

SEE MOSAICS MEETING VII

RECONSIDERING
PROTECTION OF
MOSAIC HERITAGE
IN THE FACE OF
CLIMATE CHALLENGES:
CONSERVATION,
PRESERVATION AND
RESTORATION



Book of Abstracts

Ljubljana
SLOVENIA
13–16 October
2026

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in the Face of Climate Challenges:
Conservation, Preservation and Restoration**

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SEE Mosaics Meeting VII
Ljubljana, 13–16 October 2026

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of Slovenia

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Foreword

The 7th SEE Mosaics Meeting continues a long tradition of bringing together professionals and institutions engaged in the research, conservation-restoration, protection, and management of mosaic heritage. Over the years, the SEE Mosaics initiative has established an important professional network in Southeast Europe, providing a platform for the exchange of experience, methodological approaches, and good practices.

The organisation of this year's meeting also builds on more than fifteen years of efforts to systematically develop the protection and preservation of mosaics in Slovenia. An important milestone was the international symposium held in Ljubljana in 2010, which brought together Slovenian and international experts to address mosaic heritage from archaeological, conservation-restoration, research, and educational perspectives. This was followed in 2011 by an international workshop at Simonov zaliv, where theoretical principles were directly linked to practical conservation-restoration work at the archaeological site. Another important step was the second international symposium in 2015, dedicated to the protection and maintenance of mosaics in situ.

The continuity of professional meetings, participation in international conferences and projects, and, above all, experience gained through conservation-restoration interventions have contributed to the establishment and consolidation of professional expertise in mosaic heritage in Slovenia. Interdisciplinary cooperation and collaboration with international professional institutions have played an important role in this development.

We therefore see hosting the 7th SEE Mosaics Meeting as a continuation of these efforts and an opportunity to strengthen international cooperation. This year's meeting, entitled *Reconsidering Protection of Mosaic Heritage in the Face of Climate Challenges: Conservation, Preservation and Restoration*, focuses on the current challenges of preserving ancient and contemporary mosaic heritage under changing environmental conditions.

The contributions collected in this publication examine the impacts of climate change and different approaches to the conservation, protection, and long-term preservation of ancient and contemporary mosaic heritage. They emphasise the importance of research, documentation, and condition monitoring as a basis for informed conservation decisions. The diversity of the case studies demonstrates that the successful preservation of mosaics requires a comprehensive understanding of each monument and its environment, supported by interdisciplinary cooperation, the exchange of experience, and critical assessment of past practices.

Like previous SEE Mosaics meetings, this year's meeting has also received financial support from the Central European Initiative (CEI) through the CEI Cooperation Fund, contributing to stronger international cooperation and the exchange of professional knowledge and experience in the field of cultural heritage protection.

Martina Lesar Kikelj, Head of Restoration Centre, IPCHS

Oral and Video Presentations



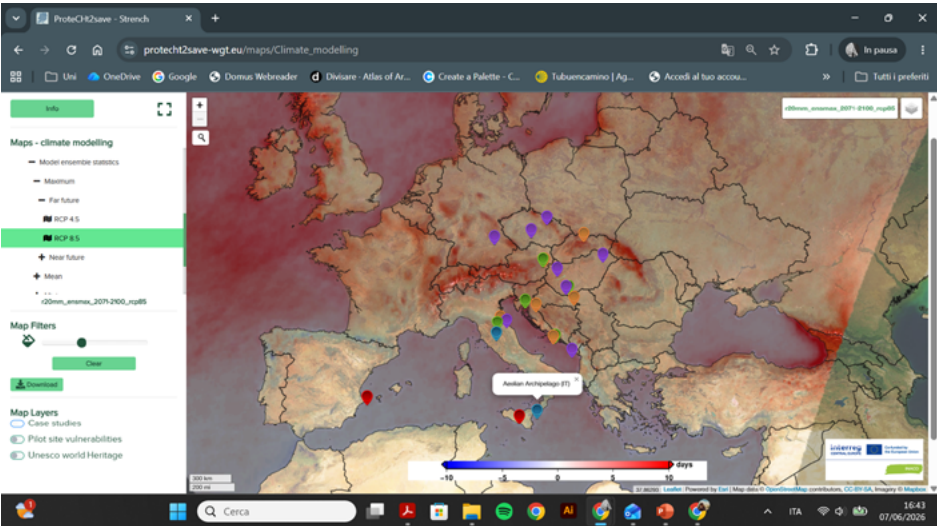
Alessandra Bonazza
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Key Note Speaker

Cultural Heritage in a Changing Climate: Towards Risk Assessment within the Framework of Heritage Climatology

The risks to cultural heritage posed by climate change have gained increasing attention in recent decades, leading to significant progress in analysing projected impacts on assets such as archaeological sites, historic centres, cultural landscapes, and monumental complexes. As key drivers for economic growth, heritage sites are increasingly vulnerable, primarily due to expanding urbanisation, tourism pressure, and inadequate visitor management in the context of global change.

From the perspective of heritage climatology, this contribution addresses the methodological approaches developed to assess the projected impacts of both extreme and slow-onset climate phenomena on cultural heritage. The current state of advancement and remaining gaps are discussed, focusing on methodologies that quantify damage, rank vulnerability, and assess risk across various heritage categories. Exemplary results

Climate projection simulation obtained through the use of the Risk Mapping Tool for Cultural Heritage Protection of R20mm (very heavy precipitation days) under RCP 8.5 for the far future (2071–2100) (~12 km resolution, ensemble maximum ‘EN-SMAX’); pilot sites which evaluations are included in the platform are highlighted.



based on climate modelling, Earth observation data, environmental monitoring, and participatory approaches with local stakeholders are presented. Additionally, this study shares European-level experience in developing tools to support policymakers and decision-makers in managing heritage sites exposed to hydrometeorological hazards like heavy rain, floods, and droughts. The methodology behind the Risk Mapping Tool for Cultural Heritage Protection (<https://www.protecht2save-wgt.eu/>) is illustrated, highlighting the elaboration of historical climate datasets for pilot sites, numerical climate modelling for hazard mapping, and vulnerability assessment frameworks. Ultimately, the discussion emphasises the crucial role of research in guiding management priorities and informing strategies for the prevention and safeguarding of cultural heritage at risk.

Véronique Blanc-Bijon
CNRS, Centre Camille Jullian
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Académie de Nîmes, France

Patrick Blanc
Independent restorer, France

How Preservation Contributes to the Development of Knowledge About Mosaics

Throughout our professional lives, we have strived to preserve and study pavements. A significant part of our work has involved sharing this new knowledge with the public. Various virtual reconstruction techniques have been used for this purpose.

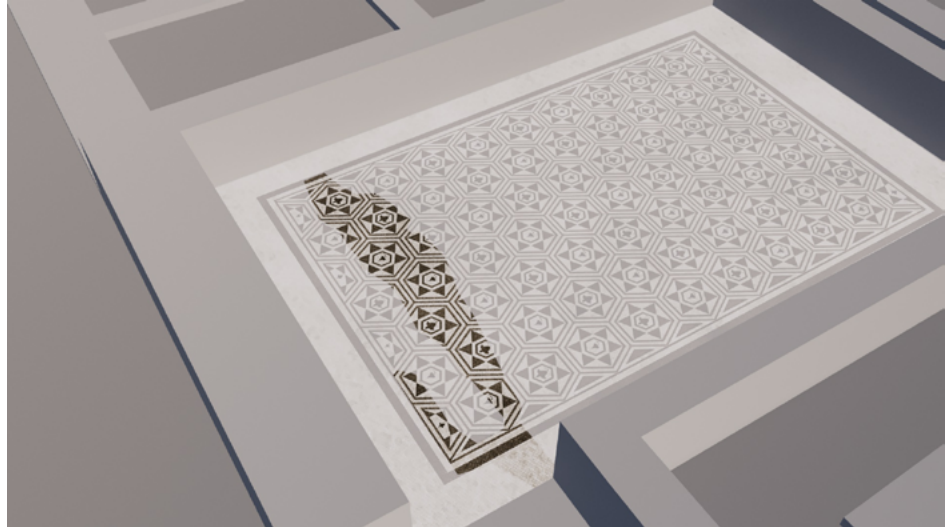
This was the case for a mosaic pavement unearthed during excavations at Notre-Dame-du-Bourg Cathedral in Digne-les-Bains (Alpes-de-Haute-Provence, France), from 1983 to 1994 by the team of Ms Gabrielle Demians d'Archambaud, professor at Aix-en-Provence University and founder of research in medieval archaeology. An 870 m² archaeological crypt was created by the architect Eric Klein and opened to the public in July 2010. Partially preserved, the mosaic covers an area of the choir of the 5th-century cathedral, a zone heavily disturbed by later buildings, including medieval and modern tombs. In 2019, preparatory work for the creation of an interpretative virtual reconstruction for public visitors led to a revision of our understanding of the pavement, its decoration, and its layout.

This is also the case for a large Roman house known as 'La Plateforme' in Fréjus (Var, France), identified between 1930 and 1936, then excavated from 1960 to 1963 by Paul-Albert Février, professor of Roman archaeology at Aix-en-Provence University. A project to enhance and create digitalised graphic representations of the remains, carried out from 2024 to 2026 with the Direction de l'Archéologie et du Patrimoine of the City of Fréjus, led to a review of all archives and to the realisation of new excavations, resulting in the discovery of more pavements and the development of new perspectives on circulation within the building. A series of digitalised views and immersive interpretations are currently being produced in collaboration with the company Edikom, led by architect Fabrice Paul, who has been working for over 10 years on the creation of such documents for cultural communication.

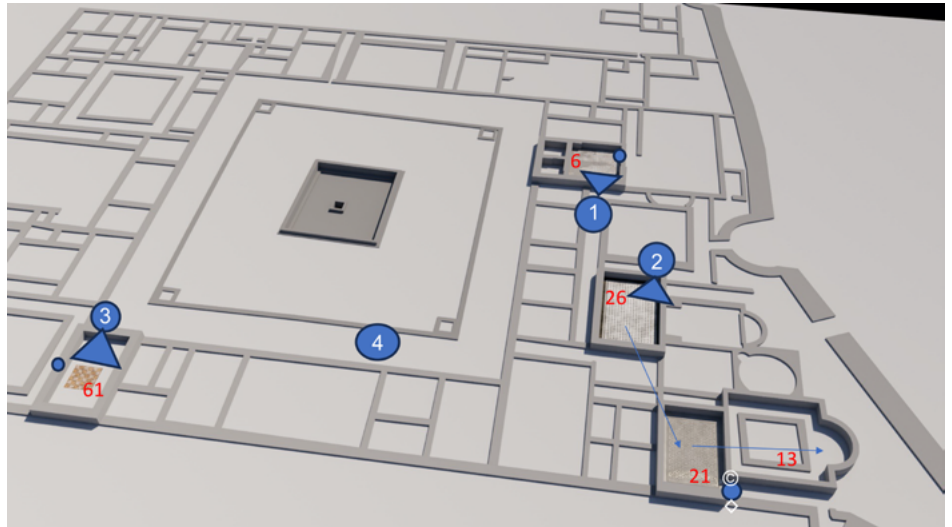
Further afield, in a Syriac monastery dating from the early 6th century, located at Mor Gabriel in Tur Abdin (Turkey), the use of 3D images (orthophotos by Banu Sayin, Solvotek Ltd) has allowed us to consider the implementation of the vault mosaics and to propose a very specific sequence for the work done by Roman mosaicists.

