

**MRCH
2026**

**3rd International Scientific
Conference**

**Multidisciplinary
Research on
Cultural Heritage**

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BOOK OF ABSTRACTS

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Book of Abstracts

3rd International Scientific MRCH Conference Multidisciplinary Research on Cultural Heritage MRCH 2026

Zagreb, 23–25 September 2026

Organizers



msu muzej suvremene umjetnosti /
museum of contemporary art
— zagreb



Sveučilište u Zagrebu
Grafički fakultet



Co-organisers: University of Zagreb – Faculty of Textile Technology, Library of the Croatian Academy of Sciences and Arts, ICARUS (International Centre for Archival Research), ERC-BP (European Research Centre for Book and Paper Conservation-Restoration), IIC (The International Institute for Conservation of Historic and Artistic Works) Croatian group.

The conference is held under the auspices of the Ministry of Culture and Media of the Republic of Croatia.

Dear colleagues and friends of science and cultural heritage,

It is our great pleasure to welcome you to the Multidisciplinary Research on Cultural Heritage (MRCH 2026) conference and to present this Book of Abstracts, which reflects the breadth and diversity of contemporary research in cultural heritage.

This year's conference continues the successful series of scholarly and professional meetings initiated with *New Approaches to Research on Written Cultural Heritage on Paper* (2023), followed by *Colour in Written Heritage: Multidisciplinary Research* (2024) and *Multidisciplinary Research on Cultural Heritage* (2025). Over the years, the conference has steadily expanded in both scope and disciplinary reach,, demonstrating the growing importance of interdisciplinary collaboration in cultural heritage research.

The 2026 programme includes 33 oral presentations and 16 poster presentations from 23 countries bringing together researchers and professionals from a wide variety of academic and professional fields. Alongside experts in conservation-restoration, archival science, library and information science, museum studies, chemistry, biology and materials science, this year's conference also welcomes contributions from architecture, economics, theatre studies, artificial intelligence, cultural tourism, Islamic art, digital humanities, and many other emerging areas relevant to cultural heritage.

The programme presents innovative multidisciplinary approaches to the study, preservation and interpretation of cultural heritage, showcasing diverse research methodologies while highlighting their complementarity and convergence. By bringing together specialists from different disciplines, the conference provides an inspiring platform for knowledge exchange, establishing new professional networks, initiating interdisciplinary collaborations, and developing future research projects. The diversity of contributions presented at MRCH 2026 confirms that cultural heritage is increasingly understood as a complex and dynamic system, where documentation, digital technologies, materials science, conservation, history, identity, sustainability, social development and economic perspectives intersect. These interactions not only enrich our understanding of cultural heritage but also open new possibilities for its preservation, interpretation and communication for future generations.

We sincerely thank all authors, reviewers, invited speakers, members of the Scientific and Organising Committees, as well as our partner institutions, whose commitment and enthusiasm have made this conference possible. We hope that the discussions initiated during MRCH 2026 will inspire new ideas, foster lasting collaborations, and contribute to the continued advancement of multidisciplinary cultural heritage research.

We wish all participants a successful conference and an enjoyable stay in Zagreb.

Andreja Dragojević, editor

The 3rd International Scientific Conference Multidisciplinary Research on Cultural Heritage (MRCH 2026) will be held in Zagreb for three days at three different locations.

On the first and second day, September 23 and 24, 2026, the conference will take place at the Croatian State Archives at Marulićev trg 21. This is the central archival institution responsible for collecting information on archival materials in Croatia. It is the most important palace of the Croatian Art Nouveau period, a combination of early Viennese Secessionism and modern European architecture from the beginning of the 20th century, built in 1913.



On the second day, September 24, 2026, the program includes a visit to the Museum of Contemporary Art at Avenija Dubrovnik 17, where this year's conference poster exhibition will be hosted. It was built according to the design of architect Igor Franić. The museum opened on December 11, 2009. As a multi-program institution, it mediates heritage and the contemporary scene, ranging from visual art to performing and film art.



On the third and final day, September 25, 2026, the conference will be held at the University of Zagreb Faculty of Graphic Arts at Getaldićeva 2. Classes began in 1960. The Faculty of Graphic Arts systematically develops nationally and internationally recognized excellence in education and research within the field of Graphic Technology – graphic engineering, visual communications, multimedia, and design. The Faculty offers the undergraduate university study programme in Graphic Technology, the undergraduate university study programme in Multimedia and Visual Communications, the graduate university study programme in Graphic Technology, and the doctoral study programme in Graphic Engineering and Design of Graphic Products.



Day 1 , September 23, 2026 – Croatian State Archives, Marulić square 21, 10000 Zagreb

9.00 Registration

9.30 Welcome Speech

Session - Music as Documented Heritage			
9.45 – 10.45	<i>Invited speaker</i>	Reconstructing Medieval Croatian Music: Sources, Methods, and Performance	Hana Breko Kustura (Croatia)
	Between Annotation and Heritage: Marginalia, Dedications and Correspondence in the Music Collections of the Arts Academy Library in Split		Maja Džaja Krile, Žana Siminiati Vioić (Croatia)
	Archives, Technology, and Musicology: Reconstituting Early Examples of Electronic Music from Bosnia and Herzegovina		Rijad Kaniža (Bosnia and Herzegovina)
10.45 – 11.00	Sponsored Lecture <i>Beyond the Data Loggers</i> - Siniša Prugovečki (Metroteka)		
11.00 – 11.15	Discussion		

11.15 – 12.00 Coffee break

Session - Digital Access to Cultural Heritage		
12.00 – 12.45	Digital Communication and Access to Performing Arts Heritage: The Digital Archive of the Croatian National Theatre in Zagreb	Zlatko Vidačković (Croatia)
	Enhancing the Perceived Value of Cultural Heritage Products through Location-Aware UX Design	Filip Cvitić (Croatia)
	Digitising the past for present decisions: archival sources and heritage protection in Venice	Sara Bini, Paola Benussi (Italy)
12.45 – 13.00	Discussion	

13.00 – 14.00 Lunch break

Session - Heritage protection, AI, Economy		
14.00 – 15.00	Shared Heritage, Divergent Practices: A Comparative Study of Stećci Protection in the Western Balkans	Marija Magdalena Šutalo, Boris Rozić (Croatia)
	Application of the artificial intelligents for historical objects and personalities creation and animation	Renata Gudaitiene, Mykolas Sidlauskas, Artūras Luksevicius, (Lithuania), Panagioti Kyratsis (Greece)
	Exploring conversational AI as a research instrument for stakeholder engagement in sustainable heritage renovation	Nina Hunter (Ireland)
	Everyday Recovery: Non-Human Agencies and the Afterlives of Modernist Housing	Avrokomi Zavitsanou (Greece)
15.00 – 15.15	Discussion	
15.15 – 16.00	Guided Tour of Selected Premises of the Croatian State Archives	

Day 2, September 24, 2026 - Croatian State Archives, Marulić square 21, 10000 Zagreb

8.30 Registration

Session - Cartography, Codices and Chronicle		
9.00 – 9.45	Cholera on the Map of Nineteenth-Century Gdańsk: A GIS-Based Digital Reconstruction of Albert Liévin's 1868 Epidemiological Map	Grzegorz Sobczyk (Poland)
	The Works and Translations made by Georgius Trapezuntius in the Corvina Library and the "First Heraldic Painter	Péter Ekler (Hungary)
	Islamic art and calligraphy	Edib Huseinagić (Bosnia and Herzegovina)
9.45 – 10.00	Discussion	

10.00 – 10.30 Coffee break

10.35 -12.00 Guided Tour of the Botanical Garden

Session - Museums and Libraries		
12.30 – 13.15	Cultural Heritage in The Collections of Kosovo Museums	Valon Shkodra (Kosovo)
	The Metropolitan Library of the Zagreb Archdiocese over the Last 50 Years: Librarians as Guardians of Historical Heritage	Emilia Plukavec, Tomica Plukavec (Croatia)
	Oriental Manuscripts as Written Heritage: The Collection of the National and University Library "St. Clement of Ohrid" in Skopje	Emel Sherif Miftar (R.N. Macedonia)
13.15 – 13.30	Discussion	

13.30 -14.30 Lunch

15.00 – 17.00	Museum of Contemporary Art , Avenija Dubrovnik 17, Zagreb - Guided Tour of the museum's permanent exhibition - Visit to the Conservation Department - Official Opening of the Conference Poster Exhibition
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**Day 3, September 25, 2026 - University of Zagreb, Faculty of Graphic Arts;
Getaldićeva 2, 10000 Zagreb**

8.30 Registration

9.00 Welcome Speech

Session - Technology in Preservation Practice			
9.15 – 10.30	<i>Invited speaker</i>	Advanced Bio-Based Coatings for Paper Preservation	Urška Vrabič –Brodnjak (Slovenia)
	A Contribution to the Identification of Rare Books Through Data Fusion Strategies Based on Multispectral Imaging		Jani dos Santos Monteiro (Portugal)
	Preservation of Paper and Wooden Artefacts Through Atmospheric Pressure Plasma Jet Treatment		Rafaela Radičić, Ana Bielen , Nikša Krstulović, Karolina Pietrzak, Andreja Dragojević, Maja Šegvić Klarić (Croatia)
	Marquetry Technique in Lithuanian Furniture Heritage 1918–1940: Formation of National Identity and Contemporary Interpretations in Education		Aistė Dičkalnytė (Lithuania)
10.30 – 10.45	Discussion		

10.45 – 11.15 Coffee break, Exhibition opening: *Between nature, light, and color / Između prirode, svjetla i boje*

Session - Textile Heritage and Material Analysis		
11.15 – 12.15	Armenian Manuscripts and Printed Books Containing Textiles - Statistics and Descriptions	Patricia Engel, Aldona Jedrusik (Austria)
	Chemical, biomolecular and colorimetric analysis of a Rubiaceae-derived dye from the Konavle region and its application in textile conservation	Iva Glavaš, Danijela Jemo, Mateo Miguel Kodrič Kesovia, Lucia Emanuele, Dragana Ivulić, Laura Scrano (Croatia, Italy)
	Traditional Turkish Carpet Weaving: A Field Study of Yağcıbedir Carpets in Bergama, İzmir	Banu Hatice Gürcüm, Hatice Feriha Akpınarli (Turkey)
	Rediscovering Sacred Power at the Wereldmuseum/Nationaal Museum van Wereldculturen: The Macan Ali Flag, Mystical Protection, and the Sensorial Memory of Cirebon	Afifi Hasbunallah (Indonesia)
12.15 – 12.30	Discussion	

