment of the natural radioactivity content in typical building materials employed in the Italian cultural heritage

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

871 Monitoring of indoor Radon in historical heritage buildings by means of passive and active methods. A case study

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

876 Radioactivity content in construction materials of assets of particular historical-artistic interest

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

881 Thermoluminescence dating of historical buildings as a tool for assessing natural radioactivity risk

Rosaria Galvagno (Department of Physics and Astronomy "E. Majorana", University of Catania, Via S. Sofia 64, 95123 Catania, Italy), Alessia D'Anna (Department of Physics and Astronomy "E. Majorana", University of Catania, Via S. Sofia 64, 95123 Catania, Italy), Anna Maria Gueli (Department of Physics and Astronomy "E. Majorana", University of Catania, Via S. Sofia 64, 95123 Catania, Italy), Giuseppe Politi (Department of Physics and Astronomy "E. Majorana", University of Catania, Via S. Sofia 64, 95123 Catania, Italy) and Giuseppe Stella (Department of Physics and Astronomy "E. Majorana", University of Catania, Via S. Sofia 64, 95123 Catania, Italy)

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

Room: Aula 6 - Department of Sciences

- 886 Geophysical and geoarchaeological investigations in the Submerged Archaeological Park of Baia (south Italy)**
Crescenzo Violante (Institute of Cultural Heritage ISPC-CNR), Enrico Gallochio (Phlegraean Fields Archaeological Park (PAFLEG), Palazzo de Fraja - Pozzuoli (NA)), Fabio Pagano (Phlegraean Fields Archaeological Park (PAFLEG), Palazzo de Fraja - Pozzuoli (NA)) and Nikos Papadopoulos (Institute for Mediterranean Studies, Foundation for Research and Technology, Nikiforou Foka 130, Rethymno)
- 892 iblueCulture – An Innovative Underwater Cultural Heritage Real-Time Streaming System In A Virtual Reality Environment**
Apostolos Vlachos (Information Technologies Institute Centre for Research and Technology Hellas), Stelios Krinidis (Information Technologies Institute Centre for Research and Technology Hellas), Kimon Papadimitriou (Aristotle University of Thessaloniki), Aggelos Manglis (Skopelos Dive Centre, Atlantis Consulting S.A.), Anastasia Fourkiotou (Atlantis Consulting S.A.) and Dimitrios Tzovaras (Information Technologies Institute Centre for Research and Technology Hellas)
- 897 Marine remote sensing and photogrammetric survey of an UCH site: A cluster of cannons in the SW Gulf of Patras, Greece**
Alexandros Labrianidis (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Elias Fakiris (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Georgiou Nikos (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Dimitris Christodoulou (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Xenophon Dimas (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Maria Geraga (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Nikos Mavrommatis (Intelligent Machines P.C., Ag. Paraskevis, 26504, Patras, Greece) and George Papatheodorou (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras)
- 903 A low cost Unmanned Surface Vehicle for mapping shallow-water UCH sites: Ancient and historical shipwrecks in Methoni bay, Greece**
Vasileios Giannakopoulos (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), George Papatheodorou (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Dimitris Christodoulou (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Elias Fakiris (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Maria Geraga (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Panagiotis Gkionis (Laboratory of Marine Geology and Physical Oceanography, Dept. Geology, University of Patras), Nikos Mavrommatis (Intelligent Machines P.C., Ag. Paraskevis, 26504, Patras, Greece) and Thomas Levy (Center for Cyber-Archaeology and Sustainability, Qualcomm Institute, University of California)
- 908 Coastal and shallow marine geophysical investigations in the Roman site of Baia in Naples, Italy**
Nikos Papadopoulos (GeoSat Lab, IMS-FORTH), Crescenzo Violante (Institute of Heritage Science), Dimitrios Oikonomou (GeoSat Lab, IMS-FORTH) and George Kritikakis (Technical University of Crete, School)
- 913 Archaeological predictive modelling in underwater contexts. Utility and challenges**
Manuela Ritondale (University of Groningen)
- 918 Combining acoustic and optical cameras onboard an ROV as a detection and expertise tool for underwater preventive archaeology: a case study off Marseilles (France)**
Souen Fontaine (Institut National de Recherches Archéologiques Préventives), Alex Sabastia (Institut National de Recherches Archéologiques Préventives), Jérôme Sialelli (Copetech SM), Denis Dégez (Département des Recherches Archéologiques Subaquatiques et Sous-Marines), Alexis Rochat (Département des Recherches Archéologiques Subaquatiques et Sous-Marines) and Marine Sadania (Département des Recherches Archéologiques Subaquatiques et Sous-Marines)

