



ICCROM

Sustaining Digital
Heritage

Ctrl+S Culture

AI and Heritage in a Digital World

Book of Abstracts

In Close Collaboration With:



unitar
United Nations
Institute for Training and Research



Ctrl+S Culture: AI and Heritage in a Digital World

About the conference

Digital is a continent—vast, evolving, and accessible to anyone, anywhere. In a world where digital is the new domain—expansive, ever-shifting, and accessible to all[1]—our cultural heritage faces unprecedented opportunities and urgent challenges. It is a realm where heritage is not only preserved but continuously created and reimagined. In this dynamic space, Artificial Intelligence (AI) emerges as a powerful tool that can transform how we safeguard, interpret, and share our cultural heritage.

Ctrl+S Culture is more than a conference—it is a collective call to protect, activate, and reimagine cultural heritage in the age of artificial intelligence.

Conceived by ICCROM's Sustaining Digital Heritage (SDH) initiative, this two-day online event is organized in close collaboration with the First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR) and Youth.Heritage.Africa (YHA) programmes. It is held in partnership with VAIA – the Flanders AI Academy – and CIFAL York, part of UNITAR's global network of training centres. Ctrl+S Culture brings together visionary thinkers, creators, and practitioners working at the intersection of AI, culture, and heritage protection.

This conference will explore the **opportunities, challenges, and ethical implications** of applying Artificial Intelligence (AI) technologies in the field of cultural heritage. It aims to stimulate critical reflection and cross-disciplinary exchange among those engaged in the preservation, interpretation, and dissemination of cultural heritage through digital means.



Daily programme

[Register Here](#)

Day 1, 19 Nov 2025 (All Times in CET/Rome)

AI-Powered Innovation for Heritage

CET/Rome

13.30 - 13.40

Welcome and Introduction to the Conference

13.40 - 13.50

Inaugural Address

Aruna Francesca Maria Gujral, Director-General, ICCROM

13.50 - 14.10

Keynote

The Future of Cultural Heritage: AI Technologies Between Protection, Restoration and Ethical Challenges

Anastasia Bondar, Deputy Minister for Digital Development, Digital Transformations and Digitalization

Parallel Breakout Sessions

AI-Enabled Climate, Disaster & Conflict Risk Management for Heritage

Session 01 (Room 01)

Soundcheck Social

Facilitator: Jui Ambani, Programme Officer, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR), ICCROM

Unlocking Spatial Memory: Deep Learning for Spatial Analysis of Historical Photography in Disaster Heritage Studies

Antonio Suazo, Chile

Heritage 2100: AI-Driven Climate-Time-Machine Games for Next-Generation Custodianship

Bruno Andrade, Brazil

Natural language Processing and the Mosul archives

Elah Cohen, United Kingdom

Mapping Flood Hazard Zones for Cultural Heritage Protection in Medan City Using Geo-AI Technology

Mayca Sita Nurdiana, Indonesia

Q and A - Unmute & Ask

Session 02 (Room 02)

Soundcheck Social

Facilitator: Aparna Tandon, Senior Programme Leader, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR), ICCROM

Assessing and Predicting Water Erosion Risks to Cultural Heritage Under Climate Change Using Explainable Machine Learning

Tianlian Wang, China

AI-Enhanced Digital Platform for Integrated Sustainable Cultural Heritage Management: Conceptual and Methodological Design

Hassan HajjAli, Lebanon

The Role of Artificial Intelligence in Heritage Emergency Situations: Crossed Perspectives on Post-Conflict Protection Challenges and Prospects of Saints' Mausoleums in Timbuktu, Northern Mali

Drissa Sinaly Coulibali, Mali

ChemAI: Integrating AI into Cultural Heritage Monitoring

Noémie Gabay, Italy

Q and A - Unmute & Ask

14.10 - 14.55

14.55 - 15.05

10 Mins Break - Refresh and Reset

15.05 - 15.50

Panel Discussion

AI for Inclusive Heritage: Social Sensing and Community Engagement

Moderator:

Jui Ambani, Programme Officer, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR), ICCROM

Speakers:

Maleknaz Nayebe, York University

Ali Asgary, York University

15.50 - 16.10

Keynote

AI for Risk-Resilient Heritage: A Platform for Predictive Analysis, Prioritized Response & Global Coordination

Natalia Makovetskaya - Sustainability and Heritage Advisor

16.10 - 16.20

10 Mins Break - Refresh and Reset

Parallel Breakout Sessions

Advanced Applications of AI in Conservation and Site Management

Session 01 (Room 01)

Soundcheck Social

Facilitator: Imene Khodja, Programme Intern, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR), ICCROM

Ring the Alarm – Harnessing AI in collection care

Ayaka Ajiki, Singapore

The HERA Project: Holograms, annotations and AI for the biography of altered objects

Muriel Verbeeck & Pierre Hallot, Belgium

FORSHelper: A Large Language Model (LLM) Assistant for using Fibre Optic Reflectance Spectroscopy (FORS) in pigment identification

Naomi Rosenkranz, USA

Augmented Restoration with AI: making conservation visible. The case of the Buenos Aires Museum of Modern Art

Rodrigo Alcon Quintanilha & Diamela Canosa, Argentina

ÇEKÜLGPT: AI-Driven Interpretation and Public Access to a Civil Society Organization's Archive

Alper Can Kılıç, Turkey

Q and A - Unmute & Ask

Session 02 (Room 02)

Soundcheck Social

Facilitator: Mohona Chakraborty, Programme Officer, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR), ICCROM

CROMOARCHEOLOGY – Colorizing Memory: AI Approaches to Reconstruct Original Colours in an Ex-Clandestine Detention Center (ESIM El Faro – Mar del Plata, Argentina)

Julio Cesar Maya Lozano, Argentina

From Data to Decisions: Using GeoAI to Protect Cultural and Natural Heritage under Climate Stress

Ersun Varol, Türkiye

Metadata, Memory, and Machines: Rethinking Description with AI in Developing Contexts

Muhammed Tehmash, Pakistan

AI-Based Visualization and Reinterpretation of Cultural Heritage: The Case Study of the 18th-Century Castle Interiors in Vojvodina

Isidora Đurić, Serbia

Emergency preparedness and response in the age of Artificial Intelligence: An overview of the work of UNESCO in the field of culture

Tural Mustafayev, Emergency Operations and Programmes Unit, UNESCO

Q and A - Unmute & Ask

16.20 - 17.20

17.20 - 18.30

Ctrl+S Café: Network and Reflect

Day 2, 20 Nov 2025

AI for Decoding Heritage

CET/Rome

13.30 - 13.40

Welcome and Introduction to the Conference

13.40 - 14.25

Panel Discussion

AI as a Tool to Understand Communities' Preferences in Heritage Sites

Moderator:

Xiaoxu LIANG, Politecnico di Torino, Italy

Speakers:

Nan BAI, Delft University of Technology

Yuting JIANG, College of Architecture & Urban Planning (CAUP), Tongji University, Shanghai, P.R.China; Department of Architecture and Design (DAD), Politecnico di Torino, Italy

Yan ZHOU, Delft University of Technology

Xinchen LI, Politecnico di Torino, Italy

14.25 - 14.45

Keynote

Uses and promises of AI solutions for Heritage Institutions

Frederik Truyen, Professor, KU Leuven

14.45 - 14.55

10 Mins Break - Refresh and Reset

14.55 - 15.45

Parallel Breakout Sessions

AI-Driven Documentation, Data Analysis & Pattern Recognition for Heritage

Session 01 (Room 01)

Soundcheck Social

Facilitator: Mohona Chakraborty, Programme Officer, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR), ICCROM

Digital Reconstruction and Spatial Application of Intangible Heritage Patterns Empowered by AI: A Case Study of Cloisonné

Fanghong Dang, China

Perspectives on Integrating an Ontology of Cultural Heritage and Values in Earthquake Damage Assessment and Documentation

Satwant Rihal & Hisham Assal, USA

Digitizing the Past, Building the Future: AI's Role in Africa's Cultural Heritage and Vision 2063

Mohammed Ali Mwenje, Kenya

Optimizing AI for Archaeological Site Detection: a generalizable analyst-ML workflow

Katherine Crawford, Spain

Q and A - Unmute & Ask

Session 02 (Room 02)

Soundcheck Social

Facilitator: Jui Ambani, Programme Officer, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR), ICCROM

AI-mediated interfaces for exploring cultural knowledge repositories

Nicola Carboni, USA

From Stones to Servers: Digital Heritage and the Future of AI/ML

Nailah Qazi, USA

Creating a Modern Digital Sanborn Map: AI Large Visual Model for Identifying Historic Properties: Pioneering Surveying and Building Identification Efforts in Denver

Todd Matuszewicz, USA

AI-Based Inference and Hypothetical Spatial Modelling of Historic Floor Plan Structures

Shiva Talaei Koochehbagh & Mahnoush Pourhosseini Akbarie, Italy

Q and A - Unmute & Ask

15.45 - 15.55

10 Mins Break - Refresh and Reset

Parallel Breakout Sessions

AI, Accessibility & Community Engagement for Inclusive Heritage Conservation

Session 01 (Room 01)

Soundcheck Social

Facilitator: Linda Neruba, Curator, Uganda Museum

Reclaiming Voice: Using AI to Restore Place Names and Cultural Contexts in Persian Botanical Archives

Shabnam Balouch, United Kingdom

Harnessing Artificial Intelligence to Document Oral Traditions and Indigenous Knowledge in Central Africa

Geneviève Sandrine Avoa Mebenga Belinga, Cameroon

Weaving African Women's Heritage Through AI Artistry

Portia Uwera, Uganda

Integrating AI into Museum Work: Collections Care and Storytelling at Olusegun Obasanjo Presidential Library

Peter Jegede, Nigeria

Q and A - Unmute & Ask

Parallel Breakout Sessions

AI-Driven Storytelling, Creative Reuse & Generative Heritage Applications

Session 02 (Room 02)

Soundcheck Social

Facilitator: Hilke Arijis, Programme Consultant, Sustaining Digital Heritage (SDH), ICCROM

Preserving Bedouin Oral Heritage in Petra through AI and Storytelling

Alia AlQawasmeh, Jordan

From Open Access to AI Assets: How AI Training Data Challenges Heritage Collections and the Democratic Promise of Cultural Access

Sami Itavuri, United Kingdom

From Disconnection to Reconnection: Cross-Cultural Communication In Cultural Heritage Studies Through AI-Based Digital Storytelling

Suwen Wang, China

Digitizing Culture: How AI and VR Are Preserving Uganda's Heritage

Eugene Tukei, Uganda

Q and A - Unmute & Ask

15.55 - 16.55

Panel Discussion

AI, Heritage, and Us: Co-Creating Digital Futures

Moderators:

Selin Nugent, Oxford Brookes University
Tatenda Tavingeyi, An AI of Our Own (AAOO)

Speakers:

Mutanu Kyanya, African Digital Heritage
Kristen Hopper, EAMENA, Durham University

16.55 - 17.40

Keynote

Can Machines Dream About Art ? Refik Anadol on Art and Technology

Refik Anadol, Artist, Refik Anadol Studio and Dataland

17.40 - 18.00

18.00 - 18.30

Ctrl+S Café: Network and Reflect

Day 3, 21 Nov 2025

AI-Enabled Creative Access and Use of Heritage

CET/Rome

13.30 - 13.40

Welcome and Introduction to the Conference

Parallel Breakout Sessions

AI-Driven Storytelling, Creative Reuse & Generative Heritage Applications

Session 01 (Room 01)

Soundcheck Social

Facilitator: Linda Neruba, Curator, Uganda Museum

Hearing Double: AI-Enhanced Retrieval of Personal Audio Archives and the Reshaping of Cultural Narratives

José Velázquez, United Kingdom

From Mining Memory to Digital Ethics: Applying AI to the Regenerative Reuse of Trozza's Industrial Heritage

Héla Oueslati, Tunisia

From Margins to meaning: Using ABM, GIS and AI to Reimagine Transitional Urban Spaces

Marjan Alikhanzadeh, Cyprus

Archives, Algorithms, and Afterlives: AI, Black Data, and the Future of Cultural Heritage

Angela Tate, USA

Q and A - Unmute & Ask

Parallel Breakout Sessions

AI, Accessibility & Community Engagement for Inclusive Heritage Conservation

Session 02 (Room 02)

Soundcheck Social

Facilitator: Dr. Lisa Hilte, VAIA liaison UAntwerpen

Decolonising Heritage Artificial Intelligence (AI): Whose Intelligence Counts?

Munyika Sibanda, Zimbabwe

Current Situation and New Opportunities: An Analysis of the Application of Artificial Intelligence in the Preservation and Restoration of Paper-based Cultural Heritage

Mengling Cai, China

Collecting in Code: Rethinking Representation and Knowledge in Digital Museums

Khushi Kesari & Shivani Singh, India

Making Data Speak: Addressing Metadata Debt for Ethical Media Generation

Ignacio Garnham, Denmark

Q and A - Unmute & Ask

13.40 - 14.30

14.30 - 14.40

10 Mins Break - Refresh and Reset

14.40 - 15.00

Keynote

Neck-deep in digital oil? Public broadcasting archives as AI training data sets

Brecht Declercq, Head of Archives RSI

Panel Discussion

Resurrecting Memory: AI for Film, Photo, and Sound Archives

Moderator:

Kara Van Malssen, Partner and Managing Director at AVP

Speakers:

Jim Joel, Page 4 Project

Fabio Bedoya Huerta, Duplitech

Anna Yanenko, National Preserve "Kyiv-Pechersk Lavra"

15.00 - 15.50

15.50 - 16.00

10 Mins Break - Refresh and Reset

AI, Accessibility & Community Engagement for Inclusive Heritage Conservation

Session 01 (Room 01)

Soundcheck Social

Facilitator: Hilke Arijis, Programme Consultant, Sustaining Digital Heritage (SDH), ICCROM

Decolonizing the Algorithm: The Imperative for Inclusive AI in Preserving African Heritage

Eric Takukam, Cameroon

AI-Assisted Contingency Planning for Cultural Heritage under the EU AI Act: Legal and Ethical Dilemmas

Yasmina Esther Ramada Lahoz, Spain

From Strings to Signals: AI, Southeast Asian Puppetry, and the Ethics of Digital Heritage

Alex Wen Jie Lev, Thailand

AI and digital cultural heritage at Meemoo - Flemish Institute for Archives: Ethics, Collaboration and Shared Data Governance

Bart Magnus, Belgium

Algorithmic Authenticity: AI, Commercialization, and the Future of Urban Heritage Governance at Shanghai Xintiandi

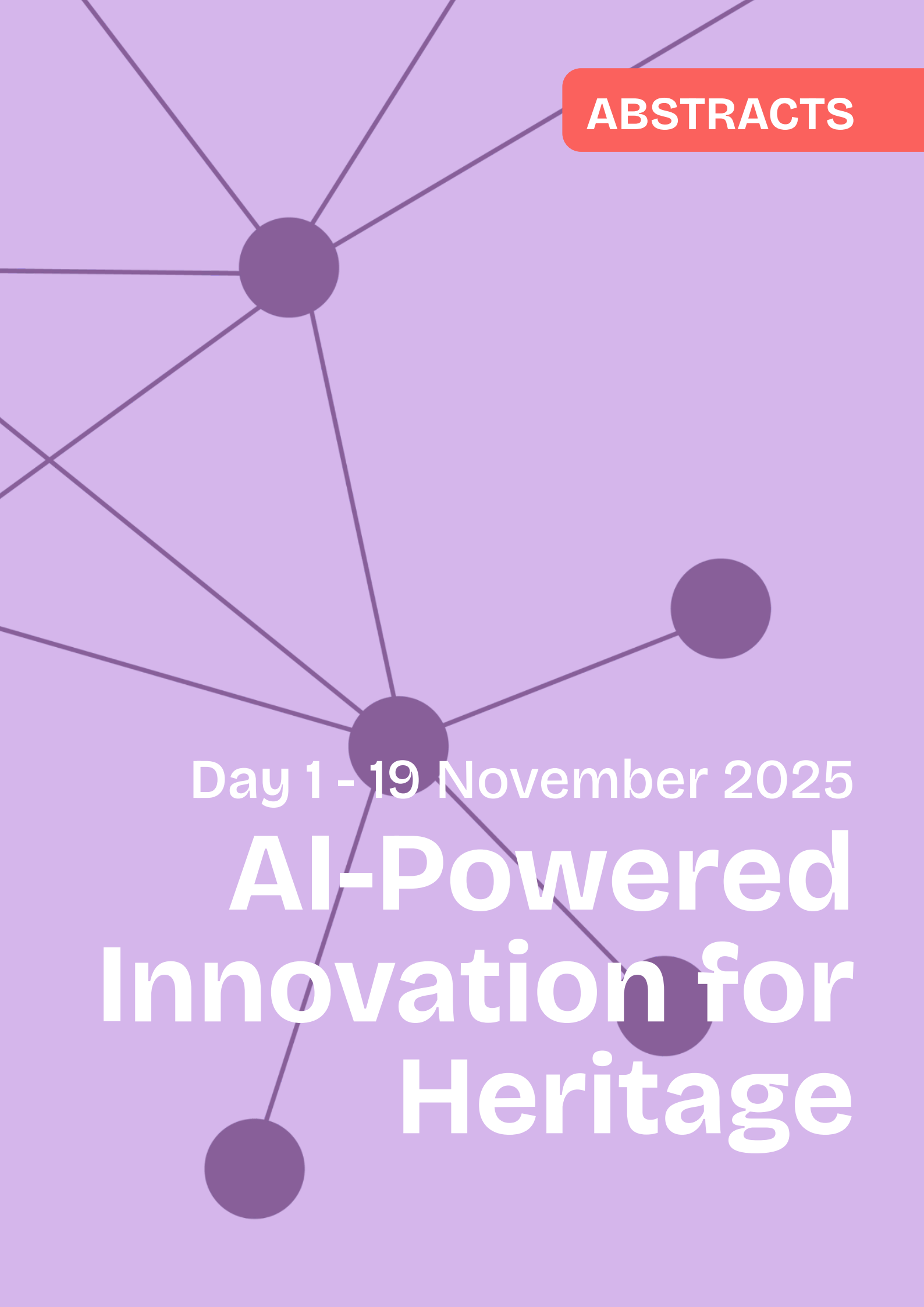
Yun Tan, China

Q and A - Unmute & Ask

16.00 - 17.00

17.00 - 18.30

Ctrl+Alt+Conclude & Ctrl+S Café: Network and Reflect



ABSTRACTS

Day 1 - 19 November 2025

AI-Powered Innovation for Heritage

Keynote 1: The Future of Cultural Heritage: AI Technologies between Protection, Restoration and Ethical Challenges

Anastasia Bondar, Deputy Minister for Digital Development, Digital Transformation and Digitalisation

Ukraine today stands as a country in its fourth year of full-scale war, where resilience has become a defining national trait. Every day, the state operates under conditions of missile strikes, drone attacks and destroyed infrastructure. Yet schools reopen after bombardments, hospitals continue to treat patients, and government services remain available even when power grids and communication lines are targeted. This capacity to function under constant threat has been made possible by digital transformation, which in Ukraine has become not an option but a condition for survival.

Digital technologies, and particularly artificial intelligence, ensure that the state can deliver its core functions under any circumstances. When administrative buildings are destroyed, services continue online. When bureaucratic processes risk delay, AI accelerates them. Artificial intelligence saves human resources, enables faster responses to the realities of war, and creates additional layers of protection and reliability for systems that are under daily attack from Russian aggression.

Ukraine is recognised as a global pioneer in digitalisation. It was the first country in the world to introduce a digital passport with full legal validity, integrated into the Diia application, which now provides access to hundreds of services—from registering a business in minutes to participating in digital voting. What began as a vision of convenience has evolved into an infrastructure of resilience. Projects such as Diia.AI, the world's first national AI agent for government services, and the creation of AI Factory, a state infrastructure for developing national large language models, further reinforce Ukraine's position as a leader in digital innovation.

This transformation is now being extended to the cultural sector, because culture is more than heritage—it is identity. And identity is precisely what aggressors have attempted to destroy for centuries. In the occupied territories, thousands of museum items remain at risk; some collections have been lost forever. Looted artefacts appear on black markets abroad. Others, evacuated for safety, remain hidden and inaccessible to the public. Without digital copies, many treasures may vanish without a trace. Digitalisation, therefore, is not merely modernisation—it is the safeguarding of memory.

Artificial intelligence offers concrete tools to protect and reclaim heritage under these extraordinary conditions. One priority is the use of AI for the recognition and transcription of handwritten museum inventory books, which form the backbone of collection management. Thousands of pages of handwritten records can be transformed into structured data, feeding secure registries that guarantee continuity even if the originals are destroyed. Another priority is AI for musical heritage, capable of digitising and cataloguing fragile sheet music collections to create a dedicated national registry. A third is AI for citizen engagement, enabling conversational systems that provide cultural services, conduct surveys and analyse demand—tools that optimise ministry operations and make policies more data-driven.