12.30 – 13.30 Lunch break

Session Conservation-restoration		
13.30 – 14.30	Conservation-restoration of a silver sanctuary light from the Prvić Luka	Sonja Đuraš, Sabina Iulia Onisia Babencu (Croatia)
	Challenges in developing and optimizing spray application of protective 2D material coatings for mural paintings	Bojana Savić (Serbia)
	The surface of Kalin's bronze Žanjica: Interdisciplinary study prior to conservation-restoration	Michelle Vidovič (Slovenia)
	Survey and Systematisation of Conservation Practices in Archaeological Iron Artefacts: Analysis of 15 Case Studies from the Early Modern Period, Monastery of São Martinho de Tibães	Sara Rodrigues (Portugal)
14.30 – 14.45	Discussion	

15.00 - 16.00	Workshops: •Beyond the Visible <i>MSI (Multispectral Imaging) - Practical Examples</i> •Why don't two spectrophotometers see the same color? <i>Comparing directional and integrating sphere measurement geometries</i>
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POSTER PRESENTATIONS

1.	Multispectral Imaging and X-ray Radiography on the Painting Vittore Carpaccio: Madonna and Child Enthroned with Six Saints	Andrej Hirci (Slovenia)
2.	Conservation and Restoration Work on a Painting by Ivo Šebalj	Tamara Ukrainčik, Barbara Horvat Kavazović; Klara Bogadi; Doroteja Korinčić; Sari Kršnjavi; Hana Pour (Croatia)
3.	Digital Reconstruction of a Fragmented Roman Sarius Cup from Caska	Andrej Bašić, Zrinka Serventi (Croatia)
4.	The Turjak Castle Epitaph of the Duchess	Špela Govže , Maja Gutman Levstik (Slovenia)
5.	Controlled-Release Systems and Green Conservation: Innovative Protocols for Treating Biodeterioration of Cultural Heritage	Laura Scrano, Z. A.Y. A. Zanoon, Tito Scalo, C. Ozdemir, A. Salvi, R. Karaman, Abu Dis (Italy, Palestine)
6.	Colours and Materials in Traditional Blouse and Skirt Sets from the Vinkovci Area: A Case Study from the Collection of the Vinkovci Municipal Museum	Nikolina Novaković, Katica Ljubas (Croatia)
7.	Contemporary Art at the Intersection of Ecology and Heritage: The Case of Gallery VN and Gallery Prozori	Petra Dolanjski Harni, Olga Majcen Linn (Croatia)
8.	Digitalization of Easel Paintings: Case Studies and Challenges in the Process	Maja Sučević Miklin, Dejan Stupar (Croatia)
9.	AI-Driven Workflows in Archival Science: Automating Information Extraction and Entity Linking at the National Archives of Hungary	Kata Ágnes Szűcs, Emese Varga (Hungary)
10.	The Visible and the Hidden in Conservation-Restoration: Challenges of Interpretation and Presentation on the Example of a Crucifix from Veliko Trojstvo	Ana Božičević, Lucia Kolar, Hana Sirotković (Croatia)
11.	Innovative Approaches to Mold Removal with Enzyme and Bacterial Treatments on Paper Heritage	Anamarija Babič, Katja Kavkler, Lucija Planinc, Tamara Trček-Pečak, Polona Zalar (Slovenia)

12.	Significance of the 'Act of Seeing' Tangible and Intangible Cultural Heritage in Terms of National Image: A Case Study of Korea	Hyuk-Jin Lee (U.S.A.)
13.	A Streamlined Virtual Reflectance Transformation Imaging (V-RTI) Pipeline for Epigraphic Analysis: Bypassing 3D Rendering via AI-Generated Light Position Matrices	Branimir Kolarek, Marko Maričević, Davor Davidović (Croatia)
14.	Beyond Aesthetics: Harnessing Cultural Heritage to Revitalise the Economy and Achieve Sustainable Cultural Tourism	Kechacha Imane , Ferhati Koudoua, Bouzeria Hamza (Algeria)
15.	Evaluating Bioconsolidation Treatments for the Conservation of Wall Paintings in Side Boyalıin Church (Antalya, Türkiye)	Bilgesu Şen (Turkey)

ABSTRACTS

LECTURES



Croatian State Archives, the interior

Reconstructing Medieval Croatian Music: Sources, Methods, and Performance

Hana Breko Kustura

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The paper provides an overview of church singing in the medieval Croatian lands. It examines the influences that shaped liturgical music in this region, ranging from Gregorian chant and Beneventan chant to the distinctive tradition of the Croatian coastal areas known as Glagolitic chant.

Particular attention is devoted to contemporary research methods which, within a comparative European context, have generated new insights into the provenance of certain Latin Gregorian sources from the Croatian territories. The paper also presents contemporary approaches to the interpretation of medieval chant through examples drawn from prominent European ensembles specializing in the performance of medieval music.

Keyword: The Gregorian chant, the Beneventan chant, Glagolitic chant, neumatic notation, chant codices.

Between Annotation and Heritage: Marginalia, Dedications and Correspondence in the Music Collections of the Arts Academy Library in Split

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The Library of the Arts Academy in Split holds collections of diverse provenance and material types; this paper focuses on music collections formed through donations and personal bequests from distinguished Split musicians and educators. Drawing on three specific holdings—the Bombardelli Collection (composer and conductor Silvije Bombardelli), the Tudor Collection (pianist and educator Ranko Tudor), and the Škunca Collection and Archive (musicologist Mirjana Škunca and violinist Josip Škunca)—this paper illuminates the research potential of musical archival materials that go beyond the standard catalogue record.

The focus is on materials that are descriptively recorded in the catalogue but whose full research potential emerges through cross-referencing, comparative analysis, and the digitisation of the originals: marginalia and manuscript annotations in books and scores, dedications, correspondence, and accompanying documentation. The digitisation of such materials, in line with contemporary practices of digital heritage presentation, enables broader access and long-term preservation. It is precisely this material that reconstructs the dynamic network of musical and pedagogical relationships in mid-twentieth-century Split. Bombardelli's handwritten marginalia and annotations in his scores reveal the genesis of different variants of his compositions and his aesthetic thinking, while his correspondence with Mirjana Škunca sheds light on his efforts to safeguard his own legacy. From the Škunca Archive, we highlight letters by opera prima donna Elza Karlovac addressed to her singing teacher Cvijeta Cindro, a telling example of how private correspondence documents pedagogical ties and musical life in Split.

The paper examines the methodological status of marginalia, dedications, and correspondence as primary sources in music heritage research and underscores the urgent need for their systematic digitisation and preservation."

Keywords: music heritage, memorial collections, marginalia, digitisation, written heritage

Archives, Technology, and Musicology: Reconstituting Early Examples of Electronic Music from Bosnia and Herzegovina

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This paper presents the process of reconstituting early examples of electronic and electroacoustic music from Bosnia and Herzegovina with an exemplary focus on the composer's oeuvre of Josip Magdić (1937-2020) and the "MASMANTRA" ensemble. The qualitative and geographical fragmentation of the archives requires an interdisciplinary approach that integrates perspectives from musicology, media archaeology, and technology studies with the aim of creating a "complete" electronic work. In such an approach, a complete electronic or electroacoustic music work is, due to the very nature of the medium, treated as a complex archival entity non-exclusively made of a sound, notational, and documentary records, each of which requires a different approach to digitization. Accordingly, the multi-layered nature of "completeness" will be demonstrated through software, audio, and image examples collected during restoration, with an explanation of solutions for specific cases within the material. An exceptional methodological challenge is the diversity of audio media and the quality of recordings (magnetic tapes and cassettes, vinyl records, and digital formats), the development of a standardized restoration methodology based on digital audio samples from the oeuvre of the composer, and the lack and dispersion of musical notations and accompanying documentation for individual works. In such conditions, the paper considers the procedures for identifying, linking, and interpreting heterogeneous sources. The research is primarily aimed at establishing a digital ecosystem of documents and artifacts that enable a reconstitution of electronic music praxis in general, as well as a process of composing and technological context within which the piece was created. Emphasizing the importance of long-term archiving and preservation of cultural heritage in the domain of digital humanities, the paper largely provides conditions for systematic research of electronic and electroacoustic music in Bosnia and Herzegovina, especially the oeuvre of Josip Magdić, and opens the possibility for artistic research and new performances of such pieces.

Keywords: Electronic Music, Josip Magdić, Experimental Music, Audio Restoration, Analog to Digital

Digital Communication and Access to Performing Arts Heritage: The Digital Archive of the Croatian National Theatre in Zagreb

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Performing arts heritage represents a complex and heterogeneous field of cultural documentation consisting of printed materials, visual records, audiovisual documentation and artistic artefacts created within theatre production processes. Theatre institutions therefore preserve diverse archival materials, such as posters, programme booklets, daily repertoires, drama texts and adaptations, photographs, video and audio recordings, costume and set design sketches, and other documentation related to stage production. Because of this diversity, the digitization of theatre heritage requires differentiated methodological approaches and carefully structured digital archival systems. This paper examines the development of the Digital Archive of the Croatian National Theatre in Zagreb as a case study in the digital communication and accessibility of performing arts heritage. Based on an analysis of archival holdings, the study proposes a conceptual structure for the digital archive, organised into thematic collections that reflect the diversity of theatrical documentation. Attention is given to the role of discovery and digital access in the communication and dissemination of cultural heritage. For documentary sources such as programme booklets, daily programmes and theatre journals, the application of optical character recognition (OCR) represents a key technological step that enables full-text search, metadata enrichment following Records in Contexts (RiC) standard and more efficient research use of digitized materials. In addition to the theatre's archival collections, materials related to the history of the Croatian National Theatre are preserved at the Institute for Theatre Studies of the Croatian Academy of Sciences and Arts, as well as at other institutions that hold complementary documentation and visual materials. In this context, this Digital Archive is conceptualized not only as an institutional repository but as an integrative digital platform capable of connecting dispersed collections and enabling wider public access, knowledge dissemination, and new forms of digital engagement with performing arts heritage. Combining archival science, theatre studies, and communication research, the paper underscores how integration, access, and searchability support sustainable digital communication of performing arts heritage. The paper bridges information and communication sciences, emphasizing a multidisciplinary approach to the digital communication of theatre heritage.