We will present these recent examples of mosaic enhancement through digital means, which have led us, in particular, to revise our understanding of the pavements under study. These few examples have benefited from insights gained from a reflection on digitisation.

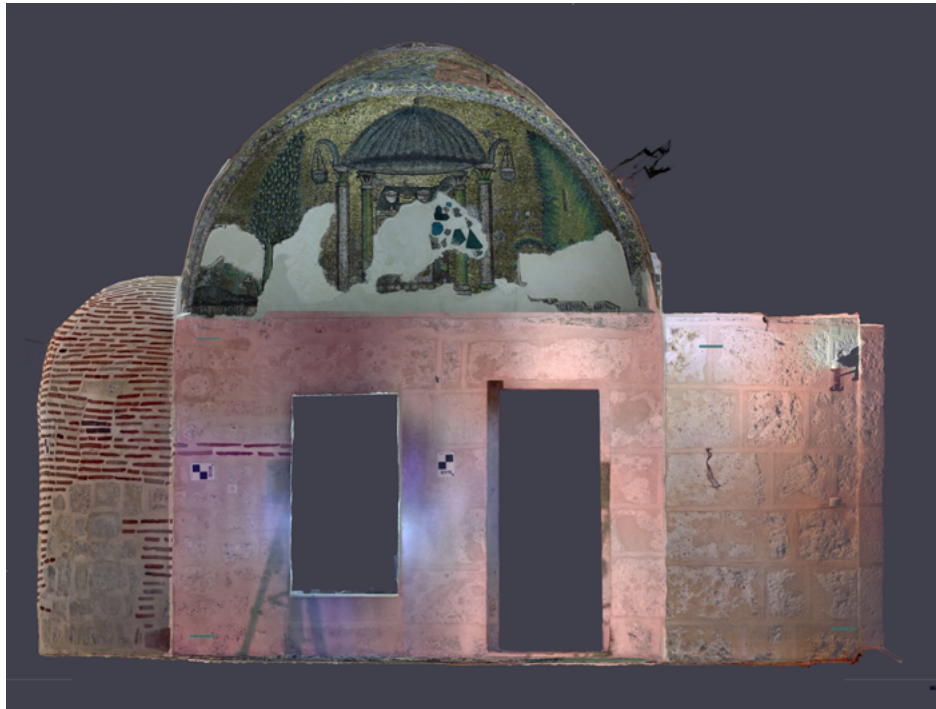
Fréjus, Plateforme – restitution
mosaic_21 (archive EDIKOM)



Fréjus, Plateforme – distribution
of terminals (archive EDIKOM)



Mor Gabriel, church – orthophoto
(archive SOLVOTEK)



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From Hibernation to Revelation: A Case Study of the In Situ Reconservation and Presentation of Unique Figurative Mosaics at the Archaeological Site of Mediana

The archaeological site of Mediana is best known for its unique figurative mosaics (Medusa, Leda and the Swan), which serve as the visual brand and identity of the late Roman imperial residence. For the past 50 years, these iconic masterpieces – the only figurative examples on the site – were protected through sand reburial, a method that ensured physical safety but removed them from public and scientific view.

This paper presents a case study of the reconservation of these figurative floors carried out at the end of 2024. The research evaluates the consequences of multi-decade sand burial as a preservation strategy. By sharing first-hand observations, the work details the mosaic's reaction to long-term burial, focusing on issues such as the removal of the protective sand layers, detailed consolidation – fixing unstable tesserae and supporting layers – mechanical and chemical cleaning, edge repair, sealing lacunas, and replacement of decorative mortar. By transitioning from long-term reburial to in-situ presentation, this intervention has not only stabilised the delicate tesserae but has effectively restored the 'face' of Mediana, ensuring that its most significant artistic treasures are once again the centrepiece of the archaeological experience.

Beyond the immediate conservation of the figurative motifs, the recent interventions at Mediana emphasise the critical importance of preventive conservation as a sustainable management strategy. By moving away from temporary measures like sand reburial and implementing a permanent shelter – combined with innovative, non-invasive biological bird mitigation – we have established a controlled environment that minimises future decay. In addition, the control of microclimatic conditions of the environment under the shelter has been performed in order to determine the influence of the present regimes on the potential deterioration of the mosaics. Accordingly, the advantages and disadvantages of the applied covering approaches would be established, as well as whether the formed microclimatic conditions pose a risk to the preservation of ancient mosaics.

This proactive approach ensures the long-term mechanical and chemical stability of the tesserae, significantly reducing the need for aggressive, invasive treatments in the decades to come. Ultimately, our work is not merely a repair of the past, but an act of sustainable management; it is a commitment to ensuring that the iconic 'faces' of Constantine's residence remain as vibrant and structurally sound for future generations as they are today.

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Conservation in progress
(photo Vesna Crnoglavac)



Medusa mosaic after conservation



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RavennAntica-Museo Classis, Italy
University of Bologna, Italy

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Freelance conservator, Italy

The Methodologies and Materials Used in Mosaic Restoration in France and Italy: Case Studies of the Workshops of Saint-Romain-en-Gal and RavennAntica

This master's thesis is the result of a collaboration between Italy and France, thanks to an agreement signed between the master's degree course in Conservation and Restoration of Cultural Heritage (University of Bologna) and the Atelier de Restauration de Mosaïques (ARM) of the Museum of Saint-Romain-en-Gal. This accord resulted in an Erasmus+ internship that took place in the summer of 2024, allowing for the study and restoration of the Mosaic with Kantharoi, the subject of the thesis, discovered during a preliminary excavation in Sainte-Colombe (France) in August 2017 in two large fragments, and detached from its original location into ten sections. The mosaic was, in the summer of 2024, included in a restoration project which aimed, first, at recomposing and relocating the mosaic sections onto a new support of aluminium honeycomb panel and, then, at restoring legibility to the mosaic surface, characterised by thick limestone encrustations. The study also explored the entire historical, geographical, and archaeological framework of the original Roman context and included thorough petrographic analyses of the material components of the mosaic (tesserae and supporting mortars). The second part of the paper aims at comparing the materials and practices used in mosaic restoration between the two countries, taking the Atelier de Restauration de Mosaïques and the restoration laboratory of the RavennAntica Foundation as case studies. In particular, in-depth studies were conducted to obtain quantitative as well as qualitative data useful for comparison, starting precisely from the differences in materials and methods used to velinate the mosaics and to recreate the support layers for the mosaic tesserae. Given these objectives, a study was carried out on some adhesives (polyvinyl acetates) tested for resistance to mechanical tensile strains, for solvent evaporation, and pH tests within the laboratories of DICAM (University of Bologna), with the collaboration of Vinavil SpA. Finally, a practical laboratory experiment was conceived and developed, aiming at putting to the test the mechanical resistance of some specifically chosen mortars applied to the backs of mosaic test pieces created ad hoc.

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Removal of the gauze and linen cloths glued to the surface of the Mosaic with Kantharoi (© 2024 Musée et sites gallo-romains de Saint-Romain-en-Gal)



Reconstitution of the support layers of the Mosaic with Kantharoi (© 2024 Musée et sites gallo-romains de Saint-Romain-en-Gal)





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Conservation Challenges of a Contemporary Mixed-Media Mosaic Composition (Destined for Indoor Spaces) after Fourteen Years Outdoors

The presentation describes a theoretical and practical approach to the remedial conservation of a contemporary mixed-media composition, dating from the year 2002, made by the conservator-restorer and artist Brigitta Maria Kürtösi. The object contains wire, gypsum-impregnated gauze, industrial mortar for tiles, and tesserae such as alabaster, black Venetian glass, and red granite. The particularity of this conservation process is that this object has been left outdoors, in the artist's garden, directly in the soil, for a total of 14 years. This led to the breakage of the object into three distinct parts. The prolonged exposure to environmental conditions such as rain, snow, freezing, sun, and biological activity has contributed to the deterioration of the materials. The interaction between the different materials of the object also plays an important role.

Special attention will be given to the stability of the structure and the compatibility of the conservation materials. The presence of soil residues and moss vegetation contributed to the retention of moisture and further deteriorated the materials. This analysis will further affect discussions on decision-making regarding treatment options, tools, materials, and useful techniques to consolidate the broken pieces and the fragile materials. Consideration will also be given to the visual integrity of the object after treatment. The 3D virtual reconstruction was a significant method during the process, because restoring the original shape in physical space was not possible (at that time) using the three main fragments. The conservation work and research are part of the BA diploma work of the first author as an Erasmus mobility student.

Object in its initial state, with overlaid contours of the three fragments resulting from later breakage; archive photo of Brigitta Maria Kürtösi (2002) with graphic documentation by Adriana-Maria Florea Galea (2026)



The object after breakage, arranged on a plane surface to reflect the object's original form (three fragments + eight secondary fragments), 2026 (photo Adriana-Maria Florea Galea)



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Croatian Conservation Institute, Croatia

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Fragile Surfaces, Changing Climate: Preserving Late Antique Mosaics in Diocletian's Palace

This paper provides a historical overview of research and a chronological account of conservation and restoration interventions carried out on the mosaics in Arhidakonova Street within Diocletian's Palace in Split, Croatia. These mosaics represent an important component of Late Antique urban heritage and constitute a valuable source for understanding the organisation of residential spaces and decorative practices within the historic city core. They originally formed part of a Late Antique peristyle courtyard with porticoes, located south of Diocletian's Mausoleum, belonging to a representative residential complex. Their dating to the late fourth and early fifth centuries is based on comparative material from Salona and the wider Aquileian cultural sphere.

The development of the medieval urban fabric, marked by intensive residential construction and the transformation of circulation routes, led to the fragmentation of the original courtyard complex. As a result, the mosaics have been preserved in a range of contexts: in situ (*sub divo*), within private buildings, and beneath later layers of street paving, creating complex conservation conditions.

Following systematic archaeological investigations in 1998, conservation and restoration works were initiated and, with occasional interruptions, have continued to the present. This paper analyses the results of these interventions, focusing on the state of preservation, identified deterioration mechanisms, and the impact of environmental factors. Particular attention is given to moisture, soluble salts, and temperature fluctuations, which contribute to the degradation of binding layers, detachment of tesserae, and loss of structural stability.

In the context of climate change and increasingly unstable microclimatic conditions within the densely built historic core, these deterioration processes are intensifying. The paper therefore examines adaptive conservation strategies, including the use of sustainable, compatible, and reversible materials, the implementation of preventive protection measures, and the establishment of systematic long-term monitoring.

The aim of this study is to evaluate past conservation practices and to propose guidelines for the sustainable preservation of mosaic heritage under changing climate conditions, with particular emphasis on in situ conservation in complex urban environments.

