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August 28th-31st
Rome - Italy

ABSTRACT BOOK

787 ARTISTS AND CRAFTSMEN. MULTIDISCIPLINARY APPROACHES IN THE ANALYSIS OF THE PRODUCTION OF EARLY MEDIEVAL WALL PAINTINGS

Room: 8=CU003-FL1-Aula III

Time: 14:00 - 18:30

Theme: 1. The Material Record: Current Trends and Future Directions

Format: Regular session

Organisers: Cassitti, Patrick (Foundation Pro Monastery of St. John, Müstair; Albert-Ludwigs-Universität Freiburg, Abteilung für Frühgeschichte und Archäologie des Mittelalters; Otto-Friedrich-Universität Bamberg, Lehrstuhl für Archäologie des Mittelalters und der Neuzeit) - Bordi, Giulia (Università degli Studi Roma Tre, Dipartimento di Studi Umanistici) - Cavallo, Giovanni (Scuola Universitaria Professionale Della Svizzera Italiana, Dipartimento Ambiente Costruzioni e Design)

ABSTRACTS

14:00 INTRODUCTION

14:15 **MERGING PERSPECTIVES: OPPORTUNITIES AND CHALLENGES IN INTERDISCIPLINARY WALL PAINTING RESEARCH**

Cassitti, Patrick - Villa, Luca (Foundation Pro Monastery of St. John) - Cavallo, Giovanni - d'Erme, Chiara (Scuola Universitaria Professionale della Svizzera Italiana, Dipartimento Ambiente Costruzioni e Design)

14:30 **UNDERSTANDING THE CAROLINGIAN ARTIST THROUGH A NOVEL WORKFLOW INVOLVING MULTIMODAL REMOTE AND IN-SITU SPECTRAL IMAGING AND SPECTROSCOPIC TECHNIQUES**

Liggins, Florence (Nottingham Trent University) - Detalle, Vincent (Centre National de la Recherche Scientifique - CNRS, Paris, France) - Romano, Francesco (CNR, Istituto di Scienze del Patrimonio Culturale (ISPC-CNR, Catania, Italy) - Cassetti, Patrick (Foundation Pro Monastery of St. John, Müstair) - Liang, Haida (Nottingham Trent University)

14:45 **INSIDE AND THROUGH PALIMPSEST WALLS. SANTA MARIA ANTIQUA AND EARLY MEDIEVAL PAINTING IN ROME**

Bordi, Giulia (Roma Tre University) - Pogliani, Paola - Pelosi, Claudia - Lanteri, Luca - Valentini, Valeria (Tuscia University)

15:00 **FROM ROCK ART TO MEDIEVAL CHURCHES: THE CONTRIBUTION OF DIGITAL IMAGE ENHANCEMENT SYSTEMS**

Croci, Chiara (University of Lausanne)

15:15 **LET'S TRY TO MAKE THE FRAGMENT SPEAK - THE WALL PAINTING CYCLE IN THE CLOISTER OF BRANDENBURG CATHEDRAL**

Schaedler-Saub, Ursula - Krause-Riemer, Sabine - Pursche, Jürgen (Hawk University of Applied Sciences and Arts Hildesheim)

15:30 **TOKALI PROJECT IN CAPPADOCIA. INTEGRATED AND INTERDISCIPLINARY SYSTEM FOR THE KNOWLEDGE AND CONSERVATION OF MURALS**

Pogliani, Paola Luisa - Andaloro, Maria - Alberti, Livia - Pelosi, Claudia (University of Tuscia) - Temur Yildiz, Hatice (Nevşehir Restorasyon Ve Konservasyon Bölge Laboratuvarı Müdürlüğü) - Kantoğlu, Ömer (Tenmak)

15:45 **DISCUSSION SLOT**

16:30 **INTERDISCIPLINARY APPROACHES TO IMPLEMENT ON SITE WALL PAINTINGS CONSERVATION - A CASE STUDY FROM THE CHURCH OF MÜSTAIR**

Leandri, Caterina - Martinucci, Camilla - Emmenegger, Rufino (Stiftung Pro Kloster St. Johann Müstair)

16:45 **THE PALIMPSEST OF THE MAGDALEN CHAPEL OF ST. EMMERAM, REGENSBURG - AN ANALYTICAL CHALLENGE**

Thalguter, Nadia - Angelin, Eva - Mindermann, Simon - Sessa, Clarimma (Technical University of Munich)

17:00 **SURROUNDED BY SAINTS. CONSERVATION AND PREVENTION WORK IN OLD DONGOLA, SUDAN.**

Skarzynska, Magdalena (Polish Centre of Mediterranean Archaeology UW)

17:15 **THE COLOURS OF THE MEDIEVAL WALLS: THE CASE OF SANT QUIRZE DE PEDRET**

Cayuela, Begoña (Ars Picta (Universitat de Barcelona)

17:30 **THE 11TH-13TH CENTURY WALL PAINTINGS IN CANTON TICINO, SWITZERLAND: A SYSTEMATIC STUDY**

Luppichini, Stefania - Piqué, Francesca - Moretti, Patrizia - Caroselli, Marta - Lumia, Chiara (University of Applied Sciences and Arts of Southern Switzerland) - Schädler-Saub, Ursula (University of Applied Sciences and Arts, Faculty Architecture, Engineering and Conservation, Hildesheim) - Jean, Giacinta (University of Applied Sciences and Arts of Southern Switzerland)