Keywords: digital archive, performing arts heritage, public access, optical character recognition (OCR), digital communication

Enhancing the Perceived Value of Cultural Heritage Products through Location-Aware UX Design

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Empirical insights indicate a complex dynamic between Generation Z and cultural heritage: while there is a latent personal interest in tradition, traditional exhibition methods and static digital catalogs often fail to translate this passive appreciation into active engagement. To bridge this gap, cultural heritage must evolve beyond traditional museum exhibits and integrate into the modern digital ecosystem. This paper presents Fabula Mea, a digital framework designed to enhance the perceived value of tangible heritage artifacts through contemporary, interactive storytelling. The proposed system integrates narrative elements with location-aware user experience (UX) architecture, providing real-time, proximity-based routing to cultural sites and artisan workshops. A central feature of this approach is a “reserve-and-experience” model, which acts as a catalyst to convert digital interaction into concrete physical action. To evaluate this framework, a comparative A/B testing methodology is applied to Generation Z participants. The study measures the impact of traditional artifact presentation (Group A) against geographically contextualized, digital-first storytelling (Group B).

Quantitative metrics focus on behavioral responses, user engagement levels, and the effectiveness of location-based triggers in driving physical visits. The anticipated results aim to demonstrate that strategic, location-aware UX design can successfully overcome psychological barriers, significantly increasing physical foot traffic to cultural institutions and supporting the long-term preservation and sustainability of cultural heritage.

Keywords: UX Design, Digital Storytelling, Cultural Heritage, Location-Aware Systems, User Engagement, Generational Perception

Digitising the past for present decisions: archival sources and heritage protection in Venice

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In heritage protection systems, access to structured knowledge on the conservation history of artefacts and monuments is essential for informed decision-making. In the Italian context, however, this knowledge is often fragmented and dispersed across heterogeneous archives that are rarely integrated into the operational processes of heritage institutions.

A significant part of the documentation relating to conservation interventions predates the establishment of the current Soprintendenze in the late nineteenth and early twentieth centuries and remains difficult to access and only marginally used in a systematic way.

This paper presents an ongoing project developed by the Soprintendenza Archeologia, Belle Arti e Paesaggio for the Municipality of Venice, aimed at reconstructing and operationalising this body of knowledge through the integrated analysis of archival sources preserved in the State Archives of Venice, the Soprintendenza archives, and the Central State Archives.

The methodology combines analytical inventorying, digitisation, and thematic indexing, not only for archival description, but also for structuring data according to the practical needs of heritage protection. Through the definition of interpretative categories such as types of intervention, materials, actors, and operational contexts, archival documentation is transformed into a searchable system capable of reconstructing the genealogy of conservation practices and supporting contemporary decision-making processes.

The paper reflects on the role of archives as a knowledge infrastructure for heritage protection and proposes a replicable model in which the enhancement of documentary heritage becomes a structural component of cultural heritage management policies.

Keywords: Archival sources, Heritage protection, Digitalisation, Decision-making, Venice

Shared Heritage, Divergent Practices: A Comparative Study of Stećci Protection in the Western Balkans

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This paper addresses the persistent challenges in the protection and management of stećci necropolises in Bosnia and Herzegovina, with particular emphasis on patterns of degradation and the structural issues faced by heritage professionals. Despite their recognized cultural and historical value, including their inscription on the UNESCO World Heritage List, numerous necropolises remain vulnerable to various forms of devastation, such as illegal construction, agricultural activities, looting, neglect, and inadequate institutional oversight. The study identifies key factors contributing to the endangerment of these sites, including fragmented administrative responsibilities, insufficient legal enforcement, limited financial and institutional resources. Furthermore, it examines the gap between formal protection frameworks and their practical implementation on the ground.

In a comparative perspective, the paper analyzes approaches to the protection, presentation, and popularization of stećci in neighboring countries: Croatia, Serbia, and Montenegro. By evaluating differences in legislative frameworks, heritage management strategies, tourism integration, and public engagement, the research highlights both successful practices and persistent shortcomings. Particular attention is given to the role of local communities, interpretative infrastructure, and the use of digital media in enhancing visibility and awareness. The aim of this paper is not only to diagnose existing problems but also to propose guidelines for more effective and sustainable heritage management. By situating Bosnia and Herzegovina within a broader regional context, the study seeks to contribute to the development of more coherent, collaborative, and forward-looking strategies for the preservation and promotion of stećci as a shared cultural heritage.

Keywords: Stećci, medieval necropolises, cultural heritage, archaeological heritage

Application of the artificial intelligents for historical objects and personalities creation and animation

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Artificial intelligence is increasingly making inroads into various fields such as science, business, media and more. Applying AI can greatly help speed up work and save time. With its help, it is possible to restore objects or personalities destroyed by time from the remaining photographs, paintings or other elements and contribute to the preservation of cultural and historical heritage. However, when it comes to historical heritage, the quality of generated images or objects plays an important role, which is directly related not only to the skills of a human specialist, but also to the capabilities of artificial intelligence tools. In view of this, the main goal of this work was to investigate the possibilities of applying artificial intelligence tools to the creation of historical figures and objects and to present examples of the obtained results.

Artificial intelligence tools such as MeshyAI, API Rodin Gen2, Trellis, API Tripo, Hitem3D, Hunyuan3D and others were used to perform the work. Autodesk Maya, Autodesk 3DMax and Blender software were used for correction and modeling of 3D objects.

During this work, historical figures were created using AI and 3D modeling programs. During the work, the advantages and disadvantages of AI tools were analyzed, the accuracy and authenticity of object reproduction was assessed, and 3D object optimization was performed. The historical figures were created by the placing bones and generating animations using 3D software and a VR environment. During the work, it was observed that most of the AI tools produce a messy mesh of generated objects with triangular segments, which usually requires optimization. Without optimization and reshaping the segments into a rectangular shape, it can be difficult to place bones and create smooth object animations. However, optimization does not always help to solve problems, improving 3D models quality, and defects and holes may appear during generation.

Keywords: artificial intelligence (AI), 3D modeling, historical persons and objects, 3D models quality, animation

Exploring conversational AI as a research instrument for stakeholder engagement in sustainable heritage renovation

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Artificial intelligence (AI) is increasingly being introduced into cultural heritage practice to support communication, interpretation and decision-making. However, relatively little is known about how stakeholders interact with conversational AI during participatory heritage processes or how these interactions can inform heritage research. Heritage decisions are rarely constrained by a lack of technical information alone; they are more often shaped by uncertainty, competing values and stakeholder concerns. This exploratory study investigates how conversational AI can support stakeholder engagement while providing new methodological insights into participatory heritage research. It was undertaken in Naples, Italy, as part of the Horizon Europe CALECHE project, which examines sustainable renovation strategies for historic and heritage buildings.

The study focused on two innovative heritage renovation technologies – bio-insulation plasters and customised building-integrated photovoltaics – and compared stakeholder engagement through printed information and a conversational AI interface (retrieval-augmented generation chatbot). The analysis examined how participants interacted with the chatbot and the questions they posed.

The interactions showed that conversational AI functioned not only as an information resource but also as a means of revealing stakeholder concerns, values and reasoning that were not fully captured through previous engagement activities. Participants sought technical clarification, explored perceived risks, investigated practical implementation and delegated evaluative judgements to the system itself. The conversational format also raised concerns not identified during earlier stakeholder engagement, including life-cycle impacts, future usability of heritage spaces and long-term management of interventions.

Rather than replacing traditional communication materials, the findings suggest that conversational AI can complement stakeholder engagement by revealing concerns, perspectives and information needs that may otherwise remain hidden. The study proposes that conversational AI has value not simply as a communication technology, but as a qualitative research instrument that enables researchers to observe stakeholder reasoning as it unfolds. As an exploratory case study, it

illustrates how AI can contribute to interdisciplinary heritage research by connecting technological innovation with the social dimensions of heritage decision-making.

Keywords: Conversational Artificial Intelligence, Human–AI Interaction; Participatory Research, Stakeholder Engagement, Sustainable Heritage Renovation

Everyday Recovery: Non-Human Agencies and the Afterlives of Modernist Housing

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This paper examines a contemporary architectural approach in the renovation of postwar housing, focusing on the polykatoikía apartment blocks of Athens and similar building types across Southern Europe. It identifies a framework of recovery as a process through which buildings continue to function, adapt, and undergo modification through intervention. Recovery is defined here as a set of practices that maintain the material, spatial, and social operation of buildings over time.

Based on selected case studies, the paper proposes a typology of six modes of recovery: material, environmental, affective, informal, speculative, and temporal. Each mode describes a specific way in which renovation engages with existing conditions and involves multiple forms of agency. These include structural elements, environmental conditions, patterns of use, informal construction practices, economic factors, and temporal layers. These factors are treated as contributing components in the production of architectural outcomes.

The analysis draws on posthumanist theory (Jane Bennett), actor-network theory (Bruno Latour), and critical heritage studies (Laurajane Smith, Rodney Harrison). It frames buildings as sites of interaction among human and non-human actors, including materials, regulations, labour, maintenance processes, and prior uses. Material recovery involves the reuse and reinterpretation of existing elements; environmental recovery refers to spatial adjustments that improve environmental performance; affective recovery addresses the role of memory and attachment in shaping design decisions; informal recovery examines unregulated interventions as forms of spatial adaptation; speculative recovery considers the influence of real estate dynamics; temporal recovery describes approaches that allow multiple temporal layers to remain visible.

The paper presents recovery as a method for re-evaluating the architectural legacy of postwar housing. By focusing on building types that are often excluded from heritage frameworks, it contributes to a broader understanding of preservation as a process linked to continued use and adaptation. The aim is to provide an interpretive framework for understanding renovation as a process involving multiple actors and conditions. Recovery is defined as an ongoing process associated with the continued use and modification of existing buildings.

Keywords: Critical Heritage Studies, Non-human agency, Everyday recovery, Postwar housing, Architectural renovation

Cholera on the Map of Nineteenth-Century Gdańsk: A GIS-Based Digital Reconstruction of Albert Liévin's 1868 Epidemiological Map

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This article presents a digital reconstruction of nineteenth-century cholera epidemics in Gdańsk based on the little-known epidemiological map published in 1868 by Dr. Albert Liévin in **Danzig und die Cholera**. Preserved in the collections of the Gdańsk Library of the Polish Academy of Sciences, the map documents the spatial distribution of cholera deaths across eight epidemic waves and twelve territorial groups within the city. Although highly significant for the history of cartography, public health, and urban studies, this source has not previously been the subject of detailed scholarly analysis or digital processing. The study applies Geographic Information Systems (GIS) methods to georeference the historical map, reconstruct Liévin's spatial divisions, and visualize aggregated mortality data through point layers, heat maps, and temporal animations. The results reveal clear concentrations of cholera mortality in areas such as the Old Town, Brabank, Biskupia Górka with Nowe Ogrody, and the Lower Town, confirming the strong relationship between epidemic intensity and the urban environment. By combining historical epidemiological data with modern spatial analysis, the article reassesses Liévin's contribution as an early pioneer of urban disease mapping and places his work in a broader comparative context alongside John Snow's cholera map of London. The study also demonstrates the contemporary research, educational, and heritage value of digital reconstructions of historical epidemic cartography.