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Split, Arhidakonova street, site appearance, 2012 (photo Jovan Kliska, Archive of the Croatian Conservation Institute)



Split, Arhidakonova street, site appearance, 2025 (photo Pino Gamulin, Archive of the Croatian Conservation Institute)

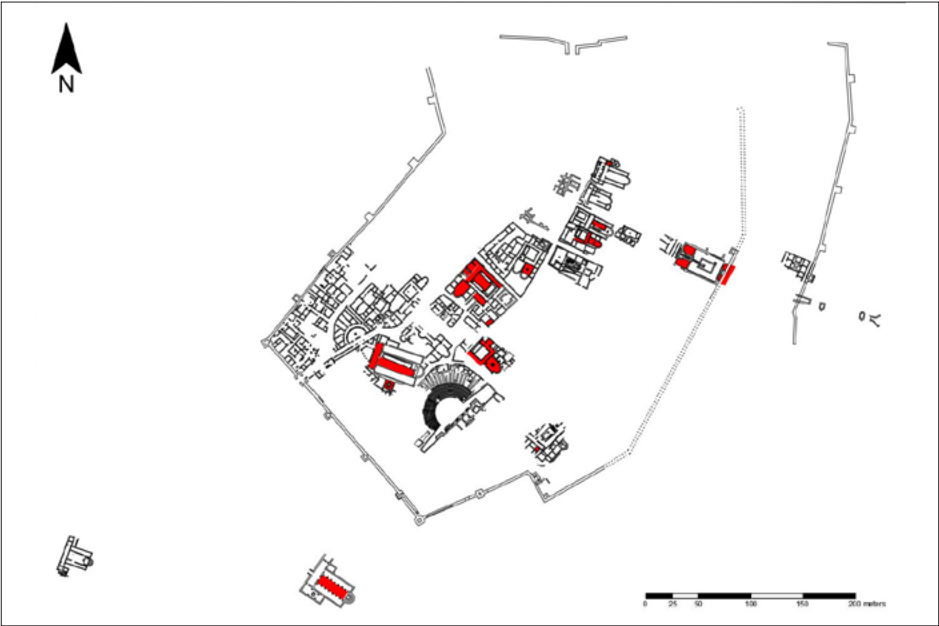


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Designing a Risk-Matrix to Assess the Vulnerability of In-Situ Roman Mosaics

The Cultural Stone Stability Index is a geoscience-informed, semi-quantitative measure of the stability of structures and decorative features built or carved from stone. The score from 0–100, calculated from over 30 parameters, is easy to grasp and gives conservators and site managers an effective tool to rank the relative stability of walls, statues, and, as was recently argued, mosaics. The score, however, does not give an estimate of overall risk, particularly in the face of climate change. Demonstrated will be: a) the flexibility of CSSI to track climate-change-driven decay of mosaics, and b) a simple mathematical model that uses CSSI to estimate risk. The principal climate factors impacting mosaics include rising sea level and inundation, salt efflorescence due to extreme wetting and drying cycles, the mechanical stress of increased thermal cycling, and accelerated colonisation by lithobionts due to changing growing seasons. These mechanisms are all identified and scored by multiple CSSI parameters, which can be extracted from the overall score to generate a climate-change-focused score out of 100. Dividing the score into five uniform bins of relative risk is, however, compromised by survivorship bias. Mosaics that have survived to the present are implicitly more resilient than those, far greater in number, that have been lost over the centuries. A high nominal score does not necessarily imply high risk. Instead, we propose fitting CSSI scores across a site or region to a lognormal or similar right-skewed probability distribution that takes into account the fact that CSSI parameters are sometimes correlated, and that the principal risk to mosaics resides in the long left-hand tail of the distribution, not in their position relative to the mean score. Taking the percentile under the fitted probability distribution to indicate the likelihood of failure, the second axis of a risk matrix requires a semi-quantitative measure of the consequences of failure. In order to avoid the complex question of heritage value, we propose a simple index of consequence that is the sum of three weighted elements: total mosaic surface area, density of tesserae, and mosaic typology, which encodes simple geometric to complex figurative designs from 1 to 5. In this way, a 5×5 risk matrix from ‘Low’ to ‘Extreme’ can be generated for a group of mosaics. The archaeological site of Stobi in the Republic of North Macedonia has over 20 in-situ mosaics, making it an ideal site for piloting this risk assessment protocol.

Map of In-Situ Mosaics at Archaeological Site Stobi (drawing by Kristen Jones)



5 × 5 risk matrix (drawing by Kristen Jones)

Impact Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Highly Unlikely	Negligible Risk	Negligible Risk	Low Risk	Moderate Risk	Moderate Risk
Unlikely	Negligible Risk	Low Risk	Low Risk	Moderate Risk	High Risk
Possible	Low Risk	Low Risk	Moderate Risk	High Risk	High Risk
Likely	Low Risk	Moderate Risk	High Risk	High Risk	Extreme Risk
Highly Likely	Moderate Risk	Moderate Risk	High Risk	Extreme Risk	Extreme Risk

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From Façade to Archive? Mosaic Heritage between Climate Stress and Insulation Practices

Over the past two decades of professional practice in the conservation and restoration of mosaic heritage, a growing and systematic loss of mosaics in Central Europe has been observed. This loss is not only the result of neglect, but increasingly of the combined effects of climate-related deterioration and contemporary building practices. Climate change contributes to accelerated material degradation through increased moisture penetration, more frequent freeze–thaw cycles, and thermal stress affecting mosaics integrated into architectural structures. At the same time, energy-efficiency strategies – particularly the widespread application of external thermal insulation systems (ETICS) – pose a critical and often irreversible threat. Mosaic artworks are frequently covered or destroyed during façade renovations aimed at improving building performance. Drawing on the long-term activities of Art & Craft Mozaika, this contribution presents selected case studies documenting both loss and preservation. These include examples of mosaics that have disappeared due to insulation interventions, as well as projects where timely identification, documentation, and conservation – sometimes involving transfer and reinstallation – enabled their survival. Such cases demonstrate the urgent need for new decision-making frameworks that integrate heritage protection into sustainable construction practices. The paper further introduces MONU – Institute of Mosaic and Monumental Art, a newly established platform addressing the absence of a specialised institution for this field. MONU aims to create an interdisciplinary environment for conservation, research, documentation, education, and public presentation of mosaic heritage. It also offers a potential model for safeguarding endangered works through controlled relocation, study, and re-contextualisation. By situating mosaic conservation within the broader context of climate change and transformation of the built environment, this contribution calls for stronger collaboration between conservators, architects, policymakers, and sustainability experts. The protection of mosaic heritage must be reconsidered as part of a wider, systemic response to environmental and societal challenges.

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Example of a glass mosaic artwork covered due to façade insulation (ETICS intervention), Děčín, Czech Republic (photo Magdalena Kracík Štorkánová)



Case study of a transferred and conserved mosaicic reinstalled in a protected interior environment, Chlumec u Ústí nad Labem, Czech Republic (photo Magdalena Kracík Štorkánová)

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Applying Conservation Experiences of Facade Mosaics to Contemporary Outdoor Realizations

The creation of large-scale mosaics has been of interest since previous historical periods, and a contemporary need is also emerging. By studying the characteristics of conservation-restoration works, it is clear that the main problems arise from the technology which was generally applied throughout history. As the mentioned mosaics are directly embedded in various architectural surfaces, their condition always depends on the support, notably the building itself and its organic parts, façades, walls, vaults, niches, as well as their contexts. The technologies and materials used are not always able to follow all the changes. Another significant factor is connected to the environment, geology, and the local climate, and to their changes, which greatly affect the general state and even the future of the mosaics.

We can draw main conclusions by following experiences of degradation and weathering in outdoor circumstances and can use them in new planning and realisation.

The contribution aims to highlight the factors, situations, and decisions applied in contemporary conservation-restoration and creation projects. How can we eliminate and prevent some of the common issues? Can it really be a clue to separate the mosaic from the architectural surface? The theme is that the new support can act as a release layer between the building and the mosaic and that a flexible mounting can help to react to the building's structural movements and material reactions such as thermal dilatation. It also takes into account the role and effect of different coatings, considering their pros and cons in relation to degradability by UV light. The contribution is based on various cases carried out by the author and is directly connected to a newly created stone mosaic intended for outdoor purposes in Budapest.

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Detail of the mosaic of Basil
of Caesarea in progress, still
without the joint mortar
(photo Brigitta Maria Kürtösi)



Polycarbonate panel as new light-
weight support. The mounting
of the tesserae was performed
with transparent MS polymer
(photo Brigitta Maria Kürtösi)



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Adapting Mosaic Conservation to Climate Challenges: The Case of Simonov zaliv Roman Villa (Slovenia)

The archaeological site of Simonov zaliv preserves the remains of a Roman maritime villa with extensive mosaic pavements, of which 284 square metres have been documented to date. The mosaics belong to representative residential spaces and testify to the high standard of living in the coastal villa complex. Due to the site's direct exposure to the marine environment, the mosaics are particularly vulnerable to environmental impacts, including capillary moisture, salt crystallisation, retention of rainwater, freeze–thaw cycles, strong winds, and the low elevation of the site above sea level. Additional instability in the southern part of the villa is caused by the unstable geological substrate and uneven subsidence of the terrain.

The conservation approach at Simonov zaliv developed gradually through time. Different solutions had been considered in the past, ranging from reburial and protective coverings to the presentation of mosaics in situ. The most recent conservation-restoration works, carried out between 2015 and 2017, employed two different methodologies. In the northern area, where the substrate proved relatively stable, the mosaics were conserved in situ, with interventions focused on cleaning, consolidation, local reintegration, and protective treatments. In the southern area, however, mosaics were severely affected by uneven subsidence, delamination of the bedding layers, and severe moisture problems, which required the lifting of the mosaics, conservation treatment in the workshop, and reinstallation onto a newly designed support system combined with drainage and designed based on the principles of the original Roman bedding construction. Currently, both areas are presented under temporary roofing structures as the most feasible solution under the existing conditions.

Recent observations have shown that changing and increasingly unpredictable environmental conditions at the site continue to affect the already conserved mosaics, making continuous condition assessment, monitoring, regular maintenance, and timely conservation interventions essential for their long-term preservation. Within the GreenHer project, Simonov zaliv will serve as a Living Lab managed by the University of Primorska. Planned activities will integrate environmental and condition monitoring, climate-risk assessment, digital documentation and data analysis, and the testing of sustainable

conservation and site-management solutions. Cooperation among researchers, conservator-restorers, site managers, students, local stakeholders, and visitors will also support knowledge exchange and participatory approaches to heritage care. The site thus offers an important testing ground for developing transferable methods for the sustainable preservation of vulnerable archaeological heritage in the context of climate change.

Protection of mosaics in the northern area during winter
(photo Nataša Škrjanec)



View of both areas protected
by the prefabricated tent
(photo Martina Lesar Kikelj)



Alessandro Lugari
Archeological Park of Colosseum, Italy

The Hellenistic Mosaics: A Different Methodological Approach

It is now an established fact that Hellenistic mosaics had a coloured surface finish. From the mid-1st century BC, this methodological practice disappears, in the sense that the construction technique of mosaics changes. Earlier restorations, by failing to take this finish into account, have effectively erased almost all traces of these surface treatments, which we are now able to identify only through microscopic analysis. In recent excavations of phases dating to the 3rd–1st century BC – where a conservator now routinely works alongside the archaeologist – these finishes are consistently evident. The new conservation challenge is to preserve these finishes by consolidating them in advance and by adapting cleaning methods.

Rome, Via Sistina,
residues of surface-coloured
plaster covering the tessellated pavement,
1st century BC (photo
Alessandro Lugari)



Rome, Aventine Hill, residues
of surface-colored plaster cover-
ing the tessellated pavement,
1st century BC (photo Alessandro
Lugari)



Attila Mézes*Hungarian University of Fine Arts,
Hungary***Ádám Albert***Hungarian University of Fine Arts,
Hungary***Mihály Filó***Filo & Co. Ltd., Hungary*

Eszperantó-Well Mosaic Reconstruction with the Help of Photogrammetry

The case study presents the restoration and reconstruction of the Eszperantó Well, made by Dezső Korniss in 1966. Commissioned by the History Museum of Budapest, the conservation work began in September 2025 by Filo & Co. Ltd., led by Mihály Filó and his team. Throughout the years of exposure to outdoor climatic challenges, and probably because it was once filled with water, today more than half of the mosaic has been lost.