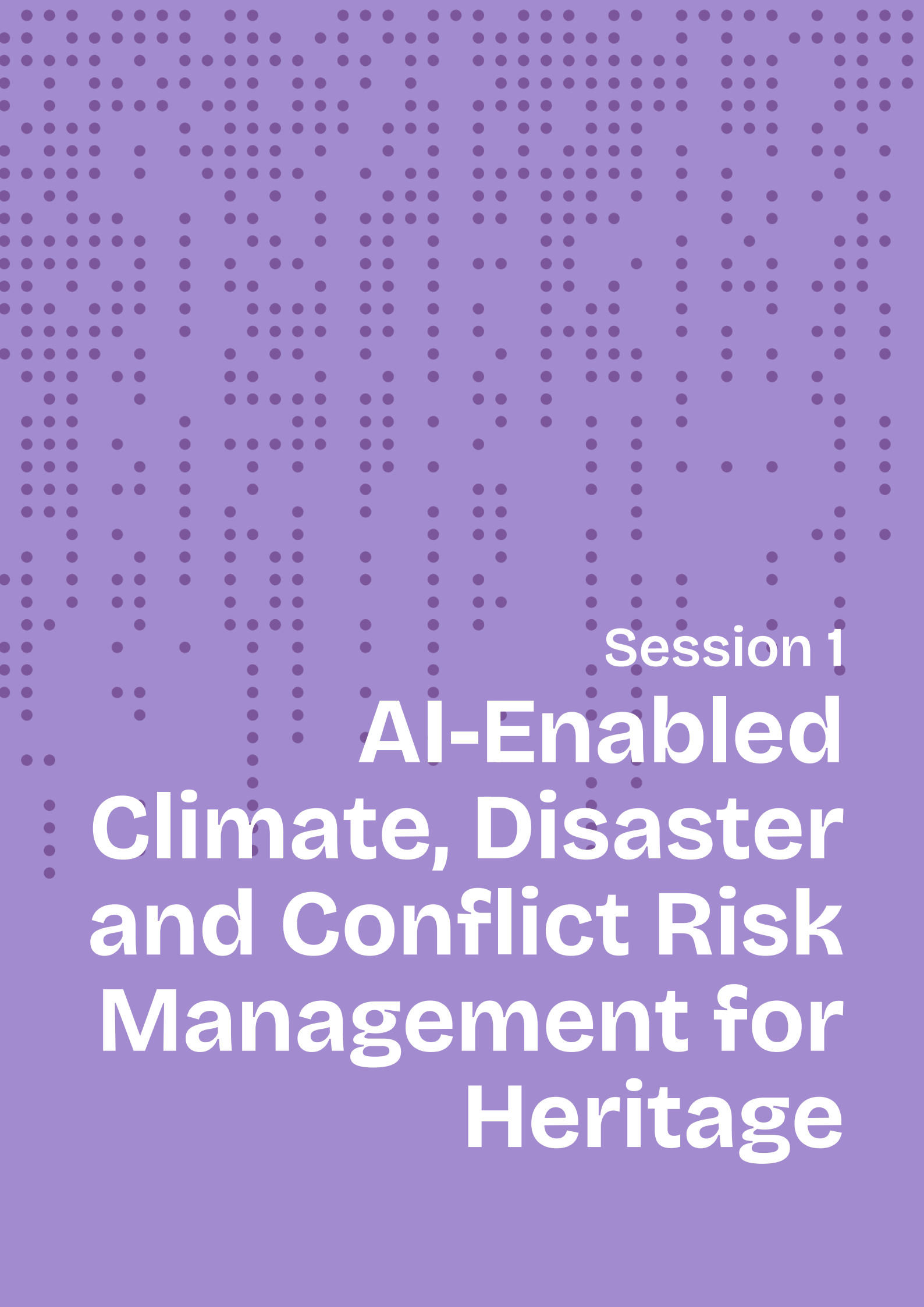
At the same time, AI can assist in identifying and tracing stolen objects, comparing photographs across databases and illicit market platforms. In this way, artificial intelligence supports not only documentation and preservation but also justice and restitution.

Digitalisation also enables Ukraine to make its hidden and evacuated collections visible to the world without putting them at risk. Through virtual galleries, 3D reconstructions and digital exhibitions, masterpieces can be shared with both Ukrainians and global audiences while remaining protected. This ensures that culture continues to live even when physical access is impossible.

Yet with innovation comes responsibility. AI systems must be transparent, ethically grounded and secure. Cultural information itself can become a target of hybrid warfare, and registries must therefore be designed with resilience and accountability. The unlawful appropriation of Ukrainian museum objects by Russian institutions highlights the urgency of creating robust international mechanisms for monitoring and protection.

Ukraine's struggle to preserve culture in wartime is not an isolated case but part of a global challenge. Around the world, communities face wars, climate change, displacement and neglect—all of which endanger heritage. What Ukraine learns today can become a model for others tomorrow. By integrating AI into documentation, registries and citizen engagement, Ukraine contributes not only to its own survival but also to global frameworks for cultural resilience.

The message of this keynote is clear: artificial intelligence, far from being merely a challenge, can be a decisive tool for survival, revival and resilience. It is a bridge between past and future, between crisis and renewal, between identity and global solidarity. In Ukraine, the destruction of buildings and infrastructure cannot erase culture—because digital technologies ensure that memory endures: protected, shared and prepared for recovery.



Session 1

AI-Enabled Climate, Disaster and Conflict Risk Management for Heritage

This session focuses on the analytical capacities of artificial intelligence: its ability to process complexity, reveal patterns, and transform unstructured heritage data into actionable knowledge. Across the fields of visual documentation, linguistic analysis, geospatial modeling, and environmental monitoring, AI tools are extending the evidentiary power of archives, photographs, and landscape data far beyond traditional methods.

Central to these innovations is the challenge of translating cultural information into computational form. How can we encode meaning, context, and ambiguity without erasing the very qualities that make heritage human? Machine learning models excel at recognizing structures and correlations, yet they depend on datasets shaped by human interpretation and bias. This tension invites us to consider not only what AI can recognize, but how and why it does so.

The session collectively demonstrates that AI-driven heritage documentation is more than a technical exercise. It represents a negotiation between precision and interpretation, automation and expertise. By making invisible patterns visible — whether in environmental risk, historical imagery, or textual archives — AI provides new foundations for heritage research and management, while also urging us to question the epistemologies that underlie digital knowledge production.

Unlocking Spatial Memory: Deep Learning for Spatial Analysis of Historical Photography in Disaster Heritage Studies

Antonio Suazo, Chile

Historical photography collections have long been recognised for their dual value: as testimonies of photographic technologies and practices that themselves form part of cultural history, and as visual records containing information about places, landscapes and built heritage. Beyond their aesthetic or documentary worth, these images can serve as critical evidence for understanding the transformation of monuments, archaeological sites and urban fabric over time. In particular, historical photographs provide a unique window into the vulnerabilities of cultural heritage when exposed to natural hazards and catastrophic events. By reconstructing past conditions and damage, they can help inform present-day strategies for resilience and risk management.

Despite this potential, the systematic use of historical photographs in heritage risk assessment remains underdeveloped. A central obstacle lies in the difficulty of extracting reliable spatial information from digitised photographs. Most historical images exist today as scanned versions of negatives, glass plates or paper prints, which lack the metadata and optical references that photogrammetric techniques require for camera calibration, spatial orientation and 3D reconstruction. As a result, traditional computer vision and digital photogrammetry approaches are limited in their ability to generate accurate spatial references from such sources.

To address this challenge, this study presents a novel workflow that applies deep learning techniques to enhance the spatial interpretability of historical photographs. The proposed method combines recent advances in depth estimation with iterative georeferencing strategies. In the first stage, predictive models—such as DeepAnything and related

architectures—are used to estimate relative depth within single historical images. These depth maps enable the approximation of 3D structures from inherently two-dimensional records. In the second stage, the estimated depth is aligned with known geographic control points through iterative algorithms such as Iterative Closest Point (ICP). This process allows the recovery of camera calibration parameters, spatial orientation and georeferencing of the photographic record.

The workflow has been tested on a corpus of 300 historical photographs documenting major seismic events in Chile during the 20th century (1906, 1939, 1960 and 1985). Drawn from diverse archives and collections, these images represent a valuable yet underutilised resource for understanding the impacts of earthquakes on Chile’s urban and architectural heritage. Preliminary results demonstrate that the method can successfully derive approximate camera parameters and spatial references from digitised historical photographs. This enables the reconstruction of 3D information and provides new pathways for spatial analysis. At the same time, limitations have been observed, particularly in cases of poor image quality or insufficient contextual anchors, underscoring the need for cautious interpretation and further refinement of the methodology.

The implications of this work are twofold. First, it opens new possibilities for harnessing historical photography in disaster risk research and heritage protection, enabling the integration of past evidence into contemporary risk preparedness and resilience strategies. Second, it illustrates the broader role of AI-driven methods in extending the evidentiary power of heritage collections, making them not only accessible but also actionable in addressing urgent societal challenges. Ultimately, the study argues that historical photographs, when paired with AI-based analysis, can support heritage conservation and risk awareness by reconnecting communities with the histories of vulnerability and resilience embedded in their built environments.

Heritage 2100: AI-Driven Climate-Time-Machine Games for Next-Generation Custodianship

Bruno Andrade, Brazil

As climate change intensifies, the Candomblé terreiros of Bahia face unprecedented threats to both their tangible structures and their living cultural practices. Addressing these complex, long-term risks requires innovative approaches that bridge scientific modelling, community engagement and the preservation of intangible heritage. This paper presents Heritage 2100, an AI-driven “climate-time-machine” serious game developed within the ICOMOS Preserving Legacies project, designed to empower next-generation custodians through immersive, anticipatory learning.

The game leverages recent advances in multimodal artificial intelligence, including generative models for text, image and 3D visualisation, to create photorealistic, scenario-based simulations of the terreiros’ futures. Rather than relying on high-fidelity digital twins from LiDAR or drone data, the platform integrates satellite imagery, orthophotos, regional climate models and open-access environmental datasets to construct dynamic representations of the sites and their surrounding landscapes. Players are invited to fast-forward to various points between 2030 and 2100, where they encounter alternative futures shaped by different adaptation and mitigation strategies.

Central to the experience are AI-powered non-player characters (NPCs) that embody ancestral knowledge and the cosmological wisdom of the orixás, guiding players through decision-making processes that balance ritual continuity, structural resilience, biodiversity and social well-being. The game's adaptive engine personalises challenges based on player analytics, fostering both accessibility for local youth and depth for heritage professionals. Each action taken by the player is reflected in real-time dashboards that present Climate Risk Assessment metrics, synthesising Heritage Impact Assessment and Social Impact Assessment to make visible the often intangible consequences of choices on cultural, environmental and community dimensions.