Keywords: HGIS, cholera epidemics, Gdansk, Dr. Albert Liévin

The Works and Translations made by Georgius Trapezuntius in the Corvina Library and the “First Heraldic Painter

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This text discusses a focus on the works and translations of George of Trebizond in the Corvina Library and on the activity of the “First Heraldic Painter.” Matthias I of Hungary and Croatia, also known as Matthias Hunyadi or Matthias Corvinus, was a prominent patron of the arts, and his Corvina Library was one of the most important manuscript collections in Europe at the time. The lecture will present five Corvina manuscripts associated with the works and translations of the learned Byzantine humanist George of Trebizond, who was active in Italy and played an important role in Quattrocento humanism: 1. *Georgius Trapezuntius: De partibus orationis ex Prisciano compendium* (Budapest, OSZK [National Széchényi Library], Cod. Lat. 428); 2. *Georgius Trapezuntius: Rhetoricorum libri V* (Budapest, OSZK, Cod. Lat. 281); 3. *S. Basilius Magnus: Adversus Eunomium. De Spiritu Sancto* (Budapest, OSZK, Cod. Lat. 415); 4. *Eusebius Caesariensis: Praeparatio evangelica* (Budapest, Egyetemi Könyvtár [University Library], Cod. Lat. 6); 5. *Cyrellus Alexandrinus: Thesaurus* (Budapest, OSZK, Cod. Lat. 358). The lecture will examine why these texts were important documents in a contemporary humanist library and how they contributed to the intellectual profile of the Corvina Library. It will also highlight the illustrations adorning the codices, the illuminators involved in their decoration, and especially the “First Heraldic Painter,” one of the most significant minor masters of the Corvina Library, whose decorated codices received gilded leather bindings. These bookbindings will be compared with other types of Corvina bindings, shedding light on the growth and stages of expansion of the Corvina Library, as well as on the library patronage of Johannes de Zredna/Ivan Vitez od Sredne and King Matthias

Keywords: Illuminated codices; Corvinian Library; Matthias I, King of Hungary and Croatia; George of Trebizond

Islamic art and calligraphy

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Islamic art and calligraphy date back to the very beginning of the revelation of Islam. The first Islamic art, and at the same time the most important, is the calligraphy of the Arabic script. It has been constantly developing and expanding since its inception, and has reached the very peak of its aesthetic level. Following calligraphy, as well as the art of the book, which characterizes Islamic civilization, other arts and crafts have developed in parallel, such as illumination, bookbinding, ebru art, miniature painting, etc. These are specific techniques, traditional materials and visual ways of communication that deserve a comprehensive work, which is the topic of this paper.

Keywords: Islamic art, calligraphy, illumination, traditional art

Cultural Heritage in The Collections of Kosovo Museums

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This study examines the diversity of materials preserved in the collections of museums in Kosovo and analyzes their historical, cultural, and scientific significance. The museum holdings include artefacts composed of stone, metal, ceramics, glass, wood, textiles, and paper, representing different historical periods from prehistory to the modern era. Each material reflects specific technological developments, craftsmanship traditions, and aspects of everyday life. The paper explores how material composition influences both the interpretation and preservation of museum objects. By examining the range of materials within museum collections, this study highlights the importance of interdisciplinary approaches in museum practice, combining archaeology, ethnology and history.

The analysis shows that the study of materials is essential for the preservation and interpretation of cultural heritage.

This abstract presents the results of our research work carried out intensively over the past year, also drawing on our previous experience in studying and working with the museums of Kosovo.

Keywords: Kosovo, museums, artefacts, cultural heritage, conservation

The Metropolitan Library of the Zagreb Archdiocese over the Last 50 Years: Librarians as Guardians of Historical Heritage

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The Metropolitan Library of the Zagreb Archdiocese, located in the very heart of Zagreb, is one of Croatia's key cultural centers. Its origins date back to the founding of the Diocese of Zagreb in 1093, and its development is indissolubly linked to the preservation of both sacred and secular works. Throughout history, librarians have played a crucial role in protecting these precious collections. Under Bishop Antun Ivan Mikulić (1688–1694), the library was significantly enriched, and Mikulić established a foundation for its maintenance. He also acquired the collection of Johannes Weichard Valvasor, which remains an important part of the library's holdings today. In the 19th century, the library was opened to the general public, and following the 1880 earthquake, it was moved to the then Royal and University Library building at Marulić Square 21 (now the Croatian State Archives building), where it remains to this day. Over the last fifty years, the librarians of the Metropolitan Library have been facing the challenges posed by 21st-century society and technology.

Keywords: Metropolitan Library, Zagreb Archdiocese, librarians, heritage preservation

Oriental Manuscripts as Written Heritage: The Collection of the National and University Library “St. Clement of Ohrid” in Skopje

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Written heritage includes the texts and documents through which societies record and transmit knowledge across generations. In this sense, the Oriental manuscripts preserved in North Macedonia form an important part of both the region’s cultural heritage and the wider legacy of Islamic civilization. They are not only historical artifacts, but also enduring witnesses to centuries of intellectual exchange and scholarly activity.

This paper offers an overview of the Oriental manuscript and rare book collection of the National and University Library “St. Clement of Ohrid” in Skopje. The collection contains works dating from the twelfth to the twentieth century and includes 3,743 catalogued manuscripts—2,586 in Arabic, 1,050 in Ottoman Turkish, and 107 in Persian—together with approximately 6,000 printed books and nine incomplete Ottoman-Turkish serial publications.

Many of these works were widely studied, copied, and transmitted by Islamic scholars across different regions of the Muslim world. As such, the collection reflects not only local intellectual life, but also the broader networks of scholarship that connected the Balkans with major centers of learning in the Middle East and beyond. Viewed as written heritage, these materials document the educational, religious, administrative, and literary traditions of the Ottoman period and illustrate the strong respect for the written word among the Muslim population in Macedonia until the end of Ottoman rule.

By drawing attention to this collection, the paper emphasizes its value both as a source for historical research and as part of a shared written heritage that links Southeast Europe to the wider Islamic scholarly tradition.

Keywords: Oriental manuscripts, written heritage, Ottoman cultural history, Balkan intellectual networks, manuscript tradition



The University of Zagreb, Faculty of Graphic Arts, Laboratory for Graphic Materials

Advanced Bio-Based Coatings for Paper Preservation

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The increasing demand for sustainable and conservation-compatible materials has intensified research into bio-based coatings for paper, particularly in cultural heritage conservation. Polysaccharide- and protein-based systems, including chitosan, bacterial nanocellulose, alginate, starch, cellulose derivatives (e.g., carboxymethyl cellulose), and traditional materials such as gelatin, are increasingly explored as alternatives to synthetic coatings due to their renewability, tunable functionality, and compatibility with cellulosic substrates (Shankar & Rhim, 2023; Zhang et al., 2024). Chitosan provides intrinsic antimicrobial activity and strong film-forming affinity with cellulose, making it effective against biodeterioration (Younes & Rinaudo, 2023). Bacterial nanocellulose is a promising reinforcement material due to its nanoscale fibrillar structure, high mechanical strength, and ability to form thin, flexible, and visually unobtrusive layers (Thomas et al., 2024). Alginate systems enable mild gelation and versatile, often removable applications (Lee et al., 2023). Cellulose derivatives, starch-based coatings, and protein materials such as gelatin contribute to surface consolidation while maintaining historical compatibility. Among these, chitosan and bacterial nanocellulose stand out by combining mechanical reinforcement with functional properties such as antimicrobial activity, while supporting minimally invasive, reversible, pH-compatible, and low-toxicity conservation approaches (Zhang et al., 2024).

Despite these advantages, several limitations restrict broader application. The hydrophilic nature of these materials leads to moisture sensitivity and dimensional instability under fluctuating relative humidity, which is critical in archival environments (Singh et al., 2023). Additional concerns include embrittlement during ageing, changes in optical properties, and uncertainties regarding long-term chemical stability. Conservation practice imposes strict requirements, including reversibility, minimal penetration, preservation of original material properties, and long-term stability, necessitating careful formulation and testing (Thomas et al., 2024).

However, bio-based coatings show strong potential as sustainable solutions for paper conservation when aligned with the rigorous and ethically grounded principles of conservation science.

Keywords: sustainable coatings; conservation-compatible materials; cultural heritage paper; conservation

A Contribution to the Identification of Rare Books Through Data Fusion Strategies Based on Multispectral Imaging

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Multispectral imaging (MSI) has become an important non-invasive approach for the study of cultural heritage materials, particularly in cases where conventional observation is not sufficient for reliable identification. This is especially relevant in archival and library contexts, where professionals often deal with rare books affected by degradation, missing content, or lack of contextual information, making their interpretation and classification uncertain.

This work presents an ongoing case study developed in collaboration with the Public Library of Braga, focusing on a set of rare books whose identification remains incomplete. Rather than approaching MSI as an isolated imaging technique, it is considered here as a starting point for data acquisition. The use of the XpeCAM system (360–1200 nm, CMOS sensor with a patented multi-band well system) enables the capture of spectral information that reveals otherwise inaccessible textual and graphical features, adding meaningful data to the analysis.

The central focus of this study lies in how this information can be used. By exploring data fusion strategies, the work combines different layers of spectral data to support a more structured interpretation of these materials. This approach allows fragmented or ambiguous evidence to be contextualized, contributing directly to the identification process.

Within the scope of ongoing doctoral research on Artificial Intelligence and Machine Learning applied to art analysis, this case study also serves as a basis to understand how multispectral data can be integrated into data-driven analytical frameworks. The aim is not only to recover information, but to make it usable in a systematic way.

The results obtained so far indicate that this approach supports more informed identification of rare books and helps reduce uncertainty in their interpretation. More broadly, it suggests a shift from viewing MSI as a purely imaging technique to considering it as a source of structured data for cultural heritage analysis.

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Keywords: Data Fusion Strategy, Rare Books, Archival Studies, Multispectral Imaging

Preservation of Paper and Wooden Artefacts Through Atmospheric Pressure Plasma Jet Treatment

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This study explores the application of a non-thermal atmospheric pressure plasma jet as an innovative disinfection strategy for the conservation of paper and wooden cultural heritage artifacts. To evaluate its effectiveness, wooden test plates were deliberately inoculated with the brown rot fungal mycelium *Coniophora puteana*, a common biodeteriogenic species known for its ability to degrade lignocellulosic materials. Following inoculation, the samples were treated using an argon-based atmospheric pressure plasma jet under controlled conditions. Paper samples were inoculated with *Aspergillus* fungi.