With the help of 3D technologies, however, the reconstruction of the 3.5 m diameter bicolour heritage work came to a conclusion. Research into archive photographs was begun by Albert Adam, and with the help of photogrammetry carried out by Attila Mezes, we were able to reconstruct the missing symbols from the well, which sped up the reconstruction phase of the well mosaic.

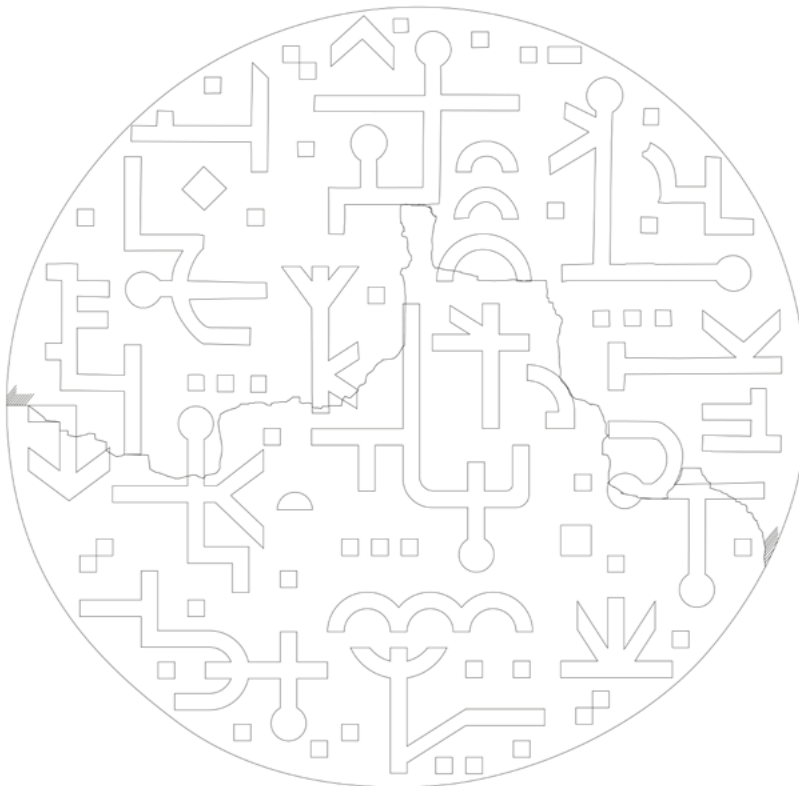
A couple of dozen photographs using a special cross-polarisation technique were taken with a high-end full-frame camera in order to make the photogrammetry of the object more high-resolution. From the 3D scan, an orthographic projection was generated from above, perfectly parallel to the front side. After scaling the orthophoto to life size with the help of markers, a vector map was drawn from the outlines of the symbols. This map became the negative used to reassemble the mosaic patches back into their original places, without distortion.

Introducing 3D techniques such as photogrammetry, 3D scan editing, texturing, and generating orthographic projections, the margin of error at the reassembling phase was greatly decreased, resulting in a much more reliable template for the reconstruction and restoration of the mosaic.



Eszperantó-well made by Dezső Korniss in 2024 october before restoration, prepared for photogrammetry

Vector-based print-template made for the reconstruction of the Eszperantó-well based on the archive pictures and of the 3D scan



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Beyond Climate: Integrating Anthropogenic Threats into Mosaic Protection Strategies

In the last ten years, the Department of Wall Paintings and Mosaics at the Restoration Centre has carried out interventions at several locations within the archaeological site of Ljubljana. Due to planned urban development, archaeological excavations revealed mosaic remains that required professional lifting. Selected case studies will be presented, illustrating the range of technical and logistical challenges encountered in such contexts.

These interventions were often conducted within limited timeframes and under unsuitable weather conditions, which required rapid, emergency responses from conservators and the continuous adaptation of methodologies to site-specific constraints. Such circumstances frequently necessitated innovative approaches, flexible decision-making, and the involvement of a larger number of specialists from different disciplines. Particular attention was given to ensuring the safe detachment, stabilisation, and transport of fragile mosaic fragments while maintaining their material integrity. The lifted fragments were subsequently conserved within our department.

However, accelerated interventions and suboptimal working conditions may also lead to compromises in methodology, potentially affecting the long-term stability and interpretation of the material. Challenges encountered in these projects include limitations in documentation, difficulties in controlling environmental parameters, and the use of provisional solutions that require further treatment at a later stage.

Emergency lifting of mosaics in urban environments does not constitute standard conservation practice, but rather represents a response to anthropogenic pressures, primarily construction activities. In such cases, in situ preservation cannot be the primary strategy; instead, emergency conservation strategies are implemented, including the presentation of lifted fragments in museum collections. These cases highlight the need to reconsider current approaches to mosaic protection by integrating anthropogenic risks within a broader framework of heritage management and decision-making.

Lifting of a roman mosaic from
Gospodsvetska cesta, Ljubljana, in
2018 (Photo Ajda Mladenović)



Conservation of a mosaic
fragment from Slovenska cesta,
Ljubljana, 2025 (Photo Jelka
Kuret)



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Climate Change and the Protection of Archaeological Mosaics: The Case of Glacov Salaš

The Roman imperial palace at Glac near Sremska Mitrovica represents an exceptional example of Roman Tetrarchic architecture, which was likely built by Emperor Maximian Herculus during the first decade of the 4th century. Previous research has uncovered numerous remains of frescoes, mosaics, and decorations in the opus sectile technique. In the central hall, a mosaic was discovered covering an area of over 450 square metres, which has only been partially excavated. It provides a timely case study on the vulnerability of in situ archaeological pavements under conditions of accelerating climate change. Located in a low-lying alluvial environment, the site is increasingly affected by irregular precipitation patterns, rising groundwater levels, prolonged drought periods, and extreme seasonal temperature amplitudes.

Upon excavation, condition assessment documented mortar decohesion, bedding-layer instability, tesserae detachment, brick tesserae dissolving, and extensive salt contamination (predominantly sulphates and nitrates). Moisture and conductivity observations detected active capillary rise and crystallisation cycles. Post-excavation exposure intensified deterioration due to rapid microclimatic shifts, alternating wet–dry cycles, and extreme summer heat, which increases vapour pressure gradients and mechanical stress within the mosaic structure.

Sudden exposure following excavation further amplified these effects, transforming a relatively stable burial environment into a highly reactive microclimatic system.

This contribution examines how contemporary climate trends require a reassessment of established conservation paradigms. Rather than relying solely on structural shelters or reburial as universal solutions, the Glac project approach must combine environmental monitoring, improved drainage management, reusable protective coverings, and conservation interventions, implementing a decision-making process that emphasises flexibility, sustainability, and long-term risk mitigation rather than short-term stabilisation alone.

The Glacov Salaš mosaic demonstrates that mosaic protection in open archaeological contexts must evolve in response to environmental unpredictability. Sustainable preservation requires flexible strategies grounded in risk assessment, material compatibility,

and interdisciplinary collaboration between conservators, archaeologists, hydrologists, and climate specialists to ensure resilient preservation models for archaeological sites in general. This case study contributes to the broader discussion on how conservators can adapt methodologies to safeguard mosaics in the face of accelerating climate change.

Excavated part of a mosaic, situation in 2019



Detail, situation in 2019



Climate-Related Damage to Mosaic Facades

In Tyrol, numerous church façades were decorated with mosaics during the 19th and early 20th centuries. These façades are typically located on the weather side of the building. Paintings do not last there, which is why the more expensive but more durable mosaic technique was chosen.

In recent years, extreme weather events have become more frequent. Summers are significantly warmer, rainfall is less frequent but more intense. Heavy rain, strong winds, and hailstorms are becoming routine. Winters are milder, with more rain than snow; night frosts and daytime warming mean that the freeze–thaw cycle occurs more frequently. Weather trends due to climate change also affect buildings and their decorations.

In mosaics, detachments develop unnoticed; the surface remains intact, but the tesserae have detached from the bedding mortar. This detachment is enhanced by frost shattering caused by night frosts and daytime warming in winter, especially when increased rainfall allows more moisture to penetrate the mortar. In the next stage, the surface bulges and becomes extremely fragile. A single heavy rainstorm is enough to cause these mosaic parts to break off. Suddenly, large sections of the mosaic, which was intact before the storm, are ‘unexpectedly’ missing. Loose edges of the lacunae must be secured quickly.

Due to high summer temperatures, severe hailstorms are becoming increasingly common. These storms are causing a new type of damage. During one of our restoration projects, we could notice from close up fine cracks in the surface of the gold smalti in the golden background of a façade mosaic. Years later, hailstones from a storm had shattered almost all of the 100-year-old gold smalti. It was striking that there was a thick, soft organic layer beneath the shattered and detached tesserae. High humidity (due to higher temperatures in summer and more rain and fog in winter) causes an organic coating to grow underneath the tesserae. This accelerates their detachment from the substrate.

Such damage cannot be prevented. However, it is crucial to react quickly. Ideally, mosaics should be routinely inspected for abnormalities and changes (such as new bulges), and façade mosaics should be restored before extreme weather events turn hidden damage into ‘unexpected’ losses.

Detached and bulged mosaic parts broken off after a heavy thunderstorm (photo Malu Storch)



Damaged gold smalti after a hailstorm (photo Malu Storch)



Toni Šaina*Croatian Conservation Institute, Croatia***Borka Milković***Croatian Conservation Institute, Croatia*

The Floor Mosaics in the Archaeological Zone of the Episcopal Complex of the Euphrasian Basilica in Poreč: Conservation and Maintenance Problems in the Light of Tides and Tidal Currents

The episcopal complex of the Euphrasian Basilica in Poreč is the best-preserved Early Christian architectural monument in the eastern part of the Mediterranean that has retained its original function. It is situated on the western coast of the Istrian Peninsula, in the northern Adriatic. The mosaics that covered the floors of various parts of the complex are evidence of several historic building phases, and also testimony to the spatial extent that the episcopal complex used to have from its earliest days.

Continuous archaeological excavations in the northern, so-called archaeological part of the complex, which contains the remains of its earliest buildings, and numerous attempts at mosaic conservation began in the second half of the 19th century.

Before the last comprehensive intervention in the northern part of the complex, executed during the 1960s and 1970s, the most endangered parts of the original mosaics had been dismantled and exhibited in the lapidarium.

The originals were replaced with copies placed on reinforced concrete decks which, after six decades of daily flooding due to the tides (the archaeological zone is in the near vicinity of the sea), are in rather poor condition.

As the drainage system still functions well, the water flows away rather quickly when the tide lowers, but the problem of frequent flooding not only affects the copies in the archaeological zone but also the original mosaics presented beneath today's floor of the 6th-century basilica. Due to the elevated tides, this situation demands intervention.

The present maintenance activities, which consist of periodic covering during the winter and cleaning and necessary conservation works in the spring, should soon be supplemented with a more efficient solution that would deal not only with the consequences but also with the causes of increasing endangerment.