- 17:45 THE DATING OF PYRENEAN ROMANESQUE PAINTING
Pons, Milagros (Universitat de Barcelona)
- 18:00 MEDIEVAL WALL PAINTINGS STUDIES VERSUS NEW METHODS OF DATATION
Boisseau, Claire (CNRS) - Marzais, Amaëlle (Université Lyon 2)
- 18:15 DISCUSSION SLOT

794 OLD EXCAVATIONS AND FINDS, NEW DATA AND INTERPRETATIONS: THE USE OF ARCHIVES IN CURRENT ARCHAEOLOGICAL RESEARCH PROJECTS

- Room:** 50=CU006-FLG-Aula I
Time: 8:30 - 16:00
Theme: 2. Archaeological Sciences, Humanities and the Digital Era: Bridging the Gaps
Format: Regular session
Organisers: Schlanger, Nathan (Ecole Nationale des Chartes, Paris; UMR Trajectoires - 8215) - Cataldi, Maddalena (Ecole Française de Rome) - Hofmann, Kerstin (Romano-Germanic Commission of the German Archaeological Institute) - Plutniak, Sébastien (Citeres Lab, CNRS, Tours) - Rosner, Chloé (Institut National d'Histoire de L'Art; UMR Temps 8068)

ABSTRACTS

- 8:30 INTRODUCTION
- 8:45 COMBINING THE OLD WITH THE NEW FOR A MORE REFLECTIVE FUTURE
Hofmann, Kerstin - Rösler, Katja (RGK - Romano-Germanic Commission DAI)
- 9:00 KNOWLEDGE CONSTRUCTION IN AND WITH THE ARCHAEOLOGICAL ARCHIVE
Ward, Chloë (Ludwig-Maximilians-Universität, University of Munich)
- 9:15 LILLA JORED A CHIEFTAIN BURIAL? - RECONSTRUCTION AN EARLY 19TH CENTURY EXCAVATION
Eboskog, Mikael - Nyqvist, Roger (Bohusläns Museum)
- 9:30 CREATING COMMON GROUND. SWEDISH ARCHIVE RESEARCH ON THE PAST FOR THE FUTURE
Wallensten, Jenny (Swedish Institute at Athens) - Hansson, Ulf (Swedish Institute in Rome) - Frejman, Axel (Uppsala University; Swedish Research Institute in Istanbul)

- 9:45 RAW MATERIALS CIRCULATION DURING THE EBA IN THE SANDOMIERZ UPLAND. DATA OF THE "PAR" PROGRAM IN THE NEW TECHNOLOGICAL REALITY
Budziszewski, Janusz (Institute of Archaeology UKSW) - Szubski, Michał (Institute of Archaeology University of Cardinal Stefan Wyszyński in Warsaw)
- 10:00 ARCHIVAL RESEARCH ON SHIPWRECKS IN TAIWAN'S WATERS: ITS CONTRIBUTION TO UNDERWATER ARCHAEOLOGY SURVEYS
Chen, Pin-Wen (Texas A&M Univeristy) - Lee, Chi-Lin (Tamkang University)
- 10:15 DISCUSSION SLOT
- 11:00 THE BASILICA IULIA PROJECT AND THE ARCHIVE OF LAURA FABBRINI (1960-1964): QUESTIONS OF WORKFLOW, METHOD, AND DATA TRANSPARENCY
Bozza, Sara (CNR - Istituto di Scienze del Patrimonio Culturale) - Galli, Marco (Sapienza Università di Roma) - Ismaelli, Tommaso (CNR - Istituto di Scienze del Patrimonio Culturale)
- 11:15 BROWSING LEGACY MATERIAL: THE CASE OF THE ARCHIVES OF THE FRENCH MISSION AT ENKOMI (CYPRUS)
Meneghetti, Francesca (Cyprus American Archaeological Research Institute)
- 11:30 INVESTIGATING ELAEUS, FROM THE TRENCHES TO PRESS
Lebée, Thomas (Louvre Museum) - Kardianou, Alexandra (Louvre Museum)
- 11:45 ANCIENT, ARCHIVAL, AND MODERN SOURCES COMBINED WITHIN THE PTOLEMAIC PATHYRIS PROJECT (EGYPT)
Skalec, Aneta (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences) - Ejsmond, Wojciech (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences)
- 12:00 ARCHIVES TELL THE TRUTH - RECONSTRUCTING THE HISTORY OF ARCHAEOLOGICAL AND CONSERVATION WORK AT THE TEMPLE OF HATSHEPSUT IN EGYPT.
Kasprzycka, Katarzyna (University of Warsaw, Faculty of Archaeology)
- 12:15 LE BLOT 40 YEARS LATER: AN EXAMPLE OF FUZZY LOGIC IN ARCHAEOLOGY
Vincent, Delvigne (CNRS, UMR 8068 Temps) - Bruno, Bosselin (No Rattachement) - Jacques, Virmont (No Rattachement) - Jean-Paul, Raynal (CNRS UMR 5199 PACEA)
- 12:30 DISCUSSION SLOT
- 12:45 DISCUSSION SLOT

during the Uyghur period. Unraveling the complexities of salt supply and demand in archaeology is challenging. It is hoped that this study will contribute to a deeper understanding of salt production, distribution, and trade during the medieval Mongolian period, as well as within the steppe nomadic societies of eastern Eurasia. Collaboration on scientific analysis is eagerly anticipated to enrich the ongoing discussion. This study is supported by the National Research Foundation of Korea (NRF) grant (NRF-2023R1A2C1006785)

6 MODES OF EXPLOITATION AND TRADE MECHANISMS OF SALT IN MEDIEVAL AND MODERN EASTERN ROMANIA

Asandulesei, Mihaela (Alexandru Ioan Cuza University of Iasi)

The potential of Romania's salt resources within its territory is undeniable, and this has been consistently affirmed in academic circles through numerous national and international events over time.