The findings reveal that exposure to the plasma jet induces a pronounced stress response in the fungal mycelia, leading to the formation of calcium oxalate crystals. This biomineralization process appears to inhibit further fungal proliferation, effectively suppressing colonization. Importantly, complementary analyses confirm that the plasma treatment does not modify or degrade the chemical composition of sensitive decorative layers, such as gilded or lacquered surfaces. This highlights the method's suitability for removing atmospheric contaminants and biological deposits without compromising delicate artistic finishes. Overall, the cold argon plasma jet demonstrates strong potential as a safe and efficient tool for eliminating fungal contamination on wooden artifacts [1].

Beyond its immediate disinfection capabilities, this approach also opens pathways for future conservation technologies. In particular, the integration of antimicrobial ZnO nanoparticles into paper, textile, or painted substrates represents a promising direction for enhancing the long-term stability and resistance of cultural heritage materials. Such hybrid plasma–nanomaterial strategies could significantly strengthen preventive conservation practices and contribute to more durable preservation solutions [2,3].

Keywords : Non-thermal Atmospheric Pressure Plasma Jet, *Coniophora puteana*, *Aspergillus*, paper preservation, wooden artifact disinfection

Marquetry Technique in Lithuanian Furniture Heritage 1918–1940: Formation of National Identity and Contemporary Interpretations in Education

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Marquetry — a decorative art and craft that involves inlaying thin pieces of wood, known as veneers, to create decorative patterns or designs. This technique became particularly important in the unique furniture design in Lithuania between 1918 and 1940 during the period of national independence. In these decades, efforts were made to create a cultural identity reflected in design within a rapidly globalising world. This presentation will reveal that marquetry in Lithuanian furniture design has evolved into more than mere decoration: it has become a way to express our cultural identity. The most prominent Lithuanian designers of the interwar period used marquetry to express ideas of national style into material form, combining local timbers, amber, and floral motifs rooted in Baltic folk ornaments and Art Deco stylisation. The materials, colours, and symbols of the ornaments that have given marquetry its heritage value will also be analysed.

The study also highlights the role of marquetry as a tool for understanding and preserving cultural heritage. At the Kauno Kolegija Higher Education Institution Faculty of Arts, students in the Object Conservation and Restoration programme engage directly with historical furniture, reconstruct craft processes, and create their own marquetry pictures inspired by Lithuanian national style traditions. This hands-on learning fosters respect for historical craftsmanship while cultivating the creative and analytical skills essential for future heritage conservation professionals. The aim of the presentation is to outline how marquetry craft was reimaged as both a form of artistic expression and a marker of national identity. The research combines historical and stylistic analysis of Lithuanian interwar furniture with marquetry decorations and includes a case study of works by Lithuanian students featuring marquetry.

Keywords: Marquetry, Furniture Heritage, Lithuania, National Identity

Armenian Manuscripts and Printed Books Containing Textiles - Statistics and Descriptions

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The paper presents an overview of the collections which were included into our research project "Textiles in Armenian Manuscripts and Printed Books" (Austrian Science Fund (FWF) FWF Stand alone PAT6918924 so far.

Collections of Armenian manuscripts and printed books are in public and private libraries, including State or National Libraries, University Libraries and in Monasteries. We first collected information about these places and tried to identify the shelf marks of the books which contain textiles from online catalogues. Because large and important collections, such as these in Isfahan and in Jerusalem, and other war stricken areas, cannot be reached by us in present moment, we found a way to nevertheless get detailed information on the textiles by creating an online available description form and invite local experts to use this form.

To make the detailedness of our description visible, we will present a comparison between valuable old descriptions with our survey. It also makes evident the difference between an art historians' approach and a conservators' approach.

We rather do not „see“ red textiles or „floral“ textiles, but we found first and foremost cotton and silk textiles and we see yarn dyed and fabric dyed textiles. Concerning the technique of decoration we will show woven patterns versus dyed and painted or printed colours, resist dye techniques, both painted and printed, versus stencil and printed colours, as well as mix of techniques. Rarely, and actually later in time velvet and metal embroidered fabric can be found in Armenian books. We also describe fabric in the binding, such as spine lining, not only paste downs and covering.

We included prints in our survey, which allowed confirming the publications already available on the topic, however it also allowed us to add new details.

Still, we want to emphasize that this is an ongoing study with still open questions, such as the question about the paths the fabrics took to the book binderies. We will introduce the places of book binderies and trade routes used by Armenians. We also must keep in mind that these books were rebound, in particular given the Armenian history of travel and exodus. This makes also the dating of both the textiles and the bindings difficult. Still we will present the features we used for this attempt.

Keywords: Armenian manuscripts, Armenian printed books, textiles, Armenian bindings

Chemical, biomolecular and colorimetric analysis of a Rubiaceae-derived dye from the Konavle region and its application in textile conservation

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Natural dyes were the primary colorants for textiles until the 19th century. Derived from plant, animal, or mineral sources, they are present in most historical textiles and are essential to the technological, aesthetic and cultural value of textile heritage. In textile conservation, knowledge of these dyes is crucial for understanding material composition, assessing condition, and planning appropriate treatments.

With the introduction of synthetic dyes, natural dyes were largely replaced due to their ease of use, reproducibility, and consistent quality. However, synthetic dyes are often non-biodegradable and may pose risks to environmental and human health. Consequently, recent decades have seen renewed interest in natural dyes, driven by environmental awareness and sustainability concerns, including in conservation practice.

This study focuses on alizarin, a natural red dye present in the roots of plants in the Rubiaceae family. Species within this family, especially *Rubia* and *Galium*, have been used for textile dyeing since prehistoric times, including the Stone, Bronze and Iron Ages, until the introduction of synthetic dyes.

The roots used in this study were collected from a local plant widely distributed in the Konavle region (southeast of Dubrovnik, Croatia), where their harvesting and use for dyeing are embedded in orally transmitted traditional knowledge. The plant was initially identified by its morphological characteristics, and its species attribution is currently being further investigated through chemical analyses. These traditional practices have led to variations in dyeing procedures, particularly concerning the optimal harvesting season. Some sources recommend specific seasons, while

others suggest year-round collection to achieve different color shades. To correlate composition with dyeing behavior, roots harvested in different seasons (summer and winter) were analyzed using a combined chemical and biomolecular approach. Additionally, the study examines an environmentally friendly mordant (ammonium alum) and natural additives (vinegar, baking soda and vine wood ash) to regulate pH and influence dye binding on wool. Colorimetric analysis was carried out on 26 experimentally dyed wool samples to quantify and evaluate differences in color. The results provide useful guidance for the analysis of historical textiles and decision-making in conservation–restoration, while confirming the potential of locally sourced plant dyes.

Keywords: Natural dyeing, Rubiaceae-derived dye, Textile conservation-restoration, Colorimetric analysis, Biochemical analyses

Traditional Turkish Carpet Weaving: A Field Study of Yağcıbedir Carpets in Bergama, İzmir

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This study examines twelve Yağcıbedir carpets documented through field research in the Bergama district of İzmir Province, an important centre of traditional carpet weaving in Western Anatolia. It focuses on the carpets' materials, weaving techniques, motifs, colours, and compositional characteristics. As a significant element of cultural heritage, traditional carpet weaving is not merely an aesthetic and functional practice but also a means of transmitting cultural identity, social values, local knowledge, and collective memory across generations.

Within Turkish culture, carpets have long functioned as a visual language encoding symbolic meanings, beliefs, lifestyles, and regional identities. The motifs, colours, and compositions of Yağcıbedir carpets reflect cultural narratives and local traditions shaped over centuries. Rooted in Anatolia's established weaving culture, Yağcıbedir carpets are distinguished by characteristic motifs, strong geometric compositions, a limited yet striking colour palette, and traditional production techniques. They have played an important role in domestic life, dowry traditions, ceremonial practices, and the preservation of regional identity. Their systematic documentation and analysis are therefore essential for safeguarding this heritage and supporting its reinterpretation in contemporary textile and design practices.

The study employs a qualitative methodology combining field research with descriptive visual analysis. Twelve Yağcıbedir carpets documented during fieldwork in Bergama were examined through direct observation and visual documentation. The analysis considered material properties, weaving techniques, motif structures, colour use, and compositional organisation. A literature review was also undertaken to position the findings within the broader context of traditional Turkish carpet weaving and Anatolian textile culture. The findings indicate that Yağcıbedir carpet weaving contributed to Bergama's local economy by providing household income and home-based employment, particularly for women. Its economic sustainability depended on continued market demand, fair compensation for weavers, and the transmission of traditional knowledge to younger generations. The study contributes to the documentation of Yağcıbedir carpet-weaving heritage and provides a basis for future research and design-oriented interpretations informed by traditional knowledge.

Keywords: Cultural Heritage, Turkish Culture, Yağcıbedir Carpets, Bergama, Traditional Carpet Weaving

Rediscovering Sacred Power at the Wereldmuseum/ Nationaal Museum van Wereldculturen: The Macan Ali Flag, Mystical Protection, and the Sensorial Memory of Cirebon

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This paper takes the Wereldmuseum/Nationaal Museum van Wereldculturen collection record of the Macan Ali flag, inventory number TM-5663-1, as a point of departure for reconstructing its earlier symbolic and sensorial life as a sacred courtly object of Cirebon. In the museum metadata, the flag is associated with magical protection, religious banners, and political-religious symbols. Rather than treating the flag merely as an ethnographic textile, this paper reads it as a material medium through which sacred power, Islamic mysticism, and Cirebonese cultural memory were visually and sensorially produced.

Methodologically, the paper combines object-biographical analysis, provenance-oriented museum research, visual-symbolic interpretation, and sensory history. It draws on a close reading of museum metadata, relevant literature on Islamic calligraphic banners, and a planned research visit to the Dutch museum collection to examine the artefact, document its material and visual features, and clarify its museological classification and collection history.

The paper argues that the museum does not simply preserve the object; it frames, classifies, and transforms it. Through inventory numbers, material descriptions, functional categories, and ethnographic taxonomies, the flag is translated from a sacred-political object embedded in the Javanese-Islamic courtly world of Cirebon into a classified museum artefact.

This museological reclassification interrupts the ritual, mnemonic, and sensorial environment through which the flag acquired its cultural force. Yet the same museum record also enables a reverse movement of interpretation: from colonial classification back to the symbolic world of Cirebon. This paper shows how rediscovery may function not only as the recovery of an object's location, but as the reactivation of a suppressed field of cultural meanings.