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A view of the archaeological zone and mosaics of the Euphrasian Basilica complex during low tide (photo Toni Šaina)



A view of the archaeological zone and mosaics of the Euphrasian Basilica complex during high tide (photo Toni Šaina)

Specific Techniques and 3D Technologies Applied in the Physical Restoration of a 6th-Century AD Opus Sectile Decoration on a Wooden Tabletop from Stobi

This paper presents the documentation, conservation, and restoration of an exceptional opus sectile decoration from the Episcopal Residence at Stobi, dating to the 6th century AD and most likely originally adorning a luxurious wooden tabletop. The find comprises more than 4,000 finely crafted sectile tiles made from a wide range of materials, including various minerals such as different types of quartz (including transparent and gilded quartz), dolomite, ankerite, cuprite, wüstite, beryl, and hematite, as well as tiles made of amorphous rocks, horn, and glass. The elements display a variety of geometric shapes and dimensions, ranging from 5 to 50 mm, with several larger irregularly rounded pieces measuring up to 80 mm, and a thickness varying between 1 and 9 mm. The sectile tiles were originally affixed to a wooden support using organic adhesives such as damar resin and colophonium.

The decoration features a combination of refined geometric patterns and stylised floral and zoomorphic motifs. Particular emphasis is placed on the engraved and gilded quartz elements, whose craftsmanship reflects a rare and highly sophisticated technique comparable to verre églomisé. Based on the preserved elements and their spatial distribution, the mosaic is interpreted as part of a rectangular wooden table, likely used within the stibadium of the residence. This unique artefact provides important insight into the use of opus sectile in elite furniture, highlighting the material richness and technical skill characteristic of Late Antique artistic production.

The state of preservation of the find – characterised by highly fragmented remains, with only a limited number of elements preserved in situ – required the development of specific approaches to its documentation, conservation, and restoration. While certain decorative units could be reliably reconstructed, the majority of the sectile tiles were found dislocated, without clear compositional context. Through detailed documentation, analytical study, and comparison with analogous works, several mosaic patterns and partial compositions were identified and reassembled.

Given the size and fragility of the materials, and the complexity of handling the mosaic units, a combined approach integrating conventional restoration techniques with 3D technologies was developed to facilitate and optimise the conservation process.

Reconstructed mosaic units were first assembled face-down on glass plates, then 3D scanned to generate digital models. These were used to create negative moulds of the reverse surface, which were subsequently 3D printed as custom supports. The mosaic elements are intended to be transferred onto new supports, ensuring stability, accuracy, and reversibility, while enabling their safe presentation and display.



Reverse side of the decorative unit with geometric pattern during conservation (photo Mishko Tutkovski)



3D scanning of the reverse side of the corner decorative unit with floral ornament (photo Mishko Tutkovski)

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Jorge Miravalles Ovejero

*Escuela de Arte y Superior de Diseño de
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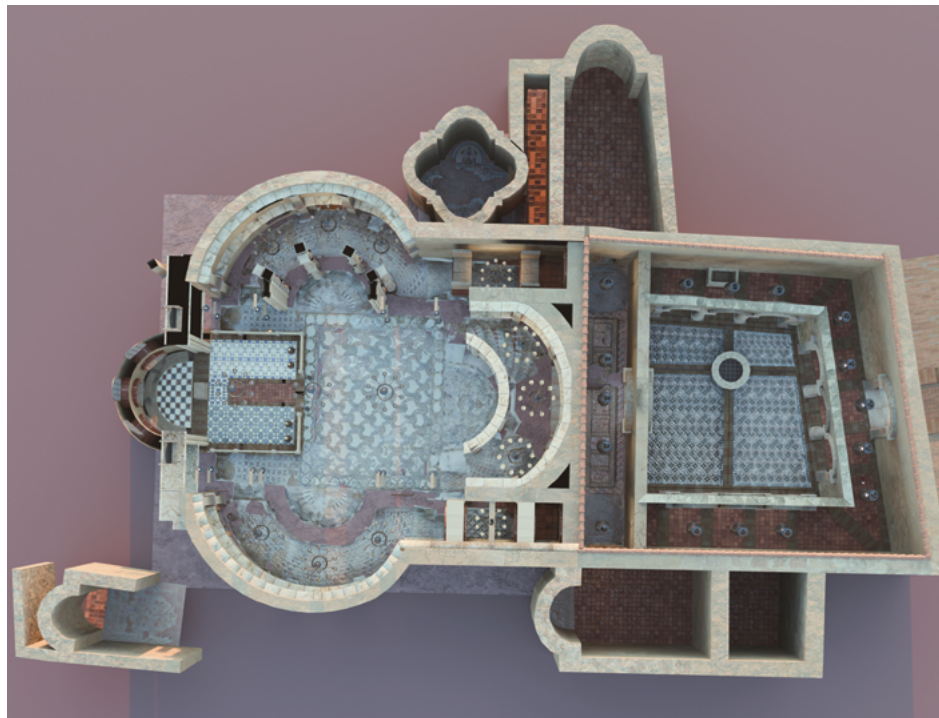
3D Reconstruction of the Mosaics from the Polyconchal Basilica at Plaošnik, Ohrid (North Macedonia)

In this meeting, we will present the 3D reconstruction of the mosaics of the Polyconchal Basilica at Plaošnik, Ohrid, North Macedonia. This study forms part of a broader 3D reconstruction of the entire building, a monument of historical, artistic, and heritage significance. The basilica is especially remarkable for its mosaics, which are considered some of the most important decorative elements of Early Christian art in the Balkans

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3D reconstruction
of the Polyconchal Basilica
at Plaošnik, view
of the floor plan (author
Nikola Upevče, Jorge
Miravalles Ovejero)



and provide important evidence for understanding the visual culture of the period.

During the presentation, we will explain in detail the technological, methodological, and interpretative processes of virtual archaeology applied in the reconstruction of these heritage elements. Special attention will be given to the documentation, analysis, digital modelling, and visual restitution of the mosaics, as well as to the challenges involved in translating archaeological evidence into a coherent three-dimensional representation.

At the end of the session, attendees who wish to do so will have the opportunity to enjoy an immersive 3D experience using augmented reality devices. This research has been carried out through the collaboration between the Institute for the Protection of Monuments of Culture and Museum – Ohrid and the Pontifical University of Salamanca, with the support of an international research grant.

3D reconstruction of the Polyconchal Basilica at Plaošnik, interior mosaic of the central nave (author Nikola Upevče, Jorge Miravalles Ovejero)





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Digital Reconstruction of Mosaics from the Tetraconchal Basilica, Plaošnik, Ohrid

Digital reconstruction of mosaic fragments from the Tetraconchal Early Christian Basilica in Plaošnik, Ohrid, is a very complex and demanding task. The results of this study will help in the digital reconstruction of the basilica using new technology for immersive experience and representation of this complex archaeological site.

The idea of this project is to reconstruct the mosaic pavement fragments from:

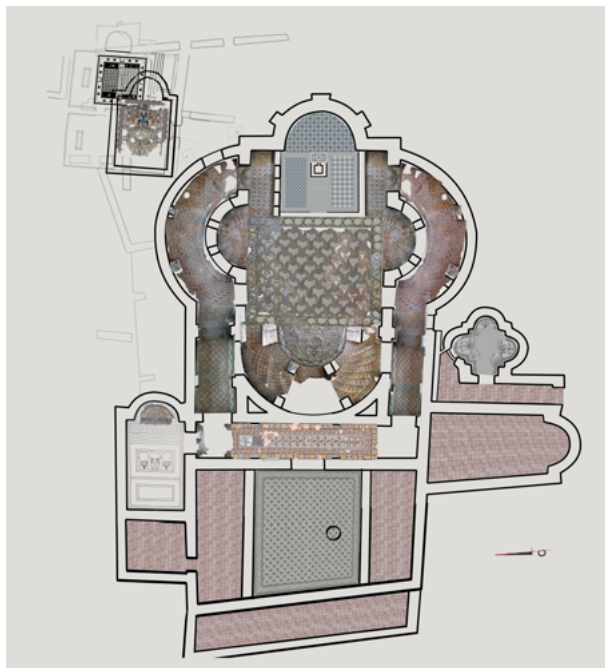
- Atrium (*opus barbaricum*),
- Narthex (only two fragments survived, and we incorporated them into the corpus with the mosaic from the Early Christian Basilica from Deboj archaeological site,
- Nave, and
- Missing parts of the altar of the basilica, which are completed with fragments of *opus sectile* mosaics from the Early Christian Basilica of St Erasmo.
- The north side wings and three annexes are reconstructed too.
- The south baptistery mosaic with *Four Rivers of Paradise*,
- Mosaic pavement from the north-west annex with the inscription ‘They made it for their blessing, those whose names God knows.’
- The mosaic from the north-east annex of the basilica, also with an inscription in three lines. ‘This inscription reveals a bishop from Lychnidos, who initiated (ἐναρξάμενος) and supported the construction of the annex, and then left it to his children who helped him the most. Unfortunately, the name of this bishop remains unknown’

The mosaics are reconstructed using the documentation provided by the previous archaeological and conservation treatments of the mosaics, from their discovery to the present day.

Northern anex (author Nikola
Upevče, Jorge Miravalles Ovejero)



Polikonhos (author Nikola
Upevče, Jorge Miravalles Ovejero)





Katerina Upevče
Ohrid Time Travel, Republic of North Macedonia

Nikola Upevče
NI Institute for Protection of Monuments of Culture and Museum – Ohrid, Republic of North Macedonia

Ohrid Time Travel by Metagemia

The Ohrid Timeline is a portal through time that combines the rich landscape, history, culture, and art of Ohrid with the latest technology of the 21st century. Located in the city centre and easily accessible to everyone and in all weather conditions, this interactive centre brings the tradition and rich historical heritage closer to the new generations in the form of educational entertainment.

12 Rooms with interactive content:

- Virtual Aquarium: A digital, interactive aquarium featuring the endemic species of Lake Ohrid.
- Architecture and Art: Virtual walks through historical sites and digital reproductions of famous art.
- Literacy: A presentation of literacy from antiquity to the present.
- Music and Dance: A fun way to present the music and dance of the region through an interactive game.
- ... and other unique experiences.

Benefits for the city:

- Expanded tourist offer: Ohrid gains a world-class attraction that attracts the younger generations.
- Promotion Centre: We function as an 'info-hub' that directs visitors to landmarks such as Samuel's Fortress, the Bay of Bones, and other sites.
- Local Economy: Employment and opportunities for professional engagement of local creators, artists, craftsmen, etc.
- Educational-Entertainment Centre for the local population, especially for families with school-age children. Bringing the natural and cultural heritage closer to the younger generations and transmitting quality values.



Antique Theatre Ohrid



Jozef Szekely, 1863



Kinga Veress

*Hungarian Museum of Trade
and Tourism, Budapest, Hungary*

Nagy Géza

Artist and photographer

Gyöngyi Fazekas

*Hungarian Museum of Trade
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A Neoavantgard Innovation: The ‘Photomosaics’ of Miklós Erdély II: Latest Research Findings; A Nationwide Analysis of the Condition and Vulnerability of the Miklós Erdély Mosaics (The Dilemmas in Conservation: Preventive Conservation of Mosaics)

The artist, architect, actor, and theorist Miklós Erdély inspired his contemporaries by his diverse activity and also found how to stay a free thinker and how to help others in a strictly controlled political environment of the era. Among his projects, he invented the technique of the so-called photomosaic in 1966. He worked in this genre as a designer, teacher, and mosaicist between 1966–1982. The photomosaics of Miklós Erdély provided a new ‘surface’ for pop art’s and montage art’s visual solutions and their changed relationship to objects. Erdély and colleagues designed compositions using the photo-montage technique as a preliminary plan reflecting the purpose and context or recalling the function of the interiors. (Excerpt from the abstract volume of the 6th conference, Kinga Veress – Brigitta Maria Kürtösi)

For the purposes of prevention and further official and public preservation, we visited the sites in question accompanied by a restorer and a photographer. The results of the documentation tour and the lessons learned from it are presented in the video and on the posters. Recognising and protecting the value of these works of art remains a pressing issue.