Theoretically, the project draws on Félix Guattari's concepts of machinic agency, chronopolitics and the hybrid rationality of human-machine assemblages. The game is conceived not merely as a tool but as an active agent in a network of ecological, technological and cultural relations, where algorithmic foresight and collective memory co-produce new forms of care and governance. By simulating the temporalities and uncertainties of climate change, Heritage 2100 invites players to inhabit the dialectic between tradition and innovation, immanence and speculation, and to imagine futures where the preservation of memory and meaning is a shared, adaptive process.

Ultimately, this approach positions AI-augmented serious games as a transformative methodology for heritage management, capable of translating abstract climate risks into visceral, participatory experiences. By aligning advanced AI with Afro-Brazilian cosmologies and international heritage standards, Heritage 2100 offers a scalable, ethical and culturally grounded model for cultivating the custodianship needed to safeguard heritage in an era of profound urban and environmental change.

Natural Language Processing and the Mosul Archives

Elah Cohen & Margareta Wetchy, United Kingdom

Natural Language Processing (NLP) within cultural heritage research is a rapidly developing field offering significant potential. NLP can be applied to tasks such as speech recognition, text identification and classification, natural language understanding and generation. The development of NLP tools specifically designed for the Arabic language enhances the accessibility of AI beyond a solely Western focus. Arabic is a uniquely complex language due to its orthographic ambiguity, dialectal variation and morphological richness, meaning that a single root may take many different forms. This results in data sparsity and poses challenges for training Arabic NLP models, which require extensive vocabularies. Nevertheless, Arabic-language NLP tools such as CAMEl Tools, Madamira and Farasa provide functionalities for pre-processing, morphological modelling, dialect identification, named entity recognition and sentiment analysis, enabling the processing of large volumes of Arabic-language data.

The proposed paper analyses data from the archives of war and peace in the city of Mosul, which constitute the foundation of the project Heritage of War & Peace, conducted by the authors' research team. The project builds on the work initiated by the blog Mosul Eye during the ISIS occupation of Mosul from 2014 to 2017 and serves as a "living archive" for materials related to that period as well as to the broader history of the city. For this paper, CAMEl Tools—an open-source Python-based NLP framework developed by the CAMEl Lab

at New York University Abu Dhabi—is employed to analyse selected data from this database. The discussion first offers a theoretical overview of the application of NLP tools in the processing of archival data, highlighting the methodological advantages such approaches provide. Second, the tool is applied to selected data from the project’s archive. Through this process, various fields of application—including morphological analysis and disambiguation, part-of-speech tagging, dialect identification, lemmatisation, transliteration, named entity recognition and text pre-processing—are explored. Examining both the benefits and challenges helps to clarify the value of such tools and enriches understanding of the potential of NLP methodologies for cultural heritage research.

Finally, the paper reflects on the ethical implications of applying machine learning tools to sensitive archival materials documenting human experiences from conflict-affected regions and communities.

Mapping Flood Hazard Zones for Cultural Heritage Protection in Medan City Using Geo-AI Technology

Mayca Sita Nurdiana, Indonesia

Climate change has had a significant impact on rainfall patterns. Increasing instability in rainfall, particularly the occurrence of extreme precipitation within short periods, heightens the risk of flooding. Changes in land use within water catchment areas also exacerbate flooding in the city of Medan. Flooding is not only an ecological and social issue but also a serious threat to the sustainability of cultural heritage buildings and traditional architectural elements that embody substantial historical, cultural and aesthetic value.

Flooding directly affects the physical condition of cultural heritage sites, potentially causing structural damage such as cracks, deterioration and partial collapse due to prolonged waterlogging. In addition, non-structural impacts include increased humidity and the growth of biological organisms that accelerate the decay of building materials.

This study aims to identify the locations of cultural heritage sites situated within flood-prone zones in Medan through a Geo-AI-based approach that integrates artificial intelligence and geospatial technology to identify spatial patterns of specific phenomena. The methodology combines spatial data integration and satellite image processing using the Google Earth Engine (GEE) platform. The primary datasets analysed include: historical flood event records from the National Disaster Management Agency; Sentinel-1 radar imagery for flood inundation detection; land use data from Sentinel-2; and drainage network data from the Geospatial Information Agency. Cultural heritage site data were derived from cultural heritage mapping initiatives in Medan.

The detection of flood-affected areas was performed using a machine learning model to classify flooded zones based on image characteristics and environmental factors, followed by spatial overlay with heritage site locations.

The results identify cultural heritage sites situated in flood-prone areas. These findings are crucial for supporting risk-based conservation strategies and promoting the integration of disaster mitigation policies into cultural heritage preservation planning.

The Geo-AI-based approach, particularly through the use of machine learning and geospatial processing, offers rapid, efficient and accurate spatial analysis for assessing the environmental vulnerability of cultural heritage sites.

Assessing and Predicting Water Erosion Risks to Cultural Heritage under Climate Change Using Explainable Machine Learning

Tianlian Wang, China

Global climate change has led to an increased frequency of extreme weather events, exposing World Heritage sites such as the Great Wall to complex natural environments that render them highly vulnerable to water erosion and related disasters. These factors contribute to the deterioration and accelerated decline of cultural heritage, posing significant challenges for its conservation. Assessing and predicting water erosion risks to cultural heritage under future climate scenarios is therefore crucial for the sustainable conservation and management of such sites, as it enables early-warning mechanisms and the adoption of targeted protection strategies.

This study investigates the current status of water erosion on the Great Wall within the Yellow River Basin through low-altitude UAV photogrammetry. The research automatically determines the optimal machine learning model for water-erosion risk assessment using the H2O-AutoML algorithm and employs SHAP (SHapley Additive exPlanations) to elucidate contributory and non-linear relationships among influencing factors. Furthermore, future climate scenarios based on CMIP6 are presented, incorporating various Shared Socio-economic Pathways (SSP126, SSP245, SSP585) to project water-erosion risks through to 2100.

The analysis reveals that (1) the Gradient Boosting Machine (GBM) model—achieving an accuracy of 0.740 and an AUC value of 0.809—is particularly effective in handling the complex datasets used in this research, balancing classification accuracy and model robustness. This model demonstrates the highest predictive performance for identifying instances of water erosion at heritage sites. The Great Wall within the study area faces significant water-erosion risks, with high-risk zones accounting for 56.50 percent of the total study length and showing concentrated spatial distribution, while very-low-risk zones appear more dispersed. (2) The principal driving factors contributing to water-erosion occurrence at these heritage sites include the Terrain Ruggedness Index (TRI), Terrain Wetness Index (TWI), Slope, Streamflow Intensity Index (SPI) and Quarterly Precipitation (QS). (3) Under projected climate scenarios, the risk of water erosion to cultural heritage is expected to continue rising, particularly between 2050 and 2100, with major risk zones identified in the upper and middle reaches of the Yellow River—especially around Baiyin City in eastern Gansu Province and Shuozhou and Xinzhou Cities in northern Shanxi Province. The Loess Plateau region also emerges as a high-incidence area for escalating erosion risks. Notably, there are marked variations among socio-economic pathways, demonstrating volatility in SSP245 and SSP126, while SSP585 exhibits particularly high erosion risk.

This paper analyses the variability and potential spatial changes in water-erosion risk across different future climate scenarios, enhancing understanding and forecasting of climate-

change impacts while contributing to more scientifically grounded and rational strategies for heritage conservation and resource allocation. The risk maps produced through the methodology extend beyond conservation planning, offering wide applicability. By integrating environmental, ecological and economic indicators, this approach provides decision-makers with comprehensive risk assessments and evidence-based support for sustainable heritage management.

AI-Enhanced Digital Platform for Integrated Sustainable Cultural Heritage Management: Conceptual and Methodological Design

Hassan HajjAli, Lebanon

This paper presents the conceptual and methodological framework of an AI-enhanced digital platform designed for the integrated and sustainable management of cultural heritage sites, focusing on complex contexts such as Lebanon's coastal archaeological zones. Developed as part of an ongoing PhD research project, the platform addresses critical challenges in heritage management, including data fragmentation, insufficient risk preparedness and limited stakeholder coordination.

Drawing on interdisciplinary methods and technologies such as GIS, HBIM, photogrammetry and AI, the platform consolidates archaeological, environmental and conservation data into a unified digital infrastructure. It supports predictive modelling, real-time monitoring and participatory governance mechanisms. The system's modular architecture ensures scalability and adaptability across heritage contexts, aligning with international standards for data interoperability, metadata structuring and semantic enrichment. It also incorporates user-defined access levels to accommodate diverse stakeholders—from heritage professionals and researchers to municipal authorities and local communities.

Case studies from Tyre, Sarepta and Anfeh inform the platform's initial design, which integrates condition-assessment tools, risk indicators and policy-relevant outputs. The decision-support dashboard synthesises heterogeneous datasets into actionable insights for conservation planning and emergency response. The project further emphasises long-term data stewardship, proposing governance structures that assign roles for data input, validation and review across institutional and community levels.

By operationalising digital-heritage principles and integrating resilience theory into its architecture, the platform serves both as a scholarly contribution and a practical response to heritage vulnerability in post-conflict and climate-sensitive environments. Ultimately, this initiative seeks to foster an inclusive, data-driven and forward-looking approach to cultural-heritage management that can be adapted to other Mediterranean and global sites facing similar challenges.

The Role of Artificial Intelligence in Heritage Emergency Situations: Crossed Perspectives on Post-Conflict Protection Challenges and Prospects of Saints' Mausoleums in Timbuktu, Northern Mali

Drissa Sinaly Coulibaly, Mali

The recent armed conflicts in Mali, particularly the 2012 occupation of Timbuktu, underscored the vulnerability of cultural heritage in crisis contexts. The destruction of UNESCO World Heritage mausoleums of saints triggered an international response centred on both physical and symbolic reconstruction. However, in the digital era, artificial intelligence is emerging as an innovative instrument for the protection, documentation and reconstruction of cultural heritage.

This paper explores the contribution of AI to safeguarding heritage assets during emergency situations, using the Timbuktu mausoleums as a case study. It combines academic literature, institutional reports and technological perspectives to analyse the opportunities, ethical challenges and future directions of AI applications within an African context still facing digital divides.

ChemiAI: Integrating Artificial Intelligence into Cultural Heritage Monitoring

Noémie Gabay, Italy

ChemiNova is a research and innovation project funded by the European Union's Horizon Europe Framework Programme. It brings together an interdisciplinary consortium to develop a suite of digital tools employing advanced technologies for on-site and remote collaborative monitoring of structural and chemical damage in cultural heritage, with a particular focus on the effects of climate change and anthropogenic hazards, including armed conflict.