In the eastern Carpathian region of Romania, the area under study, the presence of salt in both liquid and solid forms is well-documented across various historical periods, tracing back to prehistoric times with the earliest exploitation activities.

The approach to harnessing the natural mineral to meet daily needs or for economic endeavours stems from the efforts involved in the execution of spring catchment systems or from the diverse range of installations dedicated to the intensive extraction of solid salt. These methods are unique to each distinct era and undergo continual development.

The documentation of the presence of the natural mineral in various written or cartographic sources (such as maps, travel diaries, letters, descriptions, public or private documents) from different periods, particularly during the medieval and modern eras, highlights the significant importance attributed to saline substances in the development of human communities from social, economic, and ethno-cultural perspectives.

Our intervention seeks to conduct a retrospective analysis of documentary sources from the medieval and modern periods concerning pre-industrial and industrial exploitations, along with associated legal regulations. Additionally, we aim to explore methods of capitalization within the economic circuit, including trade and exchanges, both within the studied area and in the broader context of Southeast Europe.

Our documentation confirms a significant level of salt exploitation activity in the area under examination during the specified periods, and it also delineates methods of economic capitalization associated with this activity.

7 PREHISTORIC LARGE-SCALE SALT PRODUCTION, TRADE, POWER AND WEALTH IN SOUTH-EASTERN EUROPE

Kavruk, Valerii (The National Museum of Eastern Carpathians)

Prehistoric large salt production in southeast Europe is attested in two sites: Provadia-Solnitsata in north-eastern Bulgaria (inland brine evaporation, Chalcolithic) and Băile Figa (shallow rock salt mining and brine processing, Late Bronze Age) in Transylvania (central-northern Romania). To better understand the nature of this salt production, the paper integrates it into holistic pictures of the Balkan-Pontic-Anatolian Chalcolithic and Bronze Age of the Carpathian Basin.

Salt production in Provadia-Solnitsata during the Chalcolithic was part of a complex and vast system of power, economy and trade that included Eastern Balkans and possibly Anatolia. Salt obtained from this site was supplied mainly to the Balkan Peninsula. In addition, it must have been used for salting food products, including sturgeon and caviar, which were perhaps traded even to Anatolia. The fabulous richness of the Varna necropolis and some other site sites in north-eastern Bulgaria strongly suggest that salt was an essential trigger of the economic, social and political advance of this region during the Chalcolithic period.

During the Bronze Age, Transylvania became the most advanced salt production region of south-eastern Europe. In prehistoric times, the Tisza-Danube Interfluve was home to many lakes and swamps rich in food. To benefit from this resource, local people needed to trade it. This would not have been possible without salt, which they received from Transylvania and the Alpine region. Trade in salt and salted food explains the region's high socio-economic level during the Bronze Age, including the period between c. 1500 and 800 BC when large-scale salt production was carried out in Transylvania.

787 ARTISTS AND CRAFTSMEN. MULTIDISCIPLINARY APPROACHES IN THE ANALYSIS OF THE PRODUCTION OF EARLY MEDIEVAL WALL PAINTINGS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Cassitti, Patrick (Foundation pro Monastery of St. John, Müstair; Albert-Ludwigs-Universität Freiburg, Abteilung für Frühgeschichte und Archäologie des Mittelalters; Otto-Friedrich-Universität Bamberg, Lehrstuhl für Archäologie des Mittelalters und der Neuzeit) - Bordi, Giulia (Università degli Studi Roma Tre, Dipartimento di Studi Umanistici) - Cavallo, Giovanni (Scuola universitaria professionale della Svizzera italiana, Dipartimento ambiente costruzioni e design)

Session format: Regular session

Wall paintings provide valuable information on the culture and history of past societies. Because they are inextricably linked to the buildings on which they have been applied, their study happens at the intersection between Archaeology, Art History, the history of Architecture, and the natural sciences. In recent years, the field has advanced to the forefront of interdisciplinary studies. A wide, international exchange and an integration of knowledge and methods has however not yet taken place.

This session aims to promote collaboration and knowledge exchange between archaeologists, conservators, art historians and scientists working in the field of mural painting research, to present innovative methodologies and technologies used in the analysis and conservation of wall paintings and to encourage a deeper understanding of the cultural, artistic and historical significance of wall paintings through multidisciplinary approaches.

It will achieve this by bringing together researchers and experts from different backgrounds to present different views and approaches to the study of wall paintings as works of art, linked to different figurative cultures, and as products of technical and craft knowledge. A wide range of topics will be addressed, including, but not limited to:

- Analysis of painting techniques.
- Techniques of non-destructive analysis of wall paintings.
- Advances in methods of dating wall paintings.
- Characterisation of materials and provenance studies of pigments and binders.
- Documentation and conservation of wall paintings.
- Comparative analyses of wall paintings in different regions and periods.
- Interdisciplinary collaborations in research on wall painting.