A detail from the Bor-is Borozó (wine bar) photomosaics, Miskolc, Hungary (photo Kinga Veress)



A detail from the Pepsi-mosaics, Miskolc, Hungary (photo Kinga Veress)



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Long-Term Behaviour of Calcareous Marlstone in an Exterior Mosaic: Monitoring and Conservation Challenges in the Bird Family (1969) by Ludmila Jandová

This paper examines the long-term material stability of the mosaic *Bird Family* (1969) by Ludmila Jandová, based on extended post-intervention monitoring following conservation treatments carried out since 2018. The study builds on an interdisciplinary survey conducted in 2016, which identified a fundamental problem in the use of calcareous marlstone (mudstone). As the principal expressive component of the mosaic, marlstone plays a key aesthetic role; however, its layered structure, porosity, and low mechanical strength make it highly susceptible to moisture ingress and repeated freeze–thaw cycles. These factors have become increasingly critical under conditions of greater climatic variability.

The initial conservation intervention aimed to preserve the original material concept while improving the physical stability of the mosaic. Severely degraded or missing stone tesserae of irregular shape were replaced with marlstone selected through material testing from the same geological source as the original, as it best met the requirements for workability, visual appearance, and colour compatibility. Original elements were consolidated, and the bedding mortar was locally repaired. Despite careful material selection and technological optimisation, subsequent monitoring revealed the rapid recurrence of degradation phenomena. Newly inserted tesserae exhibited detachment, delamination, and loss of adhesion to the bedding mortar within a relatively short period.

Subsequent interventions focused on adjustments to the bedding system, including the use of alternative mortar compositions with modified physical and mechanical properties. While these measures led to temporary stabilisation in critical areas, they did not ensure long-term durability.

The findings indicate that the primary limiting factor lies in the inherent material properties of marlstone itself. As a sedimentary rock with low resistance to moisture and thermal stress, its performance is inherently problematic under fluctuating environ-

mental conditions. These effects are further intensified by increasing climatic variability, which accelerates material fatigue and the rate of deterioration.

The paper therefore addresses the practical limits of conservation interventions in cases where the original material is inherently unstable. It discusses possible approaches, including improving the cohesion of the stone, refining bedding mortars with regard to moisture transport, and reducing water retention within the structure. At the same time, it reflects on the necessity of reassessing conservation goals under changing climatic conditions, where increasing environmental stress may accelerate degradation beyond manageable levels. The study contributes to current discussions on the conservation of mosaics composed of highly degradable sedimentary materials and proposes recommendations for their maintenance, monitoring, and future treatment strategies.



Bird Family mosaic by Ludmila Jandová (1969): Condition of the artwork in 2016 during the initial conservation survey (Archive of the Faculty of Restoration, University of Pardubice, Czech Republic)



Detail of marlstone degradation (Archive of the Faculty of Restoration, University of Pardubice, Czech Republic)

Petra Weiss
Bundesdenkmalamt, Austria

Eva Steigberger
Bundesdenkmalamt, Austria

A Big Surprise – and What Now?

During an excavation carried out by the University of Salzburg and the Provincial Museums of Upper Austria in 2024–2025, the remains of a villa overlooking the Traun Valley near Wels, the Roman municipium of Ovilava, were found. Three adjoining rooms contain mosaics in very good condition. Parts of the walls with antique plaster were also found in situ. Antique Roman mosaics such as these do not appear that often in Austria, especially in such good original condition and with connecting modern excavated buildings as well. The site was placed under monument protection by the Monuments Authority. As it is unclear what will happen with the site, whether it will be preserved in situ under a protective building or not, it had to be reburied until a decision can be made. What one summer of poor protection, so that it could be shown to visitors, did to the mosaics and the site opened a lively discussion on what to do. Most problems come from weather conditions, as they always have, but those becoming more volatile through climate change make decisions more complicated. This presentation aims to point out the various risks to in situ preserved mosaics, ask questions about how to proceed with the actual conservation, consider the possibilities for sustainable public education and interpretation through digital approaches, and hopefully lead to a fruitful discussion.

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Mosaics in situ during excavation
spring 2025 (photo Eva Steig-
berger)



Situation summer 2025
(photo Eva Steigberger)



Maja Živić
National Museum 'Zaječar,' Serbia

Maja Franković
National Museum of Serbia

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*Institute for the Protection of Cultural
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Felix Romuliana – Gamzigrad: In Situ Mosaic Heritage Under Conservation and Presentation Challenges

Felix Romuliana (Gamzigrad), the late Roman palace complex of Emperor Galerius (late 3rd–early 4th century), near Zaječar in Eastern Serbia, is a UNESCO World Heritage Site (2007), significant for the preservation of its architecture and mosaic decoration, reflecting the ideological framework of the Tetrarchic period.

Approximately 1,800 m² of mosaic floors have been discovered. The most representative panels are housed in the National Museum in Zaječar, while mosaics from the triclinium, vestibulum, and central apsidal hall remain in situ. Conserved in the 1960s by lifting and resetting onto lime-cement bedding layers, the mosaics were subsequently reburied under sand for protection.

The current condition of the mosaics highlights critical challenges in long-term conservation and presentation. Previously conserved mosaics now require renewed intervention, emphasising the cyclical nature of conservation in the absence of stable environmental conditions and permanent protection. Only the mosaic in the circular entrance hall of the stibadium is accessible beneath a provisional scaffolding structure installed in 2014, originally intended for temporary re-conservation works. The others still remain covered.

Seasonal uncovering offers a possible alternative but requires the continuous presence of trained technical staff for preventive conservation and maintenance. While potentially sustainable, this model is difficult to implement under current economic and institutional conditions. Climate change – with increased precipitation, temperature fluctuations, and more frequent extreme weather events – further intensifies these challenges.

These conditions reflect broader structural and methodological issues. The scale and spatial complexity of the palace prevent the implementation of a single protective system. Instead, localised shelters over individual architectural units are required, each demanding careful integration into the site's visual and historical context, as well as effective drainage systems to manage rainwater. Despite formal approval by UNESCO in 2021, the shelter over the vestibulum mosaic remains unrealised due to the lack of consensus on an appropriate conceptual design. At the same time, the most significant room with mosaics – once featuring the emblematic depiction of Dionysus – continues to deteriorate while awaiting sheltering for the intervention.

The presentation highlights current problems in protecting and presenting mosaics at Felix Romuliana and outlines directions for sustainable conservation. Discussed strategies include modular and reversible protective structures, hybrid models combining exposure and reburial, improved drainage and microclimate management, and non-inva-

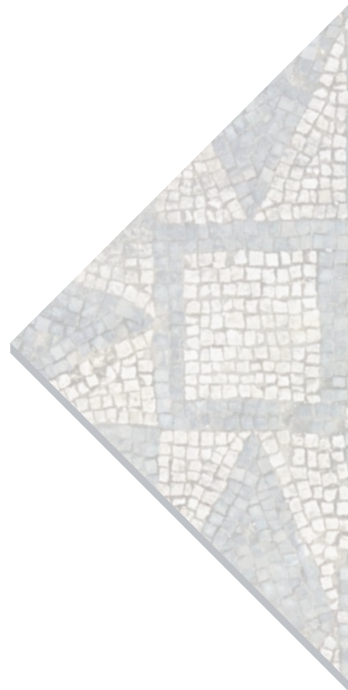
sive interpretative tools where continuous display is impractical. These approaches aim to balance conservation priorities, site presentation, and visitor engagement, ensuring the long-term safeguarding of this outstanding World Heritage site.

Felix Romuliana, aerial view
(photo Maja Živić)



Mosaics at the site: left – uncovered mosaics restored in the 1960s; right – recent re-conservation interventions (photo Maja Živić)





Poster Presentations



Sustainable Heritage Management and Mosaic Protection: A Case Study of Biological Bird Mitigation at the Archaeological Site of Mediana (Serbia)

The preservation of in-situ mosaics at the imperial villa of Mediana faces a significant challenge due to avian activity within its monumental protective structure. Covering an area of 10,000 square metres with a ceiling height of 12.5 metres, this open-sided shelter creates a vast internal volume where bird nests are physically unreachable for manual removal or the installation of traditional deterrents like spikes or nets.

This poster presents a case study on an innovative, sustainable, and non-invasive solution: biological bird mitigation using trained hawks. Unlike acoustic or chemical methods, this approach offers a clean and quiet solution that preserves the visual and acoustic integrity of the 4th-century mosaics without disturbing the site's dignified atmosphere. By establishing an 'apex predator presence,' we successfully created a natural 'no-fly zone' that prevents the accumulation of guano and the resulting chemical weathering of the delicate tesserae.

Our results demonstrate that biological mitigation is the only scalable and eco-friendly strategy capable of protecting large-scale archaeological sites where traditional physical barriers are architecturally and logistically unfeasible.

This approach represents a unique synergy between two forms of global heritage: utilising the ancient, intangible cultural heritage of falconry to safeguard the tangible, monumental mosaics of the Roman Empire. The presence of the falconer and the hawks provides a unique opportunity for public engagement, where visitors are invited to learn about the ancient art of falconry and its modern application in heritage science.

Ultimately, it creates cost-effective site management as the need for frequent, specialised manual cleaning of the mosaics is reduced.

Mediana shelter
(photo Vesna Crnoglavac)



Trained hawk
(photo Vesna Crnoglavac)



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Climate Change and the Conservation of Contemporary Mosaic Heritage: The ‘Shell with Pearl’ Fountain in Eforie Nord

This paper examines the conservation challenges of a contemporary outdoor mosaic structure – ‘Shell with Pearl,’ an artesian fountain located in Eforie Nord – as a representative case of late 20th-century public art exposed to increasingly unstable climatic conditions. Unlike traditional Roman mosaics, typically conceived as horizontal pavements or mural decoration, this work integrates a curved, semi-architectural form, combining structural, decorative, and hydraulic functions. Such complexity significantly influences its patterns of deterioration.

The mosaic surface, composed of small tesserae applied over a reinforced concrete support, exhibits advanced degradation phenomena, including cracking, detachment of tesserae, loss of cohesion within the mortar layers, biological colonisation, and surface soiling. These processes are intensified by climate-related factors, particularly repeated wetting–drying cycles, temperature fluctuations, salt crystallisation, and vegetation-induced microclimatic changes. The former or intermittent operation of the fountain further contributes to water infiltration and material fatigue, accelerating structural and surface decay.

The study proposes an integrated methodology based on damage assessment, risk analysis, and material compatibility, aimed at defining sustainable conservation strategies. Interventions include structural stabilisation, consolidation of the mosaic layer, controlled cleaning, and the implementation of preventive measures to limit moisture ingress and biological growth. Particular emphasis is placed on minimal intervention and reversibility, adapted to the specificities of contemporary materials.

Beyond technical considerations, the paper reflects on the heritage value of modern public artworks, often under-recognised despite their cultural and urban significance. It argues for the inclusion of such works in broader conservation frameworks addressing climate change, and highlights the importance of interdisciplinary collaboration and knowledge exchange in developing resilient conservation practices for outdoor mosaic heritage.

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Outdoor mosaic structure –
'Shell with Pearl' (photo Maria
Dumbrăvician)



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Republic of North Macedonia*© Author(s) <https://doi.org/10.26493/978-961-293-617-4.27>

Conservation of the Mosaic in the House of Parthenius at Stobi

The House of Parthenius is the smallest residential building from the 4th century AD discovered so far at the archaeological site of Stobi, covering an area of approximately 500 m². The house consists of six rooms and an open courtyard with two porticoes and a rectangular pool (nymphaeum), surrounded by rooms.

The mosaic is located in a rectangular room on the south-eastern side of the peristyle and occupies about half of the room's surface. It is evident that a large portion of the mosaic is missing on the north-western side, while a small section of the mosaic on the south-eastern side of the room is covered with stone slabs made of sandstone, placed approximately 35 cm above the mosaic.

The first archaeological excavations and the discovery of this structure date back to the 1930s, when the mosaic floor was most likely also uncovered. To the north-west, the house borders (i.e., shares walls) with the Theodosian Palace.

The first archaeological investigations of the House of Parthenius, which was initially considered part of the Theodosian Palace, took place in the 1920s, specifically between 1924 and 1929, under the direction of curators from the National Museum in Belgrade (Museum of Prince Paul).

The first conservation treatment of the mosaic floor was carried out in the 1930s and 1970s through grouting and edging of lacunae with cement mortar. In 2018, 2019, and 2020, preventive conservation was undertaken by NI Stobi on certain parts of the mosaic that were in very poor condition, mainly replacing the damaged edge repairs and infills, as well as injecting liquid mortar between the mortar layers and carrying out some retouching.

The main objective of this project is to ensure adequate protection of the floor mosaics and to prevent further deterioration caused by continuous exposure to atmospheric conditions.

By completing the conservation-restoration interventions and the treatment of the mosaic surface (tessellatum), as well as the mortar substrate in situ, the authentic appearance will be preserved and conditions will be created for proper display, i.e., presentation of the mosaic to visitors.

House of Parthenius – initial state
of the mosaic in 2018 (photo
Tome Filov)



House of Parthenius – the mosaic
during the conservation process
in 2022 (photo Tome Filov)



Maja Franković
National Museum of Serbia

Dunja Davidović Gnjatović
National Museum of Serbia

Beyond Conservation: Rethinking the Sustainability of Mosaics in Museum Collections

Mosaics in the collection of the National Museum of Serbia were acquired following archaeological excavations conducted in 1957–58 at an Early Christian church near the village of Stojnik on Mount Kosmaj, an area of imperial silver mines in Roman times. Executed in the *opus tessellatum* technique, the mosaic carpets feature geometric motifs and votive inscriptions characteristic of Late Roman sacral architecture of the 4th century. As archaeological finds, they provide valuable insight into the social context of the region, particularly through inscriptions that shed light on the local population.

Despite their significance, the mosaics were not presented to the public in their entirety until sixty-six years after their discovery, at the exhibition ‘From Paganism to Christianity: The Rotunda in Stojnik’ (September–November 2024). This presentation followed an extensive process of de-restoration (2005–2012), during which the mosaics were removed from earlier gypsum supports and remounted onto honeycomb panels using contemporary conservation methodologies. The project, carried out in collaboration with the Musée départemental de l’Arles antique, reconnected Serbian conservation practice with international standards after a hiatus in the 1990s. It also included a strong educational component, introducing around twenty conservators to mosaic conservation and forming a core team of four specialists.

This case highlights key challenges related to the sustainability of mosaic conservation in a museum context. Due to their large dimensions, only one of the five mosaics is currently on permanent display, while the others can be exhibited only temporarily, limiting the understanding of the original ensemble. Storage conditions are also problematic: large panels are kept in crates in circulation areas within the storage area – secure but suboptimal – while handling is hindered by architectural constraints.

The adopted conservation approach, which resulted in large, unified panels, was a deliberate choice. It aimed to avoid earlier issues caused by fragmented restorations dependent on incomplete documentation, and was developed in anticipation of improved institutional conditions, including expanded storage, exhibition space, and staffing. However, these expectations – formed in the early 2000s – were not realised, leaving the museum to manage solutions that exceed its current capacities.

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This case raises three key questions:

- How can large-scale mosaics be meaningfully exhibited within limited spatial capacities?
- Can conservation strategies be considered sustainable if they rely on projected institutional growth?
- How can knowledge and professional continuity be maintained in the absence of stable employment structures?

Ultimately, it points to a central challenge: how to plan sustainable conservation in conditions of an uncertain future.

Reconstructing layout of mosaic floors within the church – mounting of mosaic panels (photo D. Davidović Gnjatović)



Opening of the exhibition From Paganism to Christianity: The Rotunda in Stojnik (photo D. Davidović Gnjatović)





Filip Janković
*Institute for the Protection of Cultural
 Monuments of Serbia-Belgrade*

Marijana Protić
*Institute for the Protection of Cultural
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Nemanja Smičiklas
Faculty of applied arts, Serbia

Protecting the Peristyle Mosaic at Mediana: In Situ Conservation Under Environmental Challenges

This poster presents the ongoing conservation and restoration of the floor mosaic located in the peristyle of the archaeological site of Mediana near Niš (Serbia), an important example of Roman decorative art exposed to long-term environmental and climate-related deterioration.

The intervention focuses on stabilisation, material compatibility, and long-term *in situ* preservation. The first phase included the removal of the protective sand layer, detailed photographic and graphic documentation, mapping of deterioration, and testing of conservation treatments supported by physicochemical and mycological analyses.

The main conservation procedures include controlled drying of mosaic fragments, consolidation and fixing of loose tesserae, stabilisation of edges, and filling of lacunae. Previous cement repairs and deteriorated decorative mortar were removed and replaced with compatible lime-based materials. Biological growth was treated using targeted biocides, followed by surface cleaning and additional tesserae consolidation. Injection grouting was applied to stabilise unstable bedding layers, while selected areas were retouched with original tesserae where reconstruction was justified by preserved evidence.

The final phase includes overall consolidation, application of new decorative mortar, graphic reconstruction, and the application of a protective UV layer. The project is accompanied by comprehensive written, photographic, and video documentation to enable long-term monitoring and future conservation planning.

The presented case study highlights sustainable and interdisciplinary approaches to *in situ* mosaic conservation in the context of increasing environmental and climate challenges.

The process of mosaic grouting
(photo Branko Radović)



The mosaic after grouting
(photo Branko Radović)



Matko Kezele
Independent restorer, Croatia

Biljana Bojić
City Museum of Umag, Croatia

Rethinking Mosaic Protection in the Context of Climate Challenges: The Case of the Umag Area (Istria, Croatia)

The mosaic heritage in the area of the city of Umag (Savudrija, Katoro, Sv. Ivan, Lovrečica) represents a small but significant group of Roman and Late Antique floor structures, predominantly associated with ancient maritime villas. It is a heterogeneous corpus in which utilitarian floors prevail, particularly within cisterns and bath complexes.

At Katoro and Tiola, floors made of local limestone and ceramic tesserae have been recorded, while at Sv. Ivan, black-and-white mosaic floors have been documented within a bath complex. At the Lovrečica site, various floor types are present, ranging from floors executed in the *opus spicatum* technique (i.e. bricks arranged in the characteristic ‘herringbone’ geometric pattern) to mosaic floors made of local limestone.

This paper addresses the issue of preserving mosaic floors within ancient cisterns in the coastal area of Umag, with particular emphasis on the Lovrečica site. These floors, composed of limestone tesserae and recycled fragments of construction material, represent a form of utilitarian decoration adapted to the function of hydraulic architecture. Due to their immediate proximity to the sea, the sites are exposed to moisture, salt crystallisation, groundwater fluctuations, and increasingly pronounced climatic extremes.

At Lovrečica, a twin cistern located directly on the shoreline has been preserved as the only visible remains of a Roman villa (1st–4th century AD). Within the cistern, a mosaic floor has been preserved, and its cross-section reveals construction layers, including a secondary *stratumen* made of recycled roof tiles and amphora fragments, indicating multiple phases of use. The site has not been systematically investigated and requires interpretation within the broader context of maritime villas.

Climate change – manifested through rising sea levels, more intense storms, and the intrusion of saline groundwater – together with pressures from urbanisation and tourism, represents a key set of degradation factors. The resulting impacts include erosion, salt crystallisation, biological growth, and the progressive loss of tesserae, particularly in areas subject to periodic flooding.

The research is based on systematic site inventory as field documentation and analysis of existing sources, enabling assessment of condition and identification of risks. In accordance with international guidelines, a preventive and integrated conservation approach is proposed: improvement of drainage, control of moisture and salts, establishment of protective zones, use of compatible materials, and controlled covering or partial reburial.

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For the Lovrečica site, urgent preventive measures are required, including the installation of a physical barrier to limit the effects of marine action. The proposed model is also applicable to other coastal sites of the northern Adriatic.

View of the cistern in Lovrečica
(photo Matko Kezele)



Detail of the floor layers in the
cistern of Lovrečica (photo Matko
Kezele)



Anja Novak Švagelj
Self-employed in culture, Slovenia

Eva Marija Fras
Self-employed, Slovenia

Re-restoration of an Antique Mosaic

This poster discusses the re-restoration of a Roman mosaic discovered and detached at the Emona archaeological site NUK II in Ljubljana in 1997. At the time, the mosaic was already highly fragmented, with many loose tesserae and cracks. It was reassembled *in situ* based on the restorer's best judgement and later underwent another, undocumented intervention. After thirty years, the mosaic returned to conservation at IPCHS, Restoration Centre, in a very unstable condition and required further treatment.

At the beginning, the mosaic was positioned face-down on a facing that held only part of the structure, while many fragments and tesserae were loose or displaced. The backing layer varied from very hard and thick to thin and fragile. Since the design was not visible, the first step involved carefully turning the fragments into a sandpit and gradually reassembling them. Smaller pieces were joined into larger sections, and individual tesserae were repositioned using clear traces left on the original facing. Careful alignment of horizontal levels and structural continuity guided the process.

As the work progressed, earlier restoration errors became noticeable. For example, smooth-surfaced tesserae were intermixed with rougher ones, larger tesserae suggested displacement from another section, and measurements revealed a gradual widening of the white band, supported by size discrepancies among the tesserae.

These findings raise important ethical questions in conservation: should we preserve the mosaic in its current state, or attempt a reconstruction based on material evidence and its probable original appearance, even if this means removing traces of earlier interventions?

Restoration of detached mosaic
in 1997 (photo Damijan Snoj,
archive MGML)



Reassembling fragments in
sandpit, 2026 (photo Anja Novak
Švigelj)



Roman-Era Floor Mosaics on the Zadar Peninsula (Archaeological Research from the Second Half of the 19th Century to the Present)

Zadar most likely became a colony (Colonia Iulia Iader) in the first years of the reign of Emperor Augustus, after 27 BC. The city was founded on the peninsula and was built according to the basic principles of Roman urban planning. The spatial morphology and planimetry of the city area show that it was planned according to a regular orthogonal system.

The greater part of the urbanised area of the city centre was occupied by residential architecture, which covered at least half of the total city area. Its decoration, both on the floors and on the walls, played a significant role in shaping the public and private life of the inhabitants. Remains of Roman dwellings, as well as numerous traces of construction associated with Roman-era residential architecture, have been found in almost all parts of the urban area of Iader. The greatest concentration of remains was recorded in the central part of the city, in the area around the main urban dominants, and along the main transverse direction of the orthogonal street network. Individual rooms of residential buildings have been discovered in several places, while the remains of entire houses have not been found. The residential house (*domus*) was not oriented towards the street in terms of function or spatial organisation, but towards the central spaces, the atrium and the peristyle. Local workshops did not develop separate stylistic traditions, but rather emerged, developed, and transformed under the influence of strong mosaic centres in the northern Adriatic, showing all the characteristics of Italic mosaics. This paper presents all the mosaics found during archaeological research on the Zadar from the second half of the 19th century to the present day.



View of two mosaic discovered in Pupinova Street during archaeological excavations in 1965 (Archive of the Archaeological Museum Zadar)



View of the mosaic uncovered during archaeological excavations carried out in 2019 at the site of the city market in Zadar.

Two Mosaic Portraits by Ivan Joko Knežević: Conservation-Restoration Treatment as a Key to Understanding the Artistic Process

In the art collection of the Croatian Parliament and the Government of the Republic of Croatia, two mid-20th-century mosaics on movable supports are preserved: *Barba Marko* (Uncle Marko) (43 × 33 cm) and *Moja Majka* (My Mother) (51 × 42 cm). The works are executed in the traditional mosaic technique, using stone tesserae set in lime mortar, within wooden frame structures that also function as their structural support.

The author of the mosaics is the academically trained artist Ivan Joko Knežević (Lokva Rogoznica, 1907–Split, 1988), one of the early modern artists in Croatia to systematically explore mosaic as a medium. Despite a long and diverse artistic production spanning six decades, including drawing, painting, and sculpture in various materials, Knežević remains a relatively under-recognised figure in the second half of 20th-century Croatian art history.

In 2025, a comprehensive conservation-restoration treatment was carried out on the two mosaics. The intervention included detailed examination and documentation, historical and material research, laboratory analysis of constituent materials, cleaning, consolidation of the mosaic layers, reconstruction of losses, and retouching of visually disrupted areas. Particular attention was given to the relationship between the tesserae, mortar layers, and the wooden support structure.

The integration of standard conservation procedures with scientific analysis enabled new insights into the technological approach and working methods of Ivan Joko Knežević. The results contribute to a more precise understanding of his mosaic-making practice and broader artistic methodology.

Barba Marko (Uncle Marko) after
conservation-restoration treat-
ment (Photo Tea Trumbić)





Igor Žižič

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Bernarda Županek

*Museum and Galleries of Ljubljana,
City Museum of Ljubljana, Slovenia*

Conservation Works on the Early Christian Center Mosaics of the Arheopark Emona in Ljubljana

The archaeological site of the Early Christian Centre, today part of Arheopark Emona in Ljubljana, was opened to the public in 1975. In the years prior, the site had undergone archaeological investigation, followed by extensive presentation works that included the lifting, conservation-restoration, and installation of multicoloured mosaics enriched with inscribed cartouches in the baptistery.

The exceptionally high-quality conservation and restoration work was supplemented several times in the following decades due to minor damage, most recently on a larger scale in 2012. In 2026, cleaning of these mosaics and their substructure is underway, accompanied by the study of documents concerning their original condition and previous procedures carried out, as well as discussions regarding the possible reconstruction of lacunae and individual missing tesserae, as well as the restoration of deteriorated joint fillings.

In this paper, we present the ongoing work, new discoveries, questions, and challenges encountered during the cleaning process.

View of Early Christian Center
(photo Igor Žižič)



Mosaics beside the Baptistry
(photo Igor Žižič)



Programme

Tuesday 13th October 2026

- 9.00–9.30 Registration
- 9.30–10.00 Welcome
Blaž Peršin, Director of Museum and Galleries of Ljubljana, Slovenia
Jernej Hudolin, Director General of Institute for the Protection of Cultural Heritage of Slovenia
Rok Žnidaršič, Deputy Mayor of the City of Ljubljana, Slovenia
Vilijem Leban, Acting Director General, Cultural Heritage Directorate, Ministry of Culture, Republic of Slovenia
Maja Franković, SEE Mosaic Project Coauthor, National Museum of Serbia
- 10.00–10.45 Key note speech
Alessandra Bonazza
Cultural Heritage in a Changing Climate: Towards Risk Assessment within the Framework of Heritage Climatology
- Session 1
Managing Mosaic Heritage in a Changing Climate: Challenges, Risks and Responses
Chair 1: Katharina Zanier
- 10.45–11.30 Martina Lesar Kikelj, Nataša Škrjanec, Katharina Zanier, Jaka Bizjak, Judita Lux and Zrinka Mileusnić
Adapting Mosaic Conservation to Climate Challenges: The Case of Simonov zaliv Roman Villa (Slovenia)
- 11.30–11.50 Toni Šaina and Borka Milković
The Floor Mosaics in the Archaeological Zone of the Episcopal Complex of the Euphrasian Basilica in Poreč: Conservation and Maintenance Problems in the Light of Tides and Tidal Currents
- 11.50–12.10 Nemanja Smiciklas, Marijana Protić, Filip Janković and Stefan Pop Lazić
Climate Change and the Protection of Archaeological Mosaics: The Case of Glacov Salaš
- 12.10–12.30 Antonija Gluhan and Ivana Jerković
Fragile Surfaces, Changing Climate: Preserving Late Antique Mosaics in Diocletian's Palace

- 12.30–13.00 Discussion
13.00–14.00 Lunch

Session 1

Managing Mosaic Heritage in a Changing Climate: Challenges, Risks and Responses
Chair 2: Bernarda Županek

- 14.00–14.20 Maja Živić, Maja Franković and Marijana Protić
Felix Romuliana – Gamzigrad: In Situ Mosaic Heritage under Conservation and Presentation Challenges
- 14.20–14.40 Petra Weiss and Eva Steigberger
A Big Surprise – and What Now?
- 14.40–15.00 Kristen Jones, George Bevan and Tome Filov
Designing a Risk-Matrix to Assess the Vulnerability of In-Situ Roman Mosaics
- 15.00–15.20 Discussion
- 15.20–15.40 Break
- 15.40–16.40 Guided visit of Museum and Galleries of Ljubljana

Wednesday 14th October 2026

- 9.00–10.00 Guided visit of Restoration Centre of IPCHS,
Meeting point: Restoration Centre, IPCHS, Poljanska 40, Ljubljana
- 10.00–10.30 Break
- 10.30–11.40 Guided visit to the historic city of Ljubljana

Session 2

From Materials to Methodologies: Current Approaches in Mosaic Conservation
Chair: Maja Franković

Venue: Museum and Galleries of Ljubljana, Gosposka ulica 15, 1000 Ljubljana

- 12.00–12.20 Ajda Mladenović, Jelka Kuret and Martina Lesar Kikelj
Beyond Climate: Integrating Anthropogenic Threats into Mosaic Protection Strategies
- 12.20–12.40 Adriana-Maria Florea Galea, Andrei-Alexandru Galea, Attila Mézes, Fanni Gizella
Szigetváry and Brigitta Maria Kürtösi
Conservation Challenges of a Contemporary Mixed-Media Mosaic Composition (Destined for Indoor Spaces) after Fourteen Years Outdoors
- 12.40–13.00 Vesna Crnoglavac and Branko Radović
From Hibernation to Revelation: A Case Study of the In Situ Reconservation and Presentation of Unique Figurative Mosaics at the Archaeological Site of Mediana

- 13.00–13.20 Marion Denis, Paola Perpignani and Tessa Pirillo
The Methodologies and Materials Used in Mosaic Restoration in France and Italy:
Case Studies of the Workshops of Saint-Romain-en-Gal and RavennAntica
- 13.20–13.40 Alessandro Lugari
The Hellenistic Mosaics: A Different Methodological Approach
- 13.40–14.00 Discussion
- 14.00–15.00 Lunch
- 15.00–15.30 Poster session and video session
- 15.30–17.30 Guided visit of Parliament and presentation at Majda Vrhovnik

Thursday 15th October 2026

Session 3

From Digital Recording to Immersive Experiences: New Technologies for Mosaic Heritage

Chair: Toni Šaina

- 9.00–9.20 Attila Mézes, Ádám Albert and Mihály Filó
Eszperantó-Well Mosaic Reconstruction with the Help of Photogrammetry
- 9.20–9.40 Nikola Upevche and Jorge Miravalles
3D Reconstruction of the Mosaics from the Polyconchal Basilica at Plaošnik, Ohrid
(North Macedonia)
- 9.40–10.00 Nikola Upevche and Jorge Miravalles
Digital Reconstruction of Mosaics from the Tetraconchal Basilica, Plaošnik, Ohrid
- 10.00–10.20 Mishko Tutkovski
Specific Techniques and 3D Technologies Applied in the Physical Restoration of a
6th-Century AD Opus Sectile Decoration on a Wooden Tabletop from Stobi
- 10.20–10.40 Véronique Blanc-Bijon and Patrick Blanc
How Preservation Contributes to the Development of Knowledge about Mosaics
- 10.40–11.00 Katerina Upevche and Nikola Upevche
Ohrid Time Travel by Metagemia
- 11.00–11.20 Discussion
- 11.20–11.50 Break

Session 4

Challenges and Sustainability in Contemporary Mosaic Heritage

Chair: Blaž Šeme

- 11.50–12.10 Malu Storch
Climate-Related Damage to Mosaic Facades
- 12.10–12.30 Brigitta Maria Kürtösi
Applying Conservation Experiences of Façade Mosaics to Contemporary Outdoor Realizations
- 12.30–12.50 Magdalena Kracík Štorkánová
From Façade to Archive? Mosaic Heritage between Climate Stress and Insulation Practices
- 12.50–13.10 Barbora Víková, Adéla Škrabalová and Jan Vojtěchovský
Long-Term Behaviour of Calcareous Marlstone in an Exterior Mosaic: Monitoring and Conservation Challenges in the Bird Family (1969) by Ludmila Jandová
- 13.10–13.30 Kinga Veress, Nagy Géza and Gyöngyi Fazekas
A Neoavantgard Innovation: The „„Photomosaics” of Miklós Erdély II: Latest Research Findings; A Nationwide Analysis of the Condition and Vulnerability of the Miklós Erdély Mosaics (The Dilemmas in Conservation: Preventive Conservation of Mosaics)
- 13.30–13.50 Discussion
- 13.50–14.50 Lunch
- 14.50–15.50 Round Table: Can In Situ Mosaic Conservation Remain Sustainable under Climate Change?
- 19.00 Social dinner
Venue: Gruber’s Palace, IPCHS, Zvezdarska 1, Ljubljana

Friday 16th October 2026

- 8.30–16.00 Excursion to Celje
Meeting point for bus transport: Restoration Centre, IPCHS, Poljanska cesta 40, Ljubljana

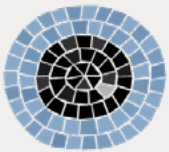








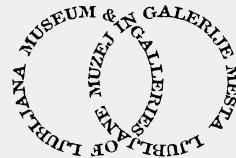




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