Keywords: Macan Ali Flag; Sacred Power; Sensorial Memory

Conservation-restoration of a silver sanctuary light from the Prvić Luka

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The silver sanctuary light belongs to the Parish Church of Mary of Grace in Prvić Luka on the island of Prvić. It was made in a Venetian goldsmith's workshop and is an example of Baroque liturgical metalwork, richly decorated with floral ornamentation characteristic of the period.

The lamp deteriorated significantly over time. The surface was covered with a thick layer of paint that concealed the fine details. The original chains were missing and the object showed extensive mechanical damage. In addition, numerous previous interventions were identified, including large quantities of soft solder, the incorporation of silver sheet elements, and the addition of a copper base.

The presentation will provide a comprehensive overview of the conservation-restoration process carried out as part of the graduate course Conservation and Restoration of Metals at the University of Dubrovnik, Department of Art and Restoration.

The process involved systematic disassembly of the object, removal of non-original and unsuitable materials, and reconstruction of missing elements. The church in Prvić Luka preserves another sanctuary lamp of the same type and origin, which, due to its better condition, served as a reference and supported decision-making. Particular attention was given to preserving the integrity of the original while following the principles of reversibility and distinctiveness.

Keywords: conservation-restoration, silverwork, liturgical objects, Prvić Luka

Challenges in developing and optimizing spray application of protective 2D material coatings for mural paintings

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The 2DHeriPro project demonstrates how conservation fosters interdisciplinary collaboration while advancing scientific innovation. Bringing together students and professors from the Faculty of Applied Arts in Belgrade and scientists from the Institute of Physics Belgrade, the project focused on the development of protective coatings based on 2D materials for mural paintings executed using different techniques. This process involved investigative work in situ including the sampling of 16th-century frescoes from the Crna Reka Monastery and contemporary secco murals from the Church of Saint George at Novi Beograd. The sampling and physico-chemical characterization of pigments and mortars from the original were essential to obtaining reference materials for the creation of replicas, which in turn provided controlled surfaces for testing the novel coatings. Recently, the application of 2D-based materials with excellent protective efficacy has been demonstrated. However, a universal methodology for surface coverage has not yet been established, and optimization for different types of surfaces is required for each material. Replicas imitating fresco (wet lime plaster) and secco (dry plaster) techniques were prepared to evaluate the behavior of a new generation of 2D material nanoplatelets when applied by spraying. This approach was selected because it is the most widely used technique for depositing 2D materials from solution and offers an in situ, non-contact deposition method over large areas. The study demonstrates how material accumulates on the surfaces depending on the material type, choice of the carrier solvent, surface wettability, number of spray passes, and subsequent heating temperature. These findings contribute to the development of a more adaptable methodology, guaranteeing that the performance of innovative materials can be assessed according to the specificities of traditional wall-painting practices, thereby aligning modern conservation strategies with cultural heritage preservation.

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and by the Institute of Physics Belgrade through the grants by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia.

Keywords: Mural paintings, 2D materials, protective coatings, spray deposition

The surface of Kalin's bronze *Žanjica*: Interdisciplinary study prior to conservation-restoration

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Patina constitutes an integral component of a bronze sculpture and a key element of the artist's visual expression. Over time, the surface undergoes chemical and visual transformations under environmental influences, particularly in the absence of proper maintenance. Decisions regarding treatment and the limits of intervention must be based on careful differentiation between artificially created, naturally formed, stable, aesthetically acceptable patinas and harmful alterations. We discuss the case of *Žanjica* (1947) by Zdenko Kalin, examined through a multidisciplinary study to guide a well-founded and respectful conservation-restoration approach. Various analytical methods (FTIR, Raman, XRF) applied at selected locations revealed the surface's chemical composition, indicating non-harmful corrosion products (copper oxides, sulfates, sulfides), wax residues, deposits and biofilm. Microbiological and genetic identification confirmed the presence of heavy metal-resistant bacteria. Art historical analysis highlighted the artist's aesthetic orientation and the influence of late 19th and early 20th century French sculpture. Archival research and comparison with related works indicate that the original surface was dark, homogeneous, and softly lustrous, likely serving to conceal traces of the lost-wax casting process. The plaster model proved particularly informative, faithfully reflecting the artist's original intent by preserving details not present on the bronze. Parallels between the patina of the plaster model and the observed condition of the bronze *Žanjica* suggest that the artist foresaw the sculpture's long-term surface changes. Excessive intervention may irreversibly obscure sculptural gestures, diminish the legibility of form, and alter the perception of light and volume, effects potentially caused by an inappropriate patina as well. Our findings suggest that the variation between lighter patina on exposed areas and darker tones in protected

zones does not appreciably affect the perception of the sculpture.

The intervention thus aimed to preserve the artist's three-dimensional expression and the aesthetic and material integrity of the work rather than reconstruct its original appearance.

Keywords: outdoor bronze sculpture, patina, multidisciplinary, conservation-restoration

Survey and Systematisation of Conservation Practices in Archaeological Iron Artefacts: Analysis of 15 Case Studies from the Early Modern Period, Monastery of São Martinho de Tibães

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This paper examines the conservation, treatment history, and institutional management of archaeological iron artefacts from the Monastery of São Martinho de Tibães, a Benedictine complex in northern Portugal. It focuses on fifteen Early Modern objects excavated in 1992 and housed at the Dom Diogo de Sousa Museum of Archaeology (Braga). Initially lacking contextual and conservation documentation, these artefacts reflect common but understudied challenges in Portuguese archaeology.

The study combines technical analysis with a critical assessment of documentation, communication, and training gaps. Over nine months, a multi-method approach was applied. Archival research identified excavation reports and inventory records, enabling stratigraphic contextualisation within the monastic complex. The artefacts were catalogued, photographed, and assessed for degradation. Treatment records were found for six cases, revealing decisions made in both field and laboratory contexts.

Additional data came from interviews with conservators, evaluation of preventive infrastructure, and questionnaires to archaeologists across Portugal assessing conservation training. A comparative review of current practices further contextualised the findings.

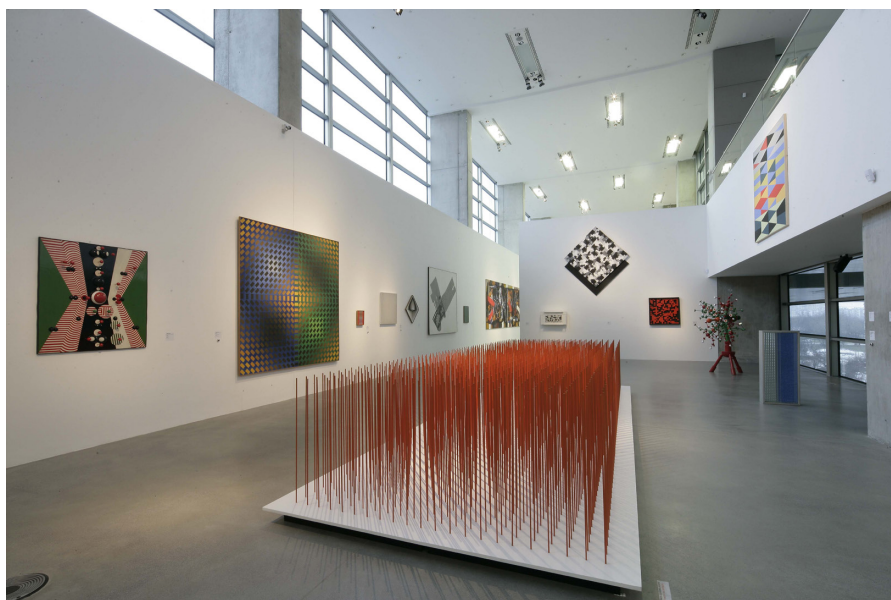
Three main issues emerge. First, a disconnect between excavation teams and museum professionals affects long-term preservation, with treatments often based on incomplete or informal data. Second, conservation is largely absent from archaeology degrees in Portugal, limiting awareness of material needs. Third, institutional documentation is not consistently integrated into wider knowledge-sharing systems.

The project produced practical outcomes: a structured framework for documenting archaeological iron from excavation to storage, and fieldwork guidelines integrating conservation into excavation practice.

Overall, the research shows that conservation is not only technical but also dependent on documentation, communication, and sustained institutional collaboration.

Keywords: Archaeology, São Martinho de Tibães Monastery, Iron Artefacts, Early Modern Period, Conservation

POSTERS



Permanent exhibition of the Museum of Contemporary Art

Multispectral Imaging and X-ray Radiography on the Painting Vittore Carpaccio: Madonna and Child Enthroned with Six Saints

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Non invasive multispectral imaging and X ray radiography were used to study Vittore Carpaccio's Madonna and Child Enthroned with Six Saints (1518). These techniques reveal the artist's materials, working process, and later interventions beneath the visible surface. Visible light shows a dark, richly toned palette, while ultraviolet imaging exposes extensive retouching and multiple varnish layers, especially on the faces. Infrared imaging reveals underdrawing and minor compositional changes. X ray radiography provides insight into the internal structure and past damage, including a largely reconstructed hand, confirming the painting's stable condition today.

Keywords: Multispectral Imaging, X-Ray, Ultraviolet, Infrared, False Colour Infrared, False Colour Ultraviolet

Conservation and restoration work on a painting by Ivo Šebalj

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This poster presents conservation and restoration work on a large-format painting by Ivo Šebalj from 1994, carried out in oil on canvas technique. The work is part of the course "Conservation and Restoration of Easel Paintings 1" at the Department of Conservation and Restoration of Works of Art at the Academy of Fine Arts Zagreb, University of Zagreb. The project is being implemented as part of practical classes in which students, under expert mentorship, participate in all phases of the conservation and restoration process.

The painting is characterized by strong color and pronounced surface texture - impasto paint layers. Visual inspection revealed that the work does not have a final protective varnish. There are deposits of dust and dirt on the surface, especially in the relief parts of the painted layer. Two mechanical damages were also observed, affecting all layers of the painting - canvas support, ground and paint layer. The conservation and restoration process begins with the documentation of the existing condition, which includes photography and description of stratigraphic materials and recording of damage. After that, dry surface cleaning is carried out to remove dust and dirt, with special attention paid to impasto areas due to their relief structure and sensitivity to mechanical damage. This is followed by stabilization of the damage to the carrier, compensation for the loss of the ground layer and aesthetic reintegration of the damaged areas using reversible restoration materials. All interventions are carried out in accordance with the fundamental principles of contemporary conservation and restoration practice, such as minimal intervention, reversibility and complete documentation of the procedure.

This work represents an important educational example through which students gain practical experience treating a work of contemporary painting. The large format of the painting, the pronounced texture of the impasto layer and the absence of a final varnish represent specific challenges in the conservation and restoration process. The project thus simultaneously contributes to the preservation of the work of art and the development of professional competencies of future conservators and restorers.