ABSTRACTS

1 MERGING PERSPECTIVES: OPPORTUNITIES AND CHALLENGES IN INTERDISCIPLINARY WALL PAINTING RESEARCH

Cassitti, Patrick (Foundation pro Monastery of St. John) - Villa, Luca (Foundation pro Monastery of St. John) - Cavallo, Giovanni (Scuola universitaria professionale della Svizzera italiana, Dipartimento ambiente costruzioni e design) - D'Erme, Chiara (Scuola universitaria professionale della Svizzera italiana, Dipartimento ambiente costruzioni e design)

In 2022, the research initiative "Forgotten Colors - Rediscovering the Original Polychromy of Early Medieval Wall Paintings in the Raetia Curiensis Region" was initiated with support from the Swiss National Science Foundation. This ambitious project engages nine collaborative partners spanning diverse scientific fields, including archaeology, art history, heritage studies, science communication, digital humanities, material sciences, mineralogy, and physics.

The broad interdisciplinary collaboration not only offers fresh insights into the past but also presents significant challenges in harmonizing methods and synthesizing data across various disciplines. To address these challenges, the project employs a comprehensive approach, integrating microarchaeology alongside concepts and methods derived from Actor Network Theory and Symmetrical Archaeology. This bottom-up methodology entails meticulous examination of evidence and data from individual sites, culminating in the development of theories and descriptive networks through the synthesis and comparison of generated information. Furthermore, visualizations, including physical and augmented reality reconstructions of polychromies from selected sections of paintings, are being crafted.

This paper delves into a detailed exploration of this approach, providing an evaluation of the practical application of the theoretical concepts employed in the research project.

2 UNDERSTANDING THE CAROLINGIAN ARTIST THROUGH A NOVEL WORKFLOW INVOLVING MULTIMODAL REMOTE AND IN-SITU SPECTRAL IMAGING AND SPECTROSCOPIC TECHNIQUES

Liggins, Florence (Nottingham Trent University) - Detalle, Vincent (Centre National de la Recherche Scientifique (CNRS), Paris, France) - Romano, Francesco (CNR, Istituto di Scienze del Patrimonio Culturale (ISPC-CNR), Catania, Italy) - Cassetti, Patrick (Foundation pro Monastery of St. John, Müstair) - Liang, Haida (Nottingham Trent University)

F. Liggins, S. Kogou, C.S. Cheung, A. Vichi, A. Suzuki, V. Detalle, X Bai, M. Botticelli, C. Caliri, E. Ravan, F.P. Romano, C. Tennenini, P. Cassitti, H. Liang

The analysis of historical wall paintings can invite several obstacles, such as scale, complexity, diversity of materials, in substrate, pigment and binder. Locating restorative work can further add complication, especially where the work has been applied in a heterogenous manner. The Benedictine convent of St. John, a UNESCO world heritage site in Müstair, is host to both original Carolingian paintings (8th – 9th Century), and 20th Century restorative work and is therefore a prime example of where multiple methods are needed for large-scale analysis.

We demonstrate a novel workflow for thorough analysis of large-scale wall paintings which starts with a survey using a ground-based high spatial resolution remote spectral imaging system (PRISMS), which can scan entire building interiors at distances of order ~10m, providing 10-band reflectance spectra in the visible to near infrared (VNIR) (450-850nm)[1]. Hyperspectral imaging is also carried out with higher spectral resolution (~nm) covering the VNIR and shortwave infrared (SWIR) (1000-2500nm)[2]. These datasets are processed using in-house developed machine learning methods to provide material distribution maps based on reflectance spectra[2,3] such that further analysis only needs to be performed in targeted areas. Point-based analyses provide necessary complementary information in material identification, in this case ground-based remote Raman spectroscopy[4], close-range Laser-induced Breakdown Spectroscopy (LIBS), X-ray Diffraction (XRD), X-ray Fluorescence (XRF) and Fourier Transform Infrared (FTIR) spectroscopy.

Whilst demonstrating this workflow on the murals in Müstair through an IPERION HS MOLAB campaign[5], we're able to identify pigments from the original Carolingian artist's palette and define to what extent these materials are still distributed across the wall paintings.

[1] <https://doi.org/10.1016/j.isprsjprs.2014.05.011>

[2] <https://doi.org/10.1038/s41598-020-76457-9>

[3] <http://dx.doi.org/10.1186/s40494-022-00765-8>

[4] <https://doi.org/10.1364/OE.27.031338>

[5] Molab Iperion HS: <https://www.iperionhs.eu/molab/>.

3 INSIDE AND THROUGH PALIMPSEST WALLS. SANTA MARIA ANTIQUA AND EARLY MEDIEVAL PAINTING IN ROME

Bordi, Giulia (Roma Tre University) - Pogliani, Paola (Tuscia University) - Pelosi, Claudia (Tuscia University) - Lanteri, Luca (Tuscia University) - Valentini, Valeria (Tuscia University)

The multi and interdisciplinary research group consisting of art historians, restorers and chemists wants to present the research conducted within the European project Enhancement of Heritage Experiences: The Middle Ages. Digital Layered Models of Architecture and Mural Paintings over Time (EHEM), funded by Horizon 2020 - JPICH Conservation, Protection and Use. Case study is the church of S. Maria Antiqua and its extraordinary heritage of stratified murals from the 2nd to the 11th century.