ChemiAI is the tool within the ChemiNova suite that applies artificial intelligence to automatically detect damage through machine-learning algorithms. It integrates with other ChemiNova tools supporting the damage-assessment process, offering an additional information layer by identifying potential damage areas in 3D models of movable and immovable heritage assets. These models—potentially created by combining data from multiple sensors—enable users to detect material deterioration and identify potential structural and chemical damage. They can be navigated and manipulated within the interactive ChemiNova tools, which, through technologies such as AR, VR and MR, are further enriched with expert-provided heritage data, enabling collaborative condition assessments.

ChemiAI remains in the development phase. Using transformer-based neural networks, it is designed to predict a damage type (or assign the label “undamaged”) for each triangle of a 3D mesh representing the heritage asset under study. In this process, texture data

acquired from multiple sensors can be integrated as additional information. The first case study, based on the tiled roof of the historical La Nau building in Valencia, enables the consortium to monitor the impacts of slow-onset climate change and pollution on heritage. During this phase, heritage experts are contributing by identifying as many and as varied damage types as possible—such as biodeterioration, blackening and fracturing. Part of these data is used for training ChemiAI, while the remainder is reserved for testing. Integration of texture data from sensors other than RGB cameras remains to be implemented. In later testing stages, experts will be able to examine AI-flagged areas more closely and determine whether the assessments correspond with actual conditions.

While the development of ChemiAI has fostered valuable exchanges between IT developers and cultural-heritage specialists, it has also raised several critical questions: How can consistent and relevant data be produced for AI training? How can heritage professionals be meaningfully integrated into technically complex development processes requiring specialised digital expertise? How can bias or errors introduced by human input during training be mitigated? And how can the diversity and complexity of reference heritage assets be adequately addressed?

Rather than offering definitive answers, the experience with ChemiAI raises broader reflections extending beyond technical development: How can AI be employed to make monitoring faster, easier, more accurate and more effective? What does it mean to integrate AI responsibly into cultural-heritage monitoring, and for what ultimate purpose?

Panel Discussion

AI for Inclusive Heritage: Social Sensing and Community Engagement

Moderator:

Jui Ambani, Programme Officer, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR), ICCROM

Speakers:

Maleknaz Nayebe, York University

Ali Asgary, York University

Cultural heritage sites are frequent targets in times of war and conflict. More than 500 heritage sites—including historic buildings, religious sites, museums, monuments, libraries, archaeological sites and archives—have been damaged during the war in Ukraine. The public is often among the first to observe, sense, report, share, comment, react and seek support to protect, preserve or respond to heritage sites under threat or already damaged.

This panel asks: How much social attention was directed to heritage sites during the war in Ukraine? How have social monitoring and sensing assisted in understanding the vulnerability and protection of cultural heritage?

The discussion focuses on Ukraine as a case study, examining how artificial intelligence can support rapid damage assessment, digital preservation and the reconstruction of threatened sites through social-sensing monitoring and sentiment analysis. The study seeks to capture how Ukrainian communities expressed grief and resilience and called for protection when cultural landmarks were damaged or destroyed.

Speakers bring perspectives from AI research, cultural-heritage preservation and international governance, alongside insights from a student-led project analysing online narratives of cultural loss in Ukraine.

Participants will gain understanding of both the opportunities and the challenges inherent in using social media data and AI to identify, assess and preserve heritage under attack. The session will also explore the ethical and political implications of such practices, and how global communities can mobilise technology to defend cultural identity in conflict zones.

Keynote 2: AI for Risk-Resilient Heritage: A Platform for Predictive Analysis, Prioritised Response and Global Coordination

Natalia Makovetskaya – Sustainability and Heritage Advisor

Around the world, heritage sites face threats that arrive faster, strike harder and compound over time.

In Norway, the Rjukan-Notodden Industrial Heritage Site—a testament to early hydroelectric innovation—now faces a modern danger: surface flooding that threatens its infrastructure and landscape. In the Republic of Korea, advancing wildfires endangered the Historic Village of Hahoe and nearby academies. Swift emergency measures saved them, but the same fires destroyed the 1,300-year-old Gounsa Temple, leaving behind blackened ruins. In Egypt, rising groundwater once placed Abu Mena on the List of World Heritage in Danger, while in Afghanistan, the Minaret of Jam remains under severe threat from erosion and floodwaters.

All these sites differ in scale, geography and history, yet they share a common challenge: their future depends on how quickly risks are identified, communicated and addressed. Could some of these losses have been prevented if early warnings had reached site managers, city planners or the World Heritage Committee sooner?

Beyond natural threats, heritage sites also face constant pressure from chaotic land-use changes within buffer zones. In Vienna, high-rise construction led to the Historic Centre being placed on the List of World Heritage in Danger, where it remains. In Liverpool, unchecked redevelopment cost the city its World Heritage status entirely. And in Macau, the approval of a super-tall building near the Guia Fortress in 2023 prompted UNESCO to intervene, warning of irreversible visual damage to the site's setting.

Nothing will ever replace qualified site managers and conservation experts, but artificial intelligence can serve as a powerful supporting instrument—scanning thousands of signals and patterns that no human team could process alone—and giving managers more time and foresight to act.

This proposal outlines an exploratory project to test how artificial intelligence (AI) can support disaster-risk assessment, preparedness and emergency coordination for World Heritage sites. It builds on the Climate Risk Informed Decision Analysis (CRIDA) framework and the World Heritage Online Map Platform (WHOMP), focusing on the development of a modular, AI-driven system to enhance site-level risk visibility and decision-making.

The platform consists of three core modules—three ways in which AI can practically support heritage managers:

1. Seeing risk before it strikes

Using satellite imagery, machine learning and language models that scan local news, the system can detect and predict urban encroachment, illegal construction, infrastructure stress or emerging disaster risks in and around buffer zones.

- Example: AI could flag a legal notice for a proposed high-rise development near a heritage site's buffer zone, alerting both site managers and national authorities before construction approval.

- AI-supported task: scanning planning documents, news and social-media feeds to detect early signals of land-use change or construction threats.

2. Knowing what is happening now

The Live Risk Index integrates climate projections with seismic, flood, fire and conflict data to generate dynamic vulnerability maps and real-time alerts. IoT sensors monitoring humidity, vibration or other stress indicators feed into the system, highlighting early warning signs.

- Example: the platform might detect rising humidity levels inside a fragile monument or increasing flood potential around an industrial-heritage landscape.
- AI-supported task: issuing quarterly or emergency risk assessments based on updated climate maps, or monitoring subtle structural stresses before damage becomes visible.

3. Acting fast and smart in crisis

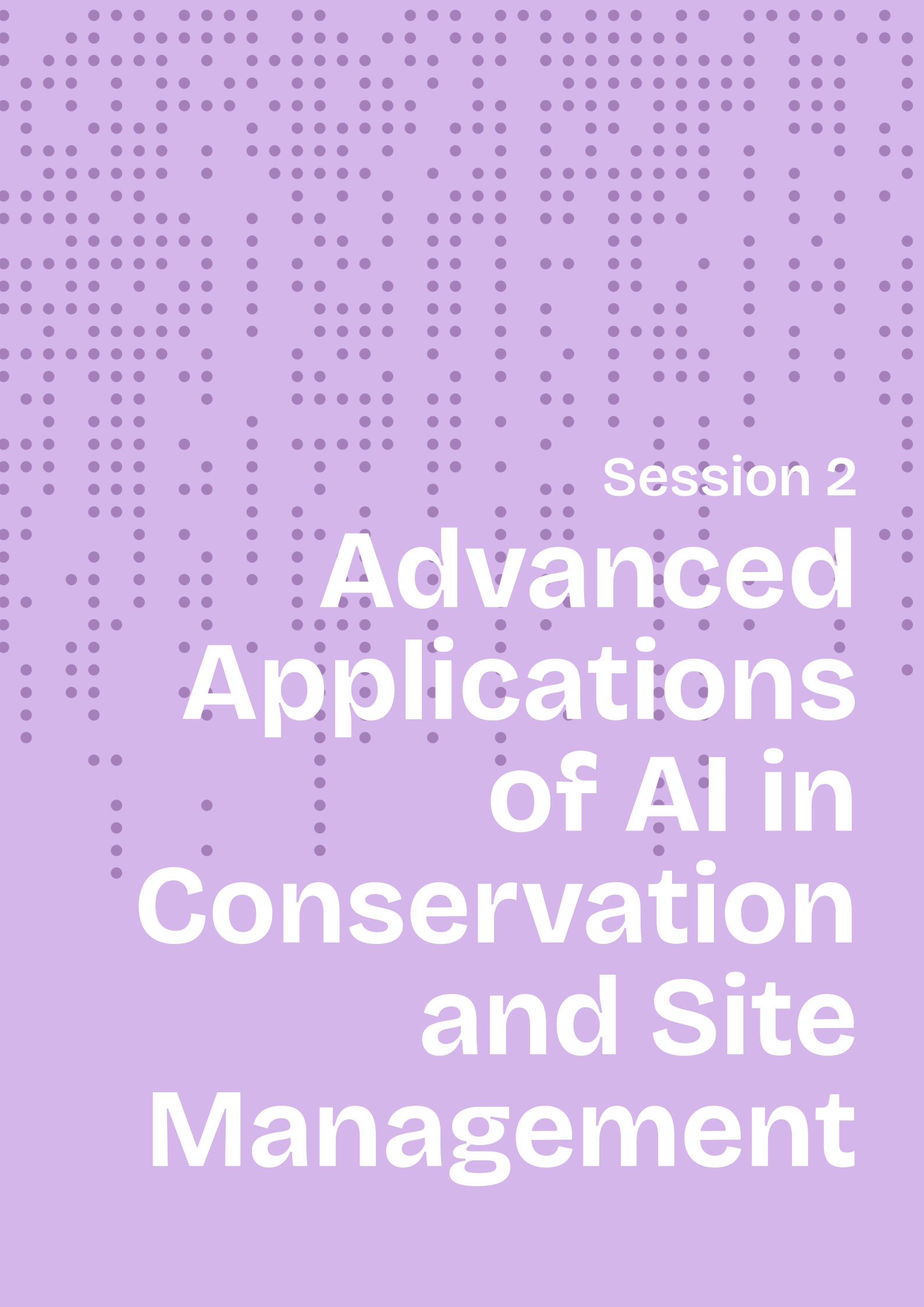
When disaster strikes, large language models can instantly generate multilingual emergency protocols tailored to the site's typology, materials and governance structures. The system will also maintain a global archive of templates, reporting forms and contact directories to streamline crisis coordination.

- Example: providing pre-filled damage-assessment forms, agency contact lists and draft communication messages during a flood or fire.
- AI-supported task: delivering real-time, step-by-step guidance to managers under pressure, helping them respond more rapidly and effectively.

This initiative is not about introducing a ready-made tool but about co-creating solutions with heritage professionals, local authorities and communities, ensuring that AI adapts to heritage-management realities—not the reverse.

AI is not perfect: it may reflect bias, misinterpret signals or produce false alerts. Transparency, human oversight and collaboration therefore remain central. AI is an assistant, not a replacement.

This proposal is a structured hypothesis: that AI, when combined with CRIDA methodologies, WHOMP and expert supervision, can provide practical and scalable tools for risk-aware heritage management in a rapidly changing world. It is also an invitation—to share data, to test new approaches and to re-imagine how heritage protection can keep pace with climate change, urban growth and crisis. So that next time floods, fires or unchecked construction threaten our shared heritage, site managers will not stand alone.



Session 2

Advanced Applications of AI in Conservation and Site Management

This session turns from analysis to application, addressing how AI supports conservation practice, emergency preparedness, and long-term heritage management. Here, artificial intelligence functions as both a predictive infrastructure and as a decision-support system – integrating data from sensors, satellite imagery, and climate models to inform planning, intervention, and response.

This evolution introduces new forms of coordination between human and machine agency. As predictive models anticipate threats and automated systems propose courses of action, how do professionals maintain interpretive authority and ethical oversight? Can AI help reconcile the immediacy of crisis management with the slow temporalities of conservation and care? And how can these systems remain inclusive and transparent when operating across regions marked by unequal access to technology?

These contributions suggest that AI can enable risk-aware, participatory, and adaptive heritage governance, but only when designed with accountability and cultural sensitivity. Rather than replacing expertise, it can augment it, fostering collaboration between technologists, conservators, and communities. The resulting dialogue between data and heritage points toward a future in which artificial intelligence is not an autonomous actor, but a partner in sustaining cultural memory amid accelerating global change.

Ring the Alarm – Harnessing Artificial Intelligence in Collection Care

Ayaka Ajiki, Singapore

For conservators, archivists and collection managers, collection care is both a core responsibility and a constant concern. Assessing the condition of items is critical to their preservation, allowing timely action to prevent further deterioration. However, as not every record can be examined upon receipt, issues are often discovered only during processing. Consultations depend on the availability of conservators, and comprehensive collection surveys—typically conducted by specialists—are time- and labour-intensive. Consequently, only a small percentage of collections can be surveyed, resulting in long waiting lists and potentially unchecked deterioration.

Given spatial constraints faced by many memory institutions, optimising and simplifying the inventory process is increasingly important. Evaluating an item's condition and estimating its potential lifespan generally require the expertise of conservators or preservation specialists—resources that are rarely available for every incoming item. Artificial intelligence offers a promising solution, predicting the stability of materials based on observable properties and conditions.

This project envisions a comprehensive, AI-powered decision-support system that predicts the stability of archival and library materials and prioritises items for inspection according to their physical properties or frequency of use. This enables early intervention and more efficient allocation of conservation resources.

Through the *Ring the Alarm – AI Check* initiative, a flexible inventory process is being developed to maximise manpower efficiency and provide an initial “set of eyes” to assess the condition of records. Using AI to identify deterioration features such as tears, creases

and losses, the system estimates condition ratings by learning from large image datasets that illustrate common forms of damage.

The project, which won Most Innovative Project at the National Library Board's Blackbox Competition, is currently at the proof-of-concept stage, focusing on identifying stains as an initial target. The objectives are to:

1. Develop an AI system capable of identifying common deterioration signs in records and estimating condition ratings;
2. Enhance the accuracy and efficiency of assessments through automated detection; and
3. Ultimately establish an automated monitoring system recommending survey frequency for various collections, enabling long-term tracking of deterioration rates and supporting conservation reporting.

Now in its second development phase, the proof of concept shows strong potential for scalability. If successful, the AI system could detect multiple forms of deterioration, improve productivity and provide robust supplementary tools for conservation documentation. Automating the detection and estimation of condition ratings will significantly reduce manual workload while supporting timely interventions and more efficient conservation management.

The HERA Project: Holograms, Annotations and Artificial Intelligence for the Biography of Altered Objects

Muriel Verbeeck and Pierre Hallot, Belgium

This project introduces a participatory, technology-based method for documenting and interpreting altered or restored heritage objects. It combines life-size holographic projections, spatialised multilingual annotations and an AI module designed to structure and analyse the resulting data.

Objects selected from dispersed collections—including those held by the AfricaMuseum (Belgium), the Institut des Musées Nationaux du Congo (IMNC), the University of Liège and the University of Kinshasa—were chosen for their ethnographic value and visible alterations.

Methodology

Objects are digitised in high resolution and projected as interactive holograms. Participants—conservator-restorers, students and community members—document the objects by anchoring annotations directly onto altered or restored areas. These annotations, which may be textual, oral or gestural, are collected in several languages, notably Lingala and Swahili. This multilingual process is both inclusive and revelatory, surfacing culturally embedded concepts of ageing, deterioration, transformation and ritual value often untranslatable in Western conservation terminology.

A semantic AI module structures these annotations, identifying patterns and narrative links that form preliminary “object biographies.” These drafts are subsequently reviewed and expanded by both experts and the originating communities. AI functions here as an analytical partner, linking multilingual and multicultural inputs, suggesting connections and facilitating non-linear narratives that unite material and social meanings.

Expected outcomes:

1. Development of an educational and conservation tool based on interactive annotation;
2. Expansion of multilingual, multicultural conservation vocabulary;
3. Creation of shared object biographies integrating materiality and meaning; Demonstration of AI’s potential—and limits—for organising participatory data in a transparent, non-hierarchical way.

By combining immersive technology, collaborative annotation and structured data analysis, this project proposes an innovative model for reactivating the material and immaterial memory of fragile heritage objects within collective narratives.

FORSHelper: A Large Language Model (LLM) Assistant for Using Fibre Optic Reflectance Spectroscopy (FORS) in Pigment Identification

Naomi Rosenkranz, United States

Fibre Optic Reflectance Spectroscopy (FORS) is widely used in conservation science for non-invasive pigment and dye analysis. Despite its straightforward principles, effective data acquisition and interpretation rely heavily on empirical knowledge that is often undocumented and easily lost.

To address this challenge, the team developed FORSHelper, a Large Language Model (LLM) assistant implemented as a local chatbot application. Drawing directly from laboratory resources, it guides users in operating the FieldSpec® instrument, interpreting data and applying analytical protocols—preserving procedural knowledge once transmitted only through mentorship.

FORSHelper uses a Retrieval-Augmented Generation framework connecting general-purpose LLMs to three external knowledge bases:

1. The manufacturer’s user manual;
2. Teaching videos recorded by expert operators;
3. Selected scientific papers detailing data-interpretation reasoning in cultural-heritage contexts.

This approach ensures reference to verified sources, minimising hallucination and preserving reliability. With over 90 pages of documentation and extensive video material,

the system provides real-time responses to natural-language queries, supporting efficient, context-specific learning.

The project demonstrates an innovative model for preserving empirical expertise, enhancing reproducibility and supporting new generations of conservation scientists.

Augmented Restoration with Artificial Intelligence: Making Conservation Visible – The Case of the Buenos Aires Museum of Modern Art

Rodrigo Alcon Quintanilha & Diamela Canosa, Argentina

The Augmented Restoration project, developed under the 2023 Cultural Patronage Programme, integrates artificial intelligence into museum experiences through augmented-reality (AR) visualisations and an AI-powered chatbot trained on conservation and restoration databases.

Through AR, visitors access high-resolution documentation of artworks prior to conservation—such as ultraviolet and infrared imaging, pre-cleaning states and chromatic reintegration processes—by scanning QR codes in the gallery. The AI chatbot provides contextual information on materials, techniques and ethics, offering a dynamic, interactive learning experience.

Collaboratively designed by a conservator, a specialised photographer and a software developer, the project ensures both technical accuracy and accessibility. Current implementations include works from the Museo de Arte Moderno de Buenos Aires, such as *Abstracción* by Juan Del Prete and *Azul con estructura* by Tomás Maldonado.

By merging AR's ability to “make the invisible visible” with AI's conversational potential, the project transforms conservation from a backstage process into an engaging public narrative. Digital tools become intelligent mediators between heritage, professionals and the wider community.

ÇEKÜLGPT: Artificial Intelligence-Driven Interpretation and Public Access to a Civil Society Organisation's Archive

Ceyda Bakbasa Bosson & Alper Can Kılıç, Türkiye

The Foundation for the Protection and Promotion of the Environment and Cultural Heritage (ÇEKÜL) is one of Türkiye's leading heritage NGOs, dedicated to safeguarding both urban and rural environments through education, advocacy and community-based initiatives.

In 2025, ÇEKÜL launched ÇEKÜLGPT, a generative AI platform that transforms its vast, place-based archival holdings—over 59,000 catalogue records—into an interactive,

conversational knowledge system. The platform functions as both a heritage guide and an educational resource for researchers, local governments, educators and the public.

Through a multi-stage data-processing pipeline involving cataloguing, digitisation, OCR, metadata alignment and vector-based search, the project ensures accuracy, accessibility and traceability. Early pilot results show 88-percent response accuracy and strong user engagement.

Designed as a replicable, low-cost model for other civil-society organisations, ÇEKÜLGPT demonstrates how open-source AI tools can advance transparency, accessibility and large-scale preservation within limited budgets—while reinforcing ethical standards and provenance control in heritage data management.

CROMOARCHEOLOGY – Colourising Memory: AI Approaches to Reconstruct Original Colours in an Ex-Clandestine Detention Centre (ESIM El Faro – Mar del Plata, Argentina)

Julio Cesar Maya Lozano, Argentina

In 2023, a combined methodology was developed to recover the original chromatic appearance of the former clandestine detention centre Escuela de Suboficiales de Infantería de Marina – Faro (Lighthouse) in Mar del Plata. The process began with AI-assisted image colourisation applied to historical black-and-white photographs—primarily those taken after the site's closure and during the 1984 CONADEP survey. These AI-generated outputs were used strictly as preliminary hypotheses to guide subsequent research.

The colourisations were validated in situ through stratigraphic paint sampling (cateos estratigráficos) and materials analysis. Integrating digital and physical methods enabled a more accurate approximation of the site's original appearance during its operation as a clandestine detention centre. The results informed conservation strategies and were pivotal for curatorial decisions shaping the museographic design of the space, whose aim is to preserve the material traces of repression while making them intelligible to visitors. The reconstructed chromatic palette was conceived not as a decorative gesture but as a critical layer of historical information. Recovering original tones contributed both to material conservation and to reinforcing the site's historical legibility and interpretative coherence.

This integrated approach demonstrates how digital technologies, when applied with methodological rigour and ethical sensitivity, can enhance heritage preservation in contexts marked by violence and trauma. It also underscores AI's value as a tool for hypothesis generation that requires cross-verification through established conservation practice. The lessons learned offer guidance for similar memory sites where colour documentation is scarce or non-existent.

The project formed part of a public tender carried out in 2023 within a series of interventions promoted by the Ministry of Public Works of Argentina, in coordination with the Ministry of Justice and Human Rights. The restoration of former clandestine detention centres sought to preserve, stabilise and render legible the material heritage associated with State

terrorism. These sites—once components of the repressive apparatus during Argentina’s last civic-military dictatorship (1976–1983)—now function as spaces for memory and the promotion of human rights, conveying that dark chapter of national history through architectural and material evidence.

From Data to Decisions: Using GeoAI to Protect Cultural and Natural Heritage under Climate Stress

Ersun Varol, Türkiye

Coastal heritage towns such as Ayvalık, in the Aegean region of Türkiye, face mounting pressures from climate change, tourism-driven urban growth and inadequate land-use controls. As a registered urban-heritage site, Ayvalık holds significant architectural and cultural value yet is increasingly vulnerable to coastal erosion, wildfires, sea-level rise and uncontrolled construction. This study presents a practical case in which Geographic Information Systems (GIS) and GeoAI are used to support climate-resilient management of cultural assets in Ayvalık and its surrounding areas.

The project focused on spatially identifying, documenting and assessing built and landscape heritage across Ayvalık’s historic core and sensitive coastal fringe. GIS was used to integrate and analyse multilayered data, including conservation boundaries, land cover, hazard zones, terrain models and historic structures. Outputs—risk maps, spatial overlays and pressure zones—provided decision-makers with a clearer view of how multiple threats intersect with cultural values on the ground.

To support analysis and reduce manual workload, complementary GeoAI tools were employed, including remote-sensing-based land-use classification and change-detection techniques to track recent construction and green-cover loss. All AI-assisted interpretations were cross-checked with local expert input and visual ground validation to ensure cultural sensitivity and accuracy.

Planning and conservation regulations provided an orienting framework but were not the primary focus; rather, they situated the GIS/GeoAI analysis within practical policy contexts—connecting digital outputs to zoning decisions, site-management guidelines and public-awareness tools. Buffer zones, ecological corridors and development restrictions were suggested on the basis of spatial risk findings.

The case illustrates how mid-sized heritage towns with limited resources can benefit from accessible digital tools to manage converging environmental and anthropogenic threats. The approach is applicable to other coastal heritage areas where rapid assessments are needed to inform proactive site-level actions.

Metadata, Memory and Machines: Rethinking Description with AI in Developing Contexts

Muhammed Tehmash, Pakistan

Archives in developing countries often face persistent resource constraints—limited staffing, inadequate funding and outdated infrastructure—despite holding collections of deep cultural, historical and community value. A major challenge is the backlog of undocumented or poorly described materials, which limits access, research and long-term preservation.

This presentation examines how artificial intelligence (AI) is being tested as a practical tool to support metadata creation in resource-constrained archives. Using the Aga Khan University Archives in Pakistan as a case, the study reports on applying image recognition, automated tagging and natural language processing to describe legacy collections, including photographs, oral histories and institutional records.

The approach was experimental and low-cost, grounded in archival principles. AI helped suggest keywords, generate basic descriptions and structure data for cataloguing systems—reducing time-consuming manual work and opening access to long-hidden materials. At the same time, it raised important questions about accuracy, context and the ethical use of automation in heritage work.

Working in a setting with limited technical capacity, the case demonstrates both the potential and the limits of AI in archives of the Global South. It underscores the need for human oversight, local knowledge and community-driven metadata practices to avoid bias and misrepresentation.

The session offers practical insights for heritage professionals and archivists considering AI, advocating a careful, step-by-step adoption that prioritises accessibility, accountability and sustainability over speed or scale.

AI-Based Visualisation and Reinterpretation of Cultural Heritage: The Case Study of 18th-Century Castle Interiors in Vojvodina

Isidora Đurić, Serbia

Castles and aristocratic residences of the 18th century in Vojvodina are among the most endangered cultural-heritage sites in Serbia. Documentation of original interiors is often minimal: some structures have been demolished; others have undergone significant alterations due to changing use, neglect or reconstruction. The lack of reliable visual records complicates efforts by architects, conservators and art historians to reconstruct and interpret these richly decorated interiors.

Traditional 3D modelling and visualisation methods for lost or transformed spaces are time-consuming and technically demanding. Recent advances in generative AI offer new

avenues: tools that can produce visual content from textual prompts, images or sketches—reducing time and effort while enabling historically informed, creative interpretations.

This paper presents results from an experimental study applying AI tools to the visualisation and artistic reinterpretation of 18th-century castle interiors in Vojvodina. Conducted in 2024 with support from the Ministry of Culture of the Republic of Serbia within a cultural-heritage digitisation framework, the project involved testing various free, publicly available generative-AI tools suitable for architectural visualisation. It also explored different prompt types—textual descriptions, reference images and sketches—to assess their influence on output quality, style and historical plausibility.

The study demonstrates that, when used thoughtfully and critically, AI-based generative tools can support virtual reconstruction of under-documented or lost architectural heritage. Success depends on deliberate tool selection, careful prompt design and a sound understanding of historical context to achieve results that are visually compelling and culturally meaningful. While not a replacement for traditional methods nor a definitive reconstruction, this approach offers a powerful means of reimagining and communicating heritage that might otherwise remain invisible or inaccessible.

Emergency Preparedness and Response in the Age of Artificial Intelligence: An Overview of UNESCO's Work in the Field of Culture

Tural Mustafayev, UNESCO

Artificial intelligence is reshaping many aspects of institutional practice. For international organisations working in culture, AI-powered tools can help shift from generic guidance to tailored, institution-specific solutions with similar—or even fewer—inputs.

This presentation introduces UNESCO's museum-focused AI application for emergency preparedness, designed to help institutions rapidly and consistently generate draft, standards-aligned preparedness plans. Grounded in international standard-setting instruments, the tool aims to translate minimal museum inputs into actionable outputs: a clear risk profile (hazards, vulnerabilities, critical spaces), prioritised preparedness measures and operational checklists for the periods before, during and after incidents—supporting museum professionals to prepare more effectively for emergencies.

By reducing the time and specialised expertise required to produce robust plans, the application strengthens institutional resilience, enables evidence-based decision-making and scales UNESCO's support across diverse contexts. The result is a practical pathway from guidance to action, so that when emergencies occur, cultural heritage is better protected and response efforts are faster, safer and more coordinated.



Day 2 – 20 November 2025

AI for Decoding Heritage

Panel Discussion

AI as a Tool to Understand Communities' Preferences in Heritage Sites

Moderator:

Xiaoxu Liang, Politecnico di Torino, Italy

Speakers:

Nan Bai, The Netherlands

Yuting Jiang, P.R. China

Yan Zhou, The Netherlands

Xinchen Li, Italy

This panel examines the role of artificial intelligence (AI) in identifying and interpreting community preferences within heritage site management. The central question guiding the discussion is: In what ways can AI contribute to more inclusive and sustainable approaches to heritage conservation?

The session introduces methodological applications of AI—including natural language processing, machine learning and geospatial analysis—to evaluate diverse forms of community input such as surveys, social media data and participatory records. Through selected case studies, the presentations demonstrate how computational approaches can reveal patterns of engagement, values and expectations associated with heritage assets.

The discussion also addresses the methodological and ethical implications of applying AI in this field, particularly issues of transparency, representation and the integration of digital tools with established participatory practices.

Sensing the Cultural Significance with AI for Social Inclusion

Nan Bai, Delft University of Technology

Whereas the 2011 UNESCO Recommendation on the Historic Urban Landscape called for new tools for knowledge documentation, social media already function as a dynamic platform through which online communities engage in heritage-related discussions. This presentation explores the potential of artificial intelligence to analyse large-scale, unstructured user-generated data, particularly within urban heritage contexts. It demonstrates how AI-driven analysis can reveal patterns of perception and participation, supporting more inclusive interpretations of cultural significance in heritage management.

Assessing Digital Tools in the Educational Process for Cultural Heritage: A Literature Review

Yuting Jiang, College of Architecture and Urban Planning (CAUP), Tongji University, Shanghai, China; Department of Architecture and Design (DAD), Politecnico di Torino, Italy

Participatory learning is essential to people-centred heritage conservation, as it engages communities and diverse audiences in the co-creation and transmission of knowledge. While emerging digital tools expand access and enrich heritage education, existing research lacks a comprehensive understanding of how different tools support participatory learning.

Based on 140 publications retrieved from the Scopus database, this study quantitatively analyses shifts in research focus over time. It establishes an assessment framework that identifies the strengths and limitations of eight digital tools and explores both the potential and risks of artificial intelligence in advancing participatory learning within heritage education.

Mapping Chinese Diasporic Heritage from Social Media Data with Spatial and Semantic Networks

Yan Zhou, Delft University of Technology

Diasporic communities and their heritage play a vital role in shaping cultural diversity in urban planning and management. However, the cross-geographical networks that constitute diasporic cultural significance are often overlooked.

This study develops a workflow to explore diasporic heritage through spatial and semantic network analysis. Using global Flickr data related to Chinatowns, it applies Hierarchical Multi-label Classification alongside spatial and semantic mapping techniques. Findings trace diasporic flows between origin and destination sites of Chinese heritage and examine distributions from a global scale to the Netherlands. Comparative analyses of semantic networks across Dutch cities further illuminate local variations in diasporic heritage representation.

Machine Learning in Cultural Heritage Conservation: A Comprehensive Review (2011–2025)

Xinchen Li, Politecnico di Torino

This report reviews the evolution of machine learning applications in cultural heritage preservation from 2011 to 2025. Using methods such as social network analysis, text mining, natural language processing and clustering analysis, it maps publication trends, global collaboration networks and research hotspots within the field.

The study examines the use of both traditional algorithms and deep-learning techniques across various digital heritage media—including images and point clouds. It highlights emerging opportunities and challenges for integrating AI into heritage conservation practice, providing insights into how machine learning can contribute to sustainable, data-driven approaches for safeguarding cultural heritage.

Keynote 1: Uses and promises of AI solutions for Heritage Institutions: two examples from the Digital Europe Program

Frederik Truyen, KU Leuven

In this talk, we will first zoom into the actual challenges that Heritage Institutions face when implementing digital strategies, and identify some challenges. With the help of experiences in two innovation projects funded by the digital Europe Program: DeBias and AI4Culture, we will discuss lessons learned.

The adoption of GenAI tools by students, scholars and broad segments of the general public has been overwhelmingly fast. This stands in huge contrast to the long, protracted digital transformation in some sectors, such as Heritage Institutions. The fact that GenAI tools were initially targeted at a wide audience (to obtain validation data) could lead to a misunderstanding that they can be integrated institutionally without integration in the overall digital support systems. While some very nice and inspiring examples of targeted GenAI uses in LAM institutions exist, it can be helpful to turn around the question and start from what the actual weak spots are in the digital approach and roadmap of institutions, to identify where GenAI can help.

While information systems have found their way like in every sector, introducing shared infrastructures, repositories and databases, life cycle management and transformation of workflows still need some work. There is also a notable difference in requirements, roadmap, pace and complexity when we look at Libraries, Archives and Museums. The drive to online interaction with the public, accelerated by the COVID-19 crisis, has laid bare a common deficiency that Libraries share with Archives and Museums, but with very specific modalities.

In particular, the descriptions of digitized/digital collections are not always fit for purpose. They come from a time when minimal descriptions were added manually to help identify and find a particular book, source or object in storage.

In this talk, we will first zoom into the actual challenges that Heritage Institutions face when implementing digital strategies, and identify some challenges. With the help of experiences in two innovation projects funded by the digital Europe Program: DeBias and AI4Culture, we will discuss lessons learned. In the DeBias project, an LLM-based GenAI tool was developed to identify and annotate possible harmful terminology in descriptive data for heritage collections, with as a main target those aggregated on Europeana. In AI4Culture, a repository of AI tools was compiled with applications that enhance digital collection information, and 5 new tools for text recognition, subtitling, enrichment and automatic translation were developed.

We will present some results and discuss the experiences of their application, and how they are used to improve the quality of aggregated digitized heritage collections.

The background of the slide is a solid red color. Overlaid on this is a pattern of small, semi-transparent purple dots. These dots are arranged in a way that they form a grid-like structure, with some dots missing or faded, creating a digital or pixelated effect. The dots are more densely packed in some areas and more sparse in others, particularly towards the left side of the slide.

Session 1

AI-Driven Documentation, Data Analysis and Pattern Recognition for Heritage

This session examines how artificial intelligence is reshaping the documentation, analysis, and exploration of cultural heritage.

AI enables the reconstruction of intangible patterns, the modeling of historic floor plans, and the detection of archaeological sites, while also powering interactive access to knowledge repositories and archival collections. Across these applications, computational tools reveal hidden patterns, classify complex datasets, and generate predictive or immersive representations that support conservation, research, and public engagement.

Yet these possibilities raise critical questions. How can AI mediate cultural information without stripping it of context, meaning, or local significance? Which narratives are prioritized or marginalized when algorithms interpret heritage data? And how can AI systems be designed to ensure inclusivity, ethical stewardship, and the integration of diverse knowledge systems?

By combining technical innovation with reflective practice, this session highlights AI as both an analytical and interpretive partner. Participants will explore how data-driven insights, spatial modeling, and intelligent interfaces can advance heritage management, while emphasizing the importance of transparency, human oversight, and culturally informed deployment. Ultimately, AI emerges not only as a tool for efficiency but as a catalyst for rethinking how we understand, preserve, and experience the past.

Digital Reconstruction and Spatial Application of Intangible Heritage Patterns Empowered by AI: A Case Study of Cloisonné

Fanghong Dang, China

With the widespread application of artificial intelligence (AI) in art and design, new pathways have emerged for the digital reconstruction and redesign of traditional intangible cultural heritage (ICH) patterns. This study focuses on “Cloisonné Enamel” (Jingtai lan), a Chinese national-level ICH craft, examining the visual characteristics and cultural semantics of its iconic patterns. Using generative-AI tools, the research reconstructs these patterns digitally and explores how AI can be integrated into landscape-design workflows. Specifically, it investigates how AI-generated Jingtai lan motifs can be translated into spatial textures, circulation schemes, planting compositions and architectural ornamentation.

Centred on the Jingtai lan-Themed Island landscape project in Tianjin, the paper analyses the auxiliary role and creative potential of AI in the spatial reinterpretation of heritage patterns. It further proposes strategies for integrating ICH within contemporary landscape contexts from a “human-AI co-creation” perspective. The study demonstrates the practical effectiveness of AI for heritage-pattern regeneration and landscape innovation, while critically reflecting on challenges related to cultural continuity, semantic depth and aesthetic originality.

Perspectives on Integrating an Ontology of Cultural Heritage and Values in Earthquake Damage Assessment and Documentation

Satwant Rihal and Hisham Assal, United States

Artificial intelligence (AI) and machine learning (ML) are reshaping heritage documentation, analysis and preservation. Leveraging high-resolution imaging, 3D scanning and deep-learning models, heritage professionals can rapidly capture and catalogue disaster damage to tangible assets and assemble digital archives that preserve pre-, during- and post-event states.

Recent earthquakes in Türkiye and the Syrian Arab Republic (2023) and in Morocco (2023) underscored the urgency of data-driven approaches. For example, following the Türkiye/Syria earthquakes, AI-assisted teams documented destruction at Gaziantep Castle—a nearly 2,000-year-old Roman-Byzantine fortress—in unprecedented detail, informing future restoration and revealing construction practices that contributed to partial survival.

ML and pattern recognition support the interpretation of large corpora of historical images, architectural features and texts, identifying trends, cataloguing motifs and illuminating relationships within cultural narratives. Vision-language models further enhance culturally sensitive description and context-aware interpretation, expanding accessibility for researchers and communities.

Ontologies that encode heritage attributes and cultural values provide structured frameworks to integrate archival resources, sensor data and expert assessments into decision-support systems. By mapping tangible attributes (materials, style, structural integrity) alongside intangible factors (cultural value, social significance), ontologies help ensure that restoration priorities address both physical robustness and the breadth of cultural values. After large-scale disasters, AI-enabled decision-support tools—grounded in ontological data and ML-based damage classification—can prioritise interventions where cultural impact is greatest or structural risk is most acute. Over the last decade, the authors have developed an approach to integrate cultural value into information models of heritage structures, flexible enough to reflect regional variation and to interoperate with BIM/HBIM standards.

Digitising the Past, Building the Future: AI's Role in Africa's Cultural Heritage and Vision 2063

Mohammed Ali Mwenje, Kenya

This paper explores the transformative potential of artificial intelligence (AI) in advancing sustainable development in Africa, focusing on applications within cultural heritage and the creative industries. In alignment with the African Union's Agenda 2063, culture and the creative economy are recognised as drivers of economic diversification and industrialisation; cultural heritage—tangible and intangible—emerges as a strategic resource within this vision.

Technologies such as virtual reality (VR) and augmented reality (AR) can enhance how heritage is studied and experienced. VR enables high-resolution, immersive documentation of sites—capturing architecture, urban morphology and structural conditions—to support conservation planning and adaptive reuse. AR recreates historical scenes, allowing users to interact with layered narratives, enriching visitor engagement and public appreciation.

Using Lamu Old Town (Kenya) as a case study, the paper illustrates how AI-enabled experiences (e.g. converting abandoned buildings into AR theatres or cultural hubs) could revitalise tourism, promote heritage-led urban regeneration and create local employment. This intersection of conservation and AI-driven innovation demonstrates how cultural assets can support inclusive, sustainable development.

The paper also addresses risks: data privacy, cultural representation, digital colonialism and marginalisation of local knowledge. It calls for responsible governance and inclusive policy frameworks to ensure that AI supports Africa's development goals. Coordinated action among African governments, international organisations and the private sector is needed to build digital infrastructure, strengthen institutional capacity and establish ethical standards. AI is presented not merely as a tool but as a strategic catalyst that—if harnessed ethically and inclusively—can advance Agenda 2063 through culture and the creative industries.

Optimising Artificial Intelligence for Archaeological Site Detection: A Generalisable Analyst–ML Workflow

Katherine Crawford, Spain

This paper presents a transferable analyst–ML workflow that integrates satellite imagery, object-detection models and structured ground-truthing to accelerate archaeological survey and heritage management. Developed at Chronicle Heritage, the multi-stage pipeline progresses from pixel-level object detection to verified features across diverse landforms and cultural contexts.

The workflow proceeds in four stages. First, training data are developed around visually distinctive morphologies. Training follows a standard deep-learning workflow, currently executed within ArcGIS Pro for rapid model development. Second, models are run on areas of interest and outputs are consolidated where they then undergo analyst review within a gridded QC framework at a consistent scale. The analyst–ML approach enables 1) initial review of results to confirm and reject detections, and 2) the addition of features that fall outside current model typologies or training coverage. Third, detections are converted into a field validation plan to enable on the ground validation. Field teams ground truth detections, recording them as true positives, false positives, and false negatives. Fourth, ground-truth outcomes are used to compute precision, recall, and F1 for assessment of the results as well as for updating training datasets, creating a feedback loop for continuous model improvement.

The workflow enables progressively more efficient review of large landscapes, supporting remote site detection and optimising survey and excavation strategies for heritage clients.

AI-Mediated Interfaces for Exploring Cultural Knowledge Repositories

Nicola Carboni, United States

The digital documentation of cultural objects has undergone significant transformation in recent years. Initially, institutional databases served as centralised catalogues for individual museums. The broader open-data movement has since reshaped their role by making institutional data openly available, converting museum catalogues from information silos into knowledge repositories.

These efforts have produced a cultural-data ecosystem founded on interconnected references, authority files and cross-institutional information. However, despite theoretical availability, practical accessibility has remained limited due to the technical schemas and infrastructures used to host the data.

Institutional datasets are primarily designed to satisfy internal functions, resulting in schemas that pose barriers to external users. Although common ontologies such as CIDOC-CRM have improved comprehensibility and discoverability, they have not resolved the fundamental accessibility problem. Data are still exposed predominantly via technical interfaces (e.g. REST APIs and SPARQL) and specialised formats (e.g. RDF and JSON) that require users to possess technical competencies to locate relevant information and synthesise results.

While simplified querying interfaces exist, they are difficult to implement and typically force users to adapt to ontological models rather than adapting infrastructure to user requirements.

This landscape has been transformed by Large Language Models (LLMs), which enable chatbot-based retrieval interfaces that translate flexible, human-readable questions into structured queries over knowledge corpora. Retrieval-Augmented Generation (RAG) systems are particularly useful: instead of relying solely on static model parameters, they dynamically retrieve relevant content from live databases and use LLMs to generate user-friendly answers. Such approaches can connect cultural-institution catalogues with their audiences through intuitive interfaces.

This contribution presents a solution using a 12th-century Byzantine church as a case study. By deploying an RDF-based Graph-RAG designed for CIDOC-CRM datasets—the de facto standard for cultural-heritage data—the project explores the iconographic, architectural, symbolic, liturgical and geographical dimensions represented in the documentation. The case elucidates challenges in documentation and data reuse, shows how RAG enables user-oriented access, and outlines inherent issues in deployment, accuracy and real