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

Room: Aula 7 - Department of Sciences

- 923 **Garden heritage and tourism: present and future of Madeira Island as a garden destination**
Susana Silva (University of Coimbra, CEGOT – Centre of Studies in Geography and Spatial Planning, Faculty of Arts and Humanities) and Paulo Carvalho (University of Coimbra, CEGOT – Centre of Studies in Geography and Spatial Planning, Faculty of Arts and Humanities)
- 928 **Preserving and valuing historic gardens: an analysis of projects under the Portugal 2020 investment framework (2014-2020)**
Susana Silva (University of Coimbra, CEGOT – Centre of Studies in Geography and Spatial Planning, Faculty of Arts and Humanities) and Paulo Carvalho (University of Coimbra, CEGOT – Centre of Studies in Geography and Spatial Planning, Faculty of Arts and Humanities)
- 934 **Identification of plant elements represented in the suburban Villa della Piscina di Centocelle (Rome, Italy) as a source of reconstruction of the ancient gardens**
Alma Kumbaric (Roma Tre University), Flavia Bartoli (ISPC-CNR), Zohreh Hosseini (Roma Tre University) and Giulia Caneva (Roma Tre University)
- 940 **The Fathers' cell gardens of the Charterhouse of Calci-Pisa in Tuscany (Central Italy): pollen and multidisciplinary reconstruction**
Eleonora Clò (Università degli Studi di Modena e Reggio Emilia), Gabriele Gattiglia (Università di Pisa), Eleonora Rattighieri (Università degli Studi di Modena e Reggio Emilia), Francesca Anichini (Università di Pisa), Antonio Campus (Università di Pisa), Marta Rossi (Università degli Studi di Siena), Mauro Buonincontri (Università degli Studi di Siena) and Anna Maria Mercuri (Università degli Studi di Modena e Reggio Emilia)