For years, the team has been working on the development of an integrated system for the identification and characterisation of individual painting phases in order to date them.

Starting from the autoptic analysis of the plasters and their mapping on a digital basis, the study of materials and techniques was tackled to support the identification of the distinct pictorial layers using scientific analyses for the characterisation of materials combined with multispectral imaging surveys. The data is being fed into a database and annotation system linked to the 3D model of the monument.

The results of the research conducted on the paintings of S. Maria Antiqua are being compared with artistic production in Rome in the early Middle Ages thanks to the project: Rome and the Others (300-1300). Foreigners in the city between conflicts and integration, funded by Prin 2022-PNRR, started in January 2024.

4 FROM ROCK ART TO MEDIEVAL CHURCHES: THE CONTRIBUTION OF DIGITAL IMAGE ENHANCEMENT SYSTEMS

Croci, Chiara (University of Lausanne)

Developed for the study of rock paintings, the digital image enhancement system DStretch reveals great potential in support of archaeological and art historical research, especially for the study of stratified pictorial surfaces or those in precarious state of preservation.

Within the SNSF project "Rome aux siècles 'obscur'. Les lumières de la communication visuelle, Ve-XIe siècles", directed by Chiara Croci and Irene Quadri at the University of Lausanne, this tool was used to deepen the knowledge of pictorial works of early medieval Rome.

Digital enhancement through DStretch brought to light traces of pictorial scenes now invisible to the naked eye, 'pentimenti' and stratifications, which guided further investigations conducted using multispectral photographic techniques in collaboration with Prof. Eng. Rita Deiana of the University of Padua.

Through a selection of case studies from churches such as San Martino ai Monti, Sant'Adriano al Foro and San Clemente (8th-9th century), this paper aims to illustrate the contribution of digital enhancement as a preliminary tool to identify elements worthy of further investigation to shed light on the technical and conceptual mechanisms of medieval artistic production.

5 LET'S TRY TO MAKE THE FRAGMENT SPEAK - THE WALL PAINTING CYCLE IN THE CLOISTER OF BRANDENBURG CATHEDRAL

Schaedler-Saub, Ursula (HAWK University of Applied Sciences and Arts Hildesheim) - Krause-Riemer, Sabine (HAWK University of Applied Sciences and Arts Hildesheim) - Pursche, Jürgen (HAWK University of Applied Sciences and Arts Hildesheim)

How can we understand, visualize and mediate fragmentary medieval wall paintings? With a still on-going research study on extremely damaged wall paintings funded by Deutsche Forschungsgemeinschaft, we present interdisciplinary collaboration and innovative methods and techniques of digital documentation, visualisation and partial reconstruction, avoiding any harmful physical intervention.

One of our case studies is the wall painting cycle dedicated to the Liberal Arts and the Mechanical Arts, created in the 1440ies in the former Premonstratensian Library in the cloister of Brandenburg Cathedral. After the secularisation of the cloister in 1507, the wall paintings were forgotten. Various changes of use and a succession of renovations led to heavy damages and losses of the paintings. Re-discovered and uncovered in the early 21st Century during an urgent structural conservation, the wall paintings were preserved unretouched. However, the fragments without any restoration require visualisation and mediation.

Our project started with a comprehensive interdisciplinary investigation aimed at understanding the extremely reduced painting cycle in its architectonic, cultural and artistic context. We studied the historical materials and techniques of the paintings and their actual state of preservation with mostly non-invasive techniques. For the visualisation of all painting traces not observable in the visible light, we developed the methodology of the so-called spectral photo-piles which are composed of different rectified spectral images, including UV-luminescence imaging, hyperspectral and multispectral imaging and digital image processing with decorrelation stretch and Principal Component Analysis (PCA). A critical interdisciplinary evaluation and interpretation of the results enabled us to create a scientifically based digital visualisation with simplified partial reconstruction of the painting cycle – a very important contribution for a better understanding of the historical, cultural and aesthetic values of fragmentary preserved wall paintings.

6 TOKALI PROJECT IN CAPPADOCIA. INTEGRATED AND INTERDISCIPLINARY SYSTEM FOR THE KNOWLEDGE AND CONSERVATION OF MURALS

Pogliani, Paola Luisa (University of Tuscia) - Andaloro, Maria (University of Tuscia) - Alberti, Livia (University of Tuscia) - Pelosi, Claudia (University of Tuscia) - TEMUR YILDIZ, Hatice (Nevşehir Restorasyon ve Konservasyon Bölge Laboratuvarı Müdürlüğü) - Kantoğlu, Ömer (Tenmak)

The speech stems from the project, "Ruprestrian painting in Cappadocia: knowledge, conservation and enhancement", which the University of Tuscia has been conducting in Cappadocia (Turkey) since 2006.

The work focuses on the knowledge of the numerous murals of Cappadocia (6th-13th century), based on research carried out during the survey in the region, and then from the experience acquired from conservation projects undertaken at two rock-cut churches: the Forty Martyrs in Şahinefendi and the New Tokali in the Göreme Open Air Museum.

The paper aims to present, in particular, the Tokali project that is a collaborative project with the Archaeological Museum and the Regional Restoration Laboratory of Nevşehir.