Keywords: contemporary art, conservation and restoration works

Digital Reconstruction of a Fragmented Roman Sarius Cup from Caska

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During the rescue excavations conducted in 2011 in Caska, a small village on the island of Pag, a disposal pit full of fragmented Roman pottery was found. Although only a part of the pit was preserved, it still gave various and unique early Roman finds, among which a distinctive and well-decorated Sarius cup stands out. This vessel was a high-end piece of Roman tableware used for the consumption of wine, and it attests to a quite early Romanization of Caska territory (turn of 1st century BC and 1st century AD). Unfortunately, the vessel was fragmented and only its partial conservation was possible. For this reason, a digital approach was attempted in order to reconstruct the Sarius cup in its entirety.

The reconstruction workflow began with high-resolution 3D scanning of the vessel in its current condition, including a fragment constructed during an earlier unsuccessful restoration attempt. After that, the inadequately reconstructed section was digitally removed, while the preserved original morphology of the vessel was retained as the basis for further modelling. Based on the preserved morphology and structural characteristics of the original ceramic form, the missing parts were reconstructed in a 3D modelling environment, enabling the creation of a complete digital model. In the final phase, the reconstructed vessel was reproduced through 3D printing, resulting in a physical replica that can support interpretation, presentation, and further study.

This approach shows how archaeological analysis and digital technologies can be combined in the reconstruction of fragmented ceramic artefacts, and how such methods can contribute to the preservation and presentation of cultural heritage. This research was conducted within the interdisciplinary scientific project "Transformation of South-Liburnian Territory in Early Antiquity" (TraLibRA)."

Keywords: Digital reconstruction; Roman pottery; Sarius cup; Caska; Cultural heritage

The Turjak Castle Epitaph of the Duchess

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A high-quality Renaissance epitaph of the Countess of Turjak was brought to the Restoration Centre decades ago. The archives contain a commission for a tombstone for Herbard Auersperg, his wife, and his daughter, placed with the sculptor Janez Faust for 800 gold coins. Assuming this is the same tombstone, we can conclude that it was commissioned in 1624 for the Turjak castle chapel. It was later incorporated into the outer wall of the chapel's railing. During World War II, the tombstone was severely damaged and remained among the rubble for some time. It was then moved indoors and later transported to the IPCHS Restoration Centre. At that time, the breaks were glued, and some probes were made, but no comprehensive conservation and restoration work was carried out.

During the castle's complete renovation in 2025, work also began on conserving the relief. As part of the conservation assessment, the lithology of the stone was examined to better understand its material properties and state of preservation.

No sampling was performed; therefore, petrographic analysis in thin section was not possible, and the lithological classification is based on macroscopic characteristics and the reaction with dilute HCl, carried out on a previously damaged and unobtrusive area of the epitaph. The stone is light grey to whitish, locally darker, likely due to compositional heterogeneity and/or surface weathering. A fine, relatively homogeneous carbonate matrix (micrite) contains numerous biogenic inclusions as oval, elongated, and irregular fragments interpreted as shell remains or microfossils. Based on these characteristics, the stone can be classified as a bioclastic micritic limestone. The stone is cross-cut by a network of calcite veins representing secondary fracture infillings.

The relief was broken and badly cracked, some parts were missing. In the past, the breaks had been glued together. We filled the larger cracks with a mortar made from NHL and fine sand, and the thinnest cracks, known as 'hairline' cracks, with a Caloxil lime filler mortar and natural umber pigment. Due to the wall being overgrown with climbing plants, the relief had a lot of tiny biological residues which appeared as black dots. These were removed manually with scalpels. We then removed the impurities using X-Tex gel. Some areas, especially in the central part, were extremely fragile. We consolidated these areas using Consolidation Formulation Water, developed by the Slovenian National Building and Civil Engineering Institute (ZAG) in collaboration with partners within the Heromat project.

The final presentation involved the stabilization of the delaminating stone scales using mortar, leaving the larger missing parts unreconstructed.

Keywords: limestone, epitaph, stone conservation, consolidation

Controlled-release systems and Green Conservation: innovative protocols for treating biodeterioration of cultural heritage

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The biodeterioration of stone surfaces constitutes one of the main threats to the conservation of cultural heritage in underground and outdoor environments, triggering processes of aesthetic and structural degradation. Although conventional biocidal treatments offer an immediate response, their effectiveness is limited by leaching, high environmental toxicity, and risks to the health of operators. In this scenario, the restoration “pharmacopoeia” is evolving toward Green Conservation, adopting controlled-release systems (smart delivery systems) based on natural plant-based substances.

This research analyzes the efficacy of active ingredients encapsulated in polymeric carriers, designed to modulate release based on environmental stimuli such as humidity and pH. Continuing with experiments conducted at the rock churches of Matera, the study explores the use of extracts of *Solanum nigrum* L. (rich in glycoalkaloids), supported on hydrogels supplemented with sodium tetraborate. This formulation leverages the synergy between the selective biocidal action of plant extracts and the antiseptic properties of borax, ensuring a drastic reduction in toxicity and simplification of application procedures.

The results, validated through visual monitoring and instrumental diagnostics, confirm the system's high cleaning capacity. The use of gel as a carrier not only allows treatment on complex underground morphologies, but also facilitates the mechanical removal of organic residues resulting from microorganism necrosis, preventing recolonization. In conclusion, the study highlights how the success of biological restoration depends on the close interaction between biocide selectivity, the nature of the substrate, and the porosity of the substrate, defining new protocols with low human impact and high temporal persistence.”

Keywords: Slow-release biocides, Stone materials , Biodeterioration, Green Conservation, Restoration

Colours and Materials in Traditional Blouse and Skirt Sets from the Vinkovci Area: A Case Study from the Collection of the Vinkovci Municipal Museum

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This paper examines colours and materials in selected traditional blouse (oplećak) and skirt (skuta) sets from the Vinkovci area, based on the holdings of the Ethnological Department of the Municipal Museum of Vinkovci. Focusing on case study of garments produced in domestic (home-based) manufacture, the research approaches textile objects both as carriers of cultural meanings and as complex material structures.

The analysed garments include several oplećak and skute, composed of cotton and silk fabrics, silk thread, silk satin (glot), gold braid (gajtan), ribbons and (tulle) lace. The methodological approach combines ethnological interpretation with material analysis, including the identification of textile fibres, weave structures, decorative techniques, and types of dyes, with particular attention to their visual and non-invasive identification, as well as conservation aspects.

Oplećak, mostly made of plain-woven cotton, are richly decorated with polychrome silk embroidery on a beige ground, enhanced with ribbons, gold braid, and crocheted lace. Skute, also made of cotton fabric, feature longitudinal decorative bands with floral silk embroidery, gold braid edging, priplet bands, (tulle) lace, and a densely gathered waist.

By analysing multiple sets, the paper highlights variations in materials and decorative solutions, as well as the interaction between locally produced textiles and industrial elements. These examples illustrate changes in materials and aesthetics during the late 19th and 20th centuries and are interpreted in relation to broader socio-economic processes, while colour symbolism is analysed in connection with social identity.

Special attention is given to conservation challenges, including fibre brittleness, stains caused by moisture, rust or mould, and other damage. Embroidered areas with different threads (cotton, silk, metal) respond differently to cleaning and stabilization, while structural instability often requires careful reinforcement.

The paper contributes to the themes of colours, materials, and characterization in cultural heritage, while also addressing preservation and the potential of non-invasive analytical approaches.

Keywords: textile materials, dye analysis, conservation, material characterization, non-invasive methods

Contemporary Art at the Intersection of Ecology and Heritage: The Case of Gallery VN and Gallery Prozori

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The paper explores the ways in which contemporary art and the activities of galleries within the library system engage with ecological themes in the context of heritage. Based on an analysis of exhibition practices in Gallery VN and Gallery Prozori (Zagreb City Libraries) conducted during 2024, a significant shift is observed from aesthetic representations of nature toward engaged, critical, and participatory models of artistic practice.

In this context, the poster presentation will specifically focus on selected artworks presented in Gallery Prozori and Gallery VN that demonstrate how contemporary art connects ecological themes with heritage contexts. It examines the ways in which artists use heritage spaces, objects, and historical artefacts as platforms for reflecting on ecology, sustainability, and the relationship between humans and the environment.

At the same time, the paper highlights the potential of linking ecology and heritage through contemporary art, pointing to the importance of developing new cultural policies and sustainable models of practice that connect art, community, and the environment.

Methodologically, the research is based on the analysis of selected artworks and accompanying program activities, as well as insights into curatorial concepts and modes of presentation within gallery spaces operating as part of the library system. In this sense, galleries within the library system are recognized as relevant platforms for the development of such critical practices, as well as spaces in which heritage is actively reinterpreted and integrated into contemporary social processes.

Keywords: contemporary art, ecology, cultural heritage, library galleries

Digitalization of Easel Paintings: Case Studies and Challenges in the Process

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The poster will present an example of multidisciplinary research on easel paintings, including a non-invasive method of investigation—digitalization of cultural heritage—which enables accessibility, dissemination, and detailed analysis of objects without physical contact.

Using several easel paintings that underwent conservation-restoration treatments as case studies, 3D scanning and 3D recording were conducted for additional research purposes, but primarily to demonstrate the potential of technology originally intended for three-dimensional, physical objects.

The technology used was based on VCSEL projection in the infrared part of the spectrum and stereo cameras for detection (Einstar Vega), i.e., an active stereo detection system based on VCSEL technology (Einstar). The main issue proved to be tracking, as was expected and requires further investigation, as there are potential solutions.

The recording yielded results of insufficient quality, but it demonstrated the potential of the technology for twodimensional objects like easel paintings.

Keywords: easel paintings, 3D scanning, 3D imaging

AI-Driven Workflows in Archival Science: Automating Information Extraction and Entity Linking at the National Archives of Hungary

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The National Archives of Hungary has launched several pilot projects to integrate machine learning and artificial intelligence into archival workflows, addressing the logistical challenges of manual document processing. Facilitated by a multidisciplinary team of digital humanities scholars, developers and archivists, these initiatives focus on transforming unstructured historical data into searchable, interconnected databases. A primary flagship project involves the automated processing of state civil registry records. This workflow utilizes Handwritten Text Recognition (HTR) models – trained on crowdsourced datasets – to generate high-accuracy transcriptions.

To refine data extraction, the Archives employs Large Language Models (LLMs) to segment composite fields – cells containing multiple data types such as name, occupation, and residence – into discrete, structured elements. This modular system also integrates a consolidated geographic namespace, using rule-based and AI-supported linking to provide automatic geocoordination and metadata enrichment. Furthermore, the project introduces entity resolution to link identical individuals across disparate records, enabling graph-based visualization of life events and familial roles.