POSTER SESSION 2

Room: Department of Sciences

- 946 **Acoustic characteristics and defects of adhesion of ancient construction materials using the PICUS system**
Francesca Mariani (Università della Tuscia), Giosuè Caliano (Università Roma Tre), Stefano De Angeli (Università della Tuscia) and Pogliani Paola (Università della Tuscia)
- 951 **The Via Severiana and its Representation in the Tabula Peutingeriana**
Enrico Petritoli (Dipartimento di Scienze - Università degli Studi "Roma Tre") and Fabio Leccese (Dipartimento di Scienze - Università degli Studi "Roma Tre")
- 956 **First results of plant processing on ground stone tools: phytolith evidence and GC-MS from archaic Messapian settlements - San Vito dei Normanni and Cavallino (Puglia, Italy)**
Gaia Sabetta (Università del Salento), Grazia Semeraro (Università del Salento), Florinda Notarstefano (Università del Salento) and Marta Portillo (Archaeology of Social Dynamics (2021SGR 501), IMF - CSIC)
- 962 **Isotopic analysis of black crust samples from the Monza Cathedral (Italy): a preliminary study**
Maria Ricciardi (Department of Chemistry and Biology, University of Salerno), Valeria Comite (Department of Chemistry, University of Milan), Andrea Bergomi (Department of Chemistry, University of Milan), Chiara Andrea Lombardi (Department of Chemistry, University of Milan), Paola Fermo (Department of Chemistry, University of Milan), Antonio Faggiano (Department of Chemistry and Biology, University of Salerno), Antonino Fiorentino (Department of Chemistry and Biology, University of Salerno), Concetta Pironti (Department of Medicine and Surgery, University of Salerno), Luana Bontempo (Fondazione Edmund Mach, Research and Innovation Center, Food Quality and Nutrition Department), Federica Camin (Fondazione Edmund Mach, Research and Innovation Center, Food Quality and Nutrition Department), Oriana Motta (Department of Medicine and Surgery, University of Salerno) and Antonio Proto (Department of Chemistry and Biology, University of Salerno)
- 967 **Diagnostic study and efficiency evaluation of treatments against rising damp and salts crystallization in ornamental stones: the case of the green stone sacristy washbasin in the Church of San Domenico in Cosenza (Calabria, Italy)**
Michela Ricca (University of Calabria)
- 972 **GP-NEP: a prototype of an assistant for non-experts in photogrammetric survey**
Luisa Ammirati (Alma Mater Studiorum University of Bologna), Bianca Magliocchetti (Sapienza University of Rome), Simone Berto (Institute of Heritage Science, National Research Council) and Emanuel Demetrescu (Institute of Heritage Science, National Research Council)

- 978 New green solvents for cleaning and conservation of Cultural Heritage: Deep Eutectic Solvents (DESs)**
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- 984 Diagnostic investigation on a Sorel and Portland cement boiserie at Palazzo Fizzarotti (1850-1908, Bari)**
Liano Marica (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro), Tiziana E. De Lillo (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro), Annarosa Mangone (Department of Chemistry, University of Bari Aldo Moro), Alessandro Monno (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro), Rocco Laviano (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro), Stefano Roascio (Parco Archeologico dell'Appia Antica, Ministero della Cultura, Roma), Giocchino Tempesta (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro) and Giacomo Eramo (Department of Earth and Geoenvironmental Sciences, University of Bari Aldo Moro)
- 990 Preliminary investigations of the action of nanostructured materials for the conservation of fresco paintings in high-humid environments**
Chiara Tuccio (University of Palermo), Francesco Armetta (University of Palermo) and Maria Luisa Saladino (University of Palermo)
- 994 Study of historical mortars from the Roman villa of Frielas (Loures, Portugal)**
Tanzil Ahmed (University of Évora), Cristina Galacho (University of Évora), José Quaresma (New University of Lisbon), Patrícia Moita (Évora University | HERCULES Laboratory) and A.R. Silva (Museu Municipal de Loures, Quinta do Conventinho, km 4.3, 2660-346 Santo António dos Cavaleiros,)
- 1000 Seismic refraction tomography and multichannel analysis of surface waves for imaging offshore Cultural Heritage in very shallow water: Results from a synthetic study and real data**
P. Bilio Markasioti (Technical University of Crete, School of Mineral Resources Engineering, Applied Geophysics Lab), George Kritikakis (Technical University of Crete, School of Mineral Resources Engineering, Applied Geophysics Lab), Antonios Vafidis (Technical University of Crete, School of Mineral Resources Engineering, Applied Geophysics Lab) and Nikos Papadopoulos (Laboratory of Geophysical Satellite Remote Sensing and Archaeoenvironment, Institute for Mediterranean Studies)
- 1006 Satellite-Derived Bathymetry for the Islands of South-Eastern Crete**
Daniel Lassak (Laboratory of Geophysical-Remote Sensing & Archaeoenvironment, Institute for Mediterranean Studies), Anna Novikova (Laboratory of Geophysical-Remote Sensing & Archaeoenvironment, Institute for Mediterranean Studies), Athanasios Argyriou (Laboratory of Geophysical-Remote Sensing & Archaeoenvironment, Institute for Mediterranean Studies) and Nikos Papadopoulos (Laboratory of Geophysical-Remote Sensing & Archaeoenvironment, Institute for Mediterranean Studies)
- 1012 Geophysical investigation on the presumed Appian way**
Lara De Giorgi (ISPC-CNR), Dora Francesca Barbolla (ISPC-CNR), Ivan Ferrari (ISPC - CNR), Francesco Giuri (ISPC-CNR), Ilaria Miccoli (ISPC-CNR), Giuseppe Scardozzi (ISPC - CNR), Chiara Torre (University of Catania) and Giovanni Leucci (ISPC - CNR)
- 1018 Electromagnetic survey at the messapian necropolis in Alezio (Lecce, Italy)**
Lara De Giorgi (ISPC-CNR), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR), Dora Francesca Barbolla (ISPC-CNR), Chiara Torre (University of Catania) and Giovanni Leucci (ISPC-CNR)
- 1023 The Acait of Tricase (LE, Puglia, Italy): an agricultural cooperative for tobacco production. Surveys and conservation status**
Francesco Giuri (CNR ISPC), Angela Calia (CNR ISPC), Ivan Ferrari (CNR ISPC), Antonio Monte (CNR ISPC), Giovanni Quarta (CNR ISPC) and Emilia Vasanelli (CNR ISPC)
- 1029 Ground Penetrating Radar survey at the Basilica of San Paolo fuori le mura (Roma, Italy)**
Salvatore Piro (ISPC CNR Institute of Heritage Sciences, Italy), Nicola M. Camerlenghi (Department of Art History, Dartmouth College, New Hampshire USA), Daniela Mondini (Istituto di Storia e Teoria dell'Arte e dell'Architettura, Università della Svizzera Italiana (USI)), Giorgia Pollio (Istituto di Storia e Teoria dell'Arte e dell'Architettura, Università della Svizzera Italiana (USI)) and Daniela Zamuner (ISPC CNR - Institute of Heritage Sciences)
- 1034 Instability assessment of "Grotta della Poesia" (Lecce, Italy)**
Lara De Giorgi (ISPC-CNR), Dora Francesca Barbolla (ISPC - CNR), Chiara Torre (University of Catania) and Giovanni Leucci (ISPC-CNR)

- 1039 Geophysical investigation at “Castle of Canossa”**
Annalisa Capurso (Soprintendenza Archeologia, Belle Arti e Paesaggio), Lara De Giorgi (ISPC-CNR), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR) and Giovanni Leucci (ISPC-CNR)
- 1044 The Roman amphitheater of Venosa (Basilicata, southern Italy): 3D survey and reconstruction**
Ivan Ferrari (ISPC CNR), Francesco Giuri (ISPC CNR) and Maurizio Lazzari (ISPC CNR)
- 1050 Geophysical surveys at the Roman Aqueduct “Aqua Virgo” (Roma, Italy)**
Vincenzo Di Fiore (ISPC-CNR), Michele Punzo (ISPC-CNR), Daniela Tarallo (ISPC-CNR), Maria Elisa Amadasi (Università di Roma la Sapienza) and Giovanni Leucci (ISPC-CNR)
- 1056 The digital database of dovecote towers in Salento (Southern Italy)**
Maurizio Delli Santi (ISPC-CNR)
- 1062 From knowledge to conservation: the hypogeum trappeto of Melpignano (LE, Apulia, Italy)**
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- 1068 Geophysical investigation at the Roman Amphitheatre (Lecce, Italy)**
Lara De Giorgi (ISPC-CNR), Immacolata Ditaranto (ISPC-CNR), Giovanni Leucci (ISPC-CNR), Iaria Miccoli (ISPC-CNR) and Giuseppe Scardozzi (ISPC-CNR)
- 1073 Geophysical investigation at the Monacato di Villa Eucheria (Frosinone, Italy)**
Dora Francesca Barbolla (ISPC-CNR), Veronica Ferrari (Università del Salento), Ivan Ferrari (ISPC-CNR), Francesco Giuri (ISPC-CNR), Iaria Miccoli (ISPC-CNR), Giovanni Leucci (ISPC-CNR) and Giuseppe Scardozzi (ISPC-CNR)
- 1078 Multitemporal aerial and satellite images for the study of the ancient city of Albania: remote sensing application at Apollonia and Phoenike**
Immacolata Ditaranto (ISPC-CNR), Fiorella De Luca (ISPC-CNR), Pasquale Merola (ISPC-CNR), Iaria Miccoli (ISPC-CNR) and Giuseppe Scardozzi (ISPC-CNR)
- 1083 Conservation of Underwater Cultural Heritage: preliminary coatings testing within the TECTONIC project**
Antonio Donato (University of Calabria - Department of Biology, Ecology and Earth Sciences (DiBEST)), Alex De Salvo (University of Calabria - Department of Chemistry and Chemical Technologies), Michal Novák (SYNPO akciová společnost, S. K. Neumann 1316, Pardubice 532 07, Czech Republic), Marie Nováková (SYNPO akciová společnost, S. K. Neumann 1316, Pardubice 532 07, Czech Republic), Silvestro Antonio Ruffolo (University of Calabria - Department of Biology, Ecology and Earth Sciences (DiBEST)), Mauro La Russa (University of Calabria - Department of Biology, Ecology and Earth Sciences (DiBEST)), Andrea Macchia (University of Calabria - Department of Biology, Ecology and Earth Sciences (DiBEST)) and Michela Ricca (University of Calabria - Department of Biology, Ecology and Earth Sciences (DiBEST))
- 1088 Integrated approaches for architectural decay mapping: a case study of the historic Tuna Factory "Florio" on Favignana Island, Sicily, Italy (IDEHA Project)**
Dario Giuffrida (Istituto per i Processi Chimico Fisici, CNR, Viale F. Stagno D'Alcontres, 37, I-98158 Messina), Samuele Barone (Istituto di Scienze del Patrimonio Culturale, CNR, Palazzo Ingrassia, Via Biblioteca 4, I-95124, Catania), Licia Cutroni (Istituto di Scienze del Patrimonio Culturale, CNR, Palazzo Ingrassia, Via Biblioteca 4, I-95124, Catania), Giuseppe Cacciaguerra (Istituto di Scienze del Patrimonio Culturale, CNR, Palazzo Ingrassia, Via Biblioteca 4, I-95124, Catania) and Rosina Celeste Ponterio (Istituto per i Processi Chimico Fisici, CNR, Viale F. Stagno D'Alcontres, 37, I-98158 Messina)
- 1094 Study of the catalytic action of heavy metals to understand the phenomenon of sulphation and the formation of black crusts**
Valeria Comite (University of Milan), Andrea Bergomi (University of Milan), Paola Fermo (University of Milan), Carlo Castellano (University of Milan), Mattia Borelli (University of Milan), Chiara Andrea Lombardi (University of Milan), Matteo Formenti (University of Milan), Cecilia Cavaterra (University of Milan) and Cristina Della Pina (University of Milan)
- 1100 Metallurgical technology of coins from Samshilde fortress (South Georgia, Caucasus)**
Natalia Rovella (Institute on Membrane Technology (ITM-CNR)), Michela Ricca (University of Calabria), David Berikashvili (University of Georgia), Maria Pia Albanese (University of Calabria) and Mauro Francesco La Russa (University of Calabria)

1105 Knowledge and decay assessment to manage a restoration plan and to define a valorisation program for a sustainable CH conservation: the experience of the ADELE-RS project

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

1110 A portable and autonomous system for the diagnosis of the structural health of cultural heritage (PICUS)

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