The project focuses on the knowledge and conservation of the extraordinary painting complex of the New Tokali Church dating from the mid-10th century. As far as knowledge is concerned, the main line of research is to study the pictorial process from conception to realisation. Central to the topic of conservation is the complicated restoration of the paintings, which has been ongoing since 2011.

Knowledge and restoration are the topics that in the Tokali project are organically connected with the characterising aspect of the monument that is the intimate relationship exists between art-historical features of their wall paintings in the context of the rock-cut. This approach is based on an integrated and interdisciplinary system of research and investigation and necessarily demands the collaboration of the historical, humanistic and techniques disciplines together with the hard science (chemistry, physics, geology, agronomy).

In the Tokali project, one important line of our work focuses on the techniques and materials of painting in the context of Cappadocia painting production (database <http://bancadati.museovirtualecappadocia.it/>). The peculiarities of the secco technique and the complex methods of execution will be emphasised through the approaches of autopsy analysis and scientific investigations carried out so far.

7 INTERDISCIPLINARY APPROACHES TO IMPLEMENT ON SITE WALL PAINTINGS CONSERVATION - A CASE STUDY FROM THE CHURCH OF MÜSTAIR

Leandri, Caterina (Stiftung Pro Kloster St. Johann Müstair) - Martinucci, Camilla (Stiftung Pro Kloster St. Johann Müstair) - Emmenegger, Rufino (Stiftung Pro Kloster St. Johann Müstair)

The Convent of Müstair (Switzerland) is a UNESCO site renowned for its wall paintings dating back to the 8th - 13th century, preserved in its main church. Starting in the late 20th century the painted surfaces underwent extensive art historical, technical, and diagnostic research, addressing topics like original technology, conservation history and state of conservation. The outcoming data led to gradual treatment applications, up to the current restoration campaign interesting the east wall of the church, since 2018 concentrated on the central apse.

The paintings characteristics, both original and later added materials, along with complex conservation issues have made the support of scientific systematic methodologies necessary in outlining intervention strategies and formulate their implementation over time.

As usual for medieval paintings, also the Müstair cycle can be seen as an outcome of different cultural heritage management practices performed over time. Some portions were covered and are today barely visible, others were strongly overpainted due to its fragmentary state.

The conservator's challenge lays in ensuring accessibility to various stakeholders while maintaining the objects physical integrity and guarantee long-term preservation. This often requires striking a balance between conservation of the material evidence together with considering monuments significance and context. A multidisciplinary approach with outstanding applications of scientific procedures is therefore crucial in providing support on the sitework, particularly in overcoming limitations of human perception by revealing aspects that otherwise cannot systematically and objectively be formulate.

The long in situ applied research allows for an overview of the evolution of analytical techniques, with particular emphasis on the increasing potential both in terms of reduced invasiveness and precision in addressing the starting questions. The Müstair case study exemplifies the delicate interplay between historical approaches and modern treatment methodologies, highlighting the indispensable contribution of interdisciplinary research to develop informed and effective conservation practices.

8 THE PALIMPSEST OF THE MAGDALEN CHAPEL OF ST. EMMERAM, REGENSBURG - AN ANALYTICAL CHALLENGE

Thalgueter, Nadia (Technical University of Munich) - Angelin, Eva (Technical University of Munich) - Mindermann, Simon (Technical University of Munich) - Sessa, Clarimma (Technical University of Munich)

The Magdalen Chapel is part of the monumental church of St. Emmeram in Regensburg (Germany). It shows a unique palimpsest of wall paintings from four simultaneously visible different painting phases.

The oldest wall paintings originate from the middle of the 12th century and depict the life of a penitent, probably Saint Maria Aegyptiaca. The fragments of the second phase, dating from around 1400, show a Man of Sorrows and Christ on the Mount of Olives. At the end of the 15th century, in the third painting phase, standing saints and an angel were painted. The fourth painting, which was probably created in the first half of the 17th century, is a decorative painting with putti and garlands of fruit on a white background.

Nowadays, the fragmentary status of the wall paintings hinders their readability and poses queries about their conservation. A multimodal in situ approach was used to characterize the materials, understand the art techniques, and explore the aging phenomena, thereby ensuring the understanding of this complex artwork.

The paintings were systematically investigated by an interdisciplinary team of conservator-restorers and scientists. They were documented through photogrammetry, technical photography (VIS and UVL) as well as visual observation mapping using metigo@MAP software. Hyperspectral imaging (spectral range 400 - 2500 nm) and macro-X-ray fluorescence were combined with punctual Raman and Mid-infrared measurements for material characterization purposes. Terahertz imaging was tested for the investigation of the stratigraphy of selected areas.

The combination of the investigation done by the conservator-restorer, mapping, technical photography, and analytical results, allowed the assignments of the individual painting phases and relative palette, identification of later interventions, and visualization of hidden layers.

The information gathered using the multi-modal, non-invasive approach will serve to develop a conservation strategy and a new concept for the access and readability of the Magdalen Chapel palimpsest.