The institution's AI initiatives extend to specialized historical databases, such as the "Hungarian Prisoners of Soviet Camps" project. This resource manages 682,000 records using automated transliteration and name-variant analysis to reconcile Cyrillic and Latin script discrepancies. Similarly, the "Those Deported to the Soviet Union" project harmonizes approximately 300,000 military and civilian documents, using AI-driven data matching to reconstruct fragmented individual biographies.

Central to these services is the implementation of Retrieval-Augmented Generation (RAG). This framework ensures the LLM generates answers based exclusively on verified archival documents. Technically, transcriptions are converted into high-dimensional vector embeddings. When a user submits a query, the system performs a semantic similarity search to retrieve relevant document segments. These are provided as a context window to the LLM, which synthesizes a coherent, evidence-based response grounded in primary sources. In this presentation, we would like to review the results and tools that have been developed so far.

Keywords: Digital Humanities, Handwritten Text Recognition (HTR), Large Language Models (LLMs), Entity Linking, Retrieval-Augmented Generation (RAG)

The Visible and the Hidden in Conservation-Restoration: Challenges of Interpretation and Presentation on the Example of a Crucifix from Veliko Trojstvo

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The crucifix originating from the parish church in Veliko Trojstvo, now housed in the Diocesan Museum of the Bjelovar-Križevci Diocese, presents a complex conservation-restoration case that foregrounds the relationship between visible and concealed interventions in the preservation of wooden polychrome sculpture. Archival information regarding its provenance and earlier treatments is preserved in the inventory records of the Diocesan Museum of the Archdiocese of Zagreb, which document its transfer to Zagreb in early 1940 and its subsequent restoration by the Slovenian academic sculptor Peter Loboda.

Loboda's intervention centred on the reconstruction of Christ's missing arms. This extended beyond technical repair, constituting a constructive and formal intervention that entailed a sculptural interpretation of the presumed original form. Such an approach reflects prevailing restoration practices of the museum's early period, when conservation tasks were frequently entrusted to academically trained sculptors, with emphasis on restoring formal coherence, aesthetic unity, and suitability for public display.

Recent conservation-restoration work has reopened the question of the boundary between original material and later additions. Loboda's reconstruction is now clearly legible and distinguishable from the original fabric, yet it simultaneously constitutes a significant historical layer, bearing witness to the evolution of conservation-restoration methodologies.

Building on the dichotomy of the visible and the hidden, this paper examines the interpretation and presentation of such stratified objects within a museum context. It raises the question of whether the differentiation between original and reconstructed elements should be accentuated or visually integrated, and how interventions that have themselves acquired historical value might be effectively communicated. Using the crucifix as a case study, the paper proposes presentation models that reconcile material authenticity with the acknowledgment of successive restoration layers.

Keywords: Crucifix from Veliko Trojstvo, Diocesan Museum of the Bjelovar-Križevci Diocese, Peter Loboda, Wooden polychrome sculpture, Conservation-restoration

Innovative Approaches to Mold Removal with Enzyme and Bacterial Treatments on Paper Heritage

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The artwork *Atelje* by the renowned Slovenian painter Gabrijel Stupica consists of two primary structural components: a canvas support and paper figures attached to it. Due to the poor quality of the paper used and improper storage conditions, the paper elements have gradually deteriorated over time. Additionally, the paper has become contaminated by fungi. Therefore, conservation-restoration intervention has become essential to preserve the integrity of the artwork. The focus of this study was on the issue of fungal contamination, specifically the occurrence of mold on one of the paper figures. The research has included the isolation and identification of the present fungi using appropriate microbiological methods. Subsequently, mock-up samples have been prepared, contaminated with selected fungi, and used for mold removal experiments. Particular emphasis has been placed on testing innovative removal methods based on the use of enzymes and bacterial supernatants incorporated into agar. A well-established and widely used disinfectant, ethanol, has also been used. The effectiveness of each method has been evaluated based on the degree of microbial removal and any potential deterioration of the material. To assess the impact of the treatments on the paper structure and paint layer, analytical techniques such as Fourier-transform infrared spectroscopy (FTIR) and colorimetry have been employed. Additionally, possible changes in surface pH have been monitored, as these may significantly affect the long-term stability of the material. The results of the analysis indicate promising potential for the use of enzyme and bacterial supernatants in the removal of mold without causing damage to the paper substrate.

Keywords: removal of mold, paper, enzyme, bacteria

Significance of 'Act of Seeing' the Tangible and Intangible Cultural Heritage in terms of National Image: A Case Study of Korea

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Just as images associated with a specific person naturally come to mind when we think of him/her, certain images also surface when we think of a particular country. In our daily lives, it is easy to overlook just how profound the significance is behind the mere 'existence' of something and 'the act of seeing' something. Every society - a collective aggregate of individuals' cognition - is profoundly influenced by these two concepts; consequently, the cultural image of a nation or society is largely shaped by seeing its tangible and intangible cultural heritage.

Drawing upon a phenomenological framework, this study analyzes how certain images of a nation or society come to be defined through South Korea's case study. In particular, it explores why the act of seeing plays such a pivotal role from a phenomenological perspective, illustrating this through a diverse array of cultural examples drawn from South Korea's tangible and intangible cultural heritage. Furthermore, this study analyzes the impact that forgotten cultural heritage - no longer visible - and severed traditions exert upon a nation's image.

Through phenomenological analysis, this study will demonstrate the significance of visual information - rather than textual sources - that occupy within the various fields of Korean Studies. This study demonstrates that the absence of visual information regarding cultural heritage exerts a distorting influence, not only upon heritage that survives solely in textual form but also upon existing cultural heritage. Finally, the findings demonstrate why an inductive approach, rather than a deductive one, is crucial within the field of cultural studies.

Although this study is a single country case study, it will offer significant insights into how the cultural images of other nations are constructed, and the reasons why some images may even become distorted.

Keywords : Cultural heritage; Visible information; Phenomenology; Korean studies, National image

A Streamlined Virtual Reflectance Transformation Imaging (V-RTI) Pipeline for Epigraphic Analysis: Bypassing 3D Rendering via AI-Generated Light Position Matrices

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Documenting shallow, unpigmented historical graffiti on pigmented surfaces, such as frescoes, presents a significant epigraphic challenge due to the visual noise created by painted motifs. While Virtual Reflectance Transformation Imaging (V-RTI) has emerged as a powerful tool to overcome the physical limitations of traditional RTI capture, the standard V-RTI pipeline remains computational and technical barrier. It typically requires exporting dense 3D meshes into complex animation software to simulate a multi-light hemispherical dome.

This poster proposes a novel, lightweight V-RTI workflow that deliberately isolates micro-topography from color by utilizing purely geometric Digital Elevation Model (DEM) images extracted from Agisoft Metashape. By coupling these uncolored DEM images with a 48-light Light Position (.lp) file generated entirely via algorithmic calculation, this method completely bypasses the need for 3D animation software or specular sphere calibration. The resulting data is fused in Relight Lab, creating a purely topographic, interactive V-RTI model that makes invisible graffiti readable while drastically lowering the computational and technical barriers to entry for cultural heritage professionals.

Keywords : Virtual Reflectance Transformation Imaging (V-RTI); Historical graffiti; Digital Elevation Model (DEM); Cultural heritage documentation

Beyond aesthetics: harnessing cultural heritage to revitalise the economy and achieve sustainable cultural tourism (Cultural heritage in the era of artificial intelligence)

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Cultural heritage is increasingly recognized as a key driver of economic revitalisation and sustainable cultural tourism, extending beyond its aesthetic and symbolic value. In the context of rapid urban transformation and growing demand for authentic cultural experiences, heritage-led strategies have become essential for strengthening local economies, reinforcing cultural identity, and supporting sustainable development. This study investigates how cultural heritage contributes to tourism development and economic resilience through adaptive and context-sensitive approaches.

Using a comparative case study methodology, the research examines Medina of Fez and AlUla Old Town. The Medina of Fez illustrates how the rehabilitation of historic urban fabric and the revival of traditional crafts generate local economic opportunities while preserving cultural authenticity and social continuity. In contrast, AlUla Old Town represents a contemporary heritage-led development model, where conservation is integrated with large-scale sustainable tourism planning, economic diversification, and environmental management. The findings highlight that cultural heritage, when strategically managed, acts as a powerful catalyst for sustainable territorial development, contributing to job creation, local entrepreneurship, and community empowerment.

The study proposes an integrated framework for embedding cultural heritage into urban and tourism planning policies. It emphasizes a holistic approach connecting conservation, economic growth, and community participation. Ultimately, heritage-led development emerges as a key pathway for achieving resilient economies and sustainable cultural tourism.

Keywords: Cultural heritage; Sustainable cultural tourism; Heritage-led development; Economic revitalisation; Urban regeneration; Cultural identity

Evaluating Bioconsolidation Treatments For The Conservation Of Wall Paintings In Side Boyalıin Church (Antalya, Türkiye)

Bilgesu Şen

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Side Boyalıin Church is a rock-cut cave church located in Antalya, Türkiye. The monument preserves wall paintings of considerable cultural significance, including rare iconographic scenes depicting the Birth of the Virgin Mary and Saint Anne. The church is carved into a carbonate conglomerate rock formation, while the wall paintings are executed on lime-based plaster layers. Due to the environmental conditions of the hypogeal setting, both the rock substrate and plaster layers have been affected by various deterioration processes over time.

This study aims to evaluate the effectiveness of bioconsolidation treatments applied to carbonate conglomerate rock and lime-based plaster samples collected from Side Boyalıin Church. The mineralogical, chemical, and microbiological characteristics of the materials were initially investigated, followed by laboratory-scale bioconsolidation treatments. The effects of the treatments were assessed through Scanning Electron Microscopy coupled with Energy Dispersive Spectroscopy (SEM–EDX) and X-ray Diffraction (XRD) analyses in order to investigate surface morphology, elemental composition, and mineralogical changes. In addition, metagenomic analyses were carried out before and after treatment to evaluate changes in microbial community composition.

The results provide insights into the response of carbonate-rich rock and lime-based plaster substrates to bioconsolidation treatments and contribute to the assessment of biological conservation strategies for rock-cut Byzantine monuments. By integrating materials characterization, microbiological investigation, and conservation science, this study presents a multidisciplinary approach for the conservation of cultural heritage in hypogeal environments.

Keywords: Byzantine Wall Paintings, Bioconsolidation, Carbonate Substrates, Cultural Heritage Conservation

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