9 SURROUNDED BY SAINTS. CONSERVATION AND PREVENTION WORK IN OLD DONGOLA, SUDAN

Skarzynska, Magdalena (Polish Centre of Mediterranean Archaeology UW)

The role of an art conservator has long exceeded the practical aspect of this profession. Preserving the material side of a monument is only one of the conservator's tasks. He became not only a "doctor" but also an "advocate" of works of art, participating in heritage science, developing documentation, appropriate prevention and cooperating with other scientists. These ideas guide conservation work at the archaeological site of Old Dongola in Sudan. Dongola served as the capital of Makuria, one of the most prominent medieval African states. Archaeological research began in 1964 as part of the mission of the Center for Mediterranean Archeology at the University of Warsaw. The institution continues to work on this site under the supervision of Professor Artur Obluski. The research area encompasses the citadel situated on the eastern bank of the Nile and the Monastery of St. Anthony the Great. The Old Dongola site's most significant discoveries include polychrome churches. These interiors feature representations of saints, archangels, the Virgin Mary, and Christ, which are typical of Eastern Christian iconography. Additionally, images of Nubian dignitaries and hierarchs decorate these interiors. The unique local elements woven into traditional Christian iconography make these interiors particularly noteworthy. In addition, the paintings showcase different styles and technologies.

The presentation aims to showcase the conservation care and documentation system implemented at the archaeological site. It will also cover recent conservation work on wall paintings in the NB2 church, the Church of the Archangel Raphael, and the „Throne Hall". Additionally, it will discuss conservation of current archaeological discoveries, such as the apse of the Great Church of Jesus and the room with king Dawid painting.

10 THE COLOURS OF THE MEDIEVAL WALLS: THE CASE OF SANT QUIRZE DE PEDRET

Cayuela, Begoña (Ars Picta (Universitat de Barcelona))

The international project EHEM (Enhancement of Heritage Experiences: The Middle Ages. Digital Layered Models of Architecture and Mural Paintings over Time) has been an opportunity to delve into an area of study little frequented by historians of medieval art: the colour of medieval walls. EHEM has been developed by a multidisciplinary team with researchers from Italy, Cyprus, and Catalonia.

One of the aims has been to create digital layered models of medieval architecture and mural paintings to provide an improved perception to the public of the original wall paintings and a tool for researchers, restorers, and heritage curators. The goal was to solve certain chromatic issues that medieval mural currently present, but immediately we realized that one major challenge was to establish the most reliable representation system in digital environments of medieval wall paintings.

The hermitage of Sant Quirze de Pedret (Spain) was decorated at two different times by superimposing two layers of wall decoration. After their discovery, the paintings were removed and transferred to the Museum of Barcelona and the Museum of Solsona and were subjected to different conservational procedures. The restoration criteria applied have resulted in notable differences in the current chromatic perception.

In this paper we will discuss the issues faced by the team in the process of recovering the colours of Pedret. It will also review the experience of determining the material characteristics of the frescoes, their chromatic palette from the digital images and grouping them in the digital model to offer a unique opportunity to see the paintings on the virtual walls and to regroup pieces originally of the same fresco that nowadays are disperse. Lastly, but not least, we will reflect on the relevance of this approach to understand the techniques used by the medieval painters of Pedret.

11 THE 11TH-13TH CENTURY WALL PAINTINGS IN CANTON TICINO, SWITZERLAND: A SYSTEMATIC STUDY

Luppichini, Stefania (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC)) - Piqué, Francesca (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC)) - Moretti, Patrizia (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC)) - Caroselli, Marta (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC)) - Lumia, Chiara (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC)) - Schädler-Saub, Ursula (University of Applied Sciences and Arts, Faculty Architecture, Engineering and Conservation, Hildesheim, Germany (HAWK)) - Jean, Giacinta (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC))

Since 2022, the Conservation and Restoration unit of SUPSI-IMC is studying of a series of 11th and 13th C. wall paintings located in churches in Canton Ticino, Switzerland. Among these are S. Maria Assunta in Sorengo, S. Vittore in Muralto, SS. Gervasio e Protasio in Cadempino and the Baptistery of Riva San Vitale. The aim of the study is to characterize the painting technique (materials and methods) and the history of the buildings' construction. The study is supported by grant from the Beate und Hans Peter Autenrieth Foundation.

Through visual examination combined with scientific investigations, the team has identified and documented aspects of the painting technique such as "giornate", incisions and snapped cord, lime-based paint and the use of traditional pigments such as ochres but also precious ones like Lapis Lazuli (Sorengo and Muralto), Azurite (Sorengo and Riva San Vitale), Egyptian Blue (Cadempino), Minio, Biacca and Cinnabar (Sorengo) applied with organic binders (no longer identifiable).

At Sorengo, the combination of archival research with on-site observations, stratigraphic analysis of the elevations of the Romanesque church, the dating of mortars and wood provided in-depth knowledge on the phases of construction.

The study faced the multiple challenges presented by the impact of previous restoration interventions. The churches have undergone architectural modification and, from the 1920s to the 1980s, attempts at recovering the Romanic wall painting schemes.

For each site, the results (graphic documentation and investigations) are organized and managed on a GIS platform.

The presentation will illustrate the extent and the result of the study of the paintings, showing technological and stylistic similarities which give important insights into the cultural and commercial exchanges of this historical period in Canton Ticino.

12 THE DATING OF PYRENEAN ROMANESQUE PAINTING

Guardia, Milagros (Universitat de Barcelona)

The research group ArsPicta of the Universitat de Barcelona, which has been involved in the study of Romanesque mural painting in the Pyrenees region, presents the following proposal:

Under the topic: Advances in methods of dating wall paintings.

The dating of Pyrenean Romanesque painting

Milagros Guardia

Ars Picta

Research Institute for Medieval Cultures (IRCVI)- Universitat de Barcelona

The historical-artistic discourse developed in relation to Pyrenean and Hispanic painting in general has been established based on chronological reference points and the establishment of formal relations between the various pictorial groups. For the latter, in turn, using a figure, that of the "master" who would be the material author of a work and to whom, precisely because of formal relationships, others have been attributed, ultimately inventing a supposed catalog. The formalist method in relation to the work of Romanesque muralists has been repeatedly questioned, though perhaps with little success or, at any rate, with little significance in general studies, and the appropriateness of the term master and the possibility of conserving more than one work by the same team has also been debated.

However, chronological marks have been scarcely discussed, and it is precisely on them that the possibility of establishing a coherent historiographical discourse is based. This is the intention of the communication presented here, precisely to subject to criticism, and to dismantle some of these references of dating of our paintings.

13 MEDIEVAL WALL PAINTINGS STUDIES VERSUS NEW METHODS OF DATATION

Boisseau, Claire (CNRS) - Marzais, Amaëlle (Université Lyon 2)

Over the past decades, technologies involved in medieval wall painting studies had transformed our way of considering it. Now we all use chemical analysis of the murals and their components to specify their dating and their context of production. Since the invention of radiocarbon or dendrochronology, new analysis can now be more accurate based on white lime or whitelead. In the meantime, Art history try to think about new methods to use stylistic details of

the paintings to appreciate their datation. Some of these methods are inspired by archeology, like typo-chronology. All these collaborations bring many benefits to the understanding of murals, but it's still a challenge for everyone. Humanities and new technologies focused on distinct preoccupations. The real benefit in the past was to refocus art history on the materiality, that was not taken in consideration at that days. But, it is clear that the chronological ranges given by carbone 14 are so large (over two or three centuries) that sometimes it is not a help at all to precise the context of creation of a mural. Thanks to examples from mainly French area, the aim of this contribution is to recap the challenge implied by an interdisciplinarity collaboration. It will recap methods and problematic cases exposed on April 2024 at the INHA (Paris) during the Workshop titled "Dater les peintures murales médiévales : approches interdisciplinaires".

789 SHARING, MERGING AND ANALYSIS OF NONINVASIVE ARCHAEOLOGICAL DATA: TOWARDS A MCSA DOCTORAL NETWORK

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: van Leusen, Martijn (Groningen Institute of Archaeology; International Mediterranean Survey workshop) - Campana, Stefano (University of Siena) - Verhegge, Jeroen (University of Ghent; PROSPECT)

Session format: Round table (without formal abstracts)

In the past half century, a massive but underused archaeological data resource has been building up, composed of different kinds of noninvasive observation. From the 1950s onward, fieldwalking surveys and aerial photography have been used to map surface archaeological remains and features over millions of square kilometers; more recently, near-surface geophysics and various types of remote sensing methods including lidar have begun to contribute more 'hidden' archaeological data. Each of these noninvasive approaches contributes valuable and complementary information about the presence, character, and degree of preservation of archaeological remains in the soil, but so far they have been the preserve of mostly separate groups of academic and commercial actors – subdisciplines that have attempted, but mostly failed, to collaborate. The challenge now is to break down the disciplinary and institutional walls between the different research communities, so that different noninvasive data can be shared and integrated for analysis, and can thus have a much greater impact on heritage management across Europe.

This roundtable session aims to bring together prospective partners to develop a proposal for a MCSA doctoral network, aiming to train up a new generation of scholars and heritage managers, not hampered by tradition, for data sharing, merging and analysis. A broad range of academic, professional, and HM partners will be needed, so students not only learn to understand the ins and outs of each noninvasive approach, but also to understand how these are conditioned by geoscientific circumstances and how current obstacles to data sharing and merging can be overcome.

790 THE (COPPER) AGE OF TRANSFORMATION: RESEARCH DEVELOPMENTS ON C. 4500-3500 BC FROM AROUND THE CARPATHIAN BASIN

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Ridge, William (University of Illinois at Chicago) - Tomazič, Iride (University of Michigan) - Čataj, Lea (Croatian Conservation Institute)

Session format: Regular session

For decades, the archaeological record of the Copper Age (including the name) was comparably vague. Primarily known from the introduction of copper metallurgy, formalized cemeteries, and a generally small record of settlements, the Copper Age presents a fundamentally transformative period. The late-5th millennium marks a major shift in sociocultural and demographic trajectories, especially across the Carpathian Basin.

Recent research, with absolute chronology, has greatly advanced the understanding of the Copper Age "package" and has suggested the emergence of macro-regional trends along with a notable amount of regional variation. However, a general lack of interregional synthesis, comparison, and communication, particularly between research traditions from different countries, restricted a fuller understanding of the period.

We invite participants to share their work from all stages of research, including reports from fieldwork from throughout the Carpathian Basin (Hungary, Slovakia, southwestern Ukraine, western Romania, northern Serbia, northeast Bosnia and Herzegovina, northern Croatia, eastern Slovenia, southeastern Austria). A question we would like the participants to address within their paper is "What makes the Copper Age? Some of the topics that we hope to address during this session include, but are not limited to:

-Inquiries of landscape change use.

-Changes in regional settlement and mortuary patterns.

-Variation in material culture across the Carpathian basin and within particular cultural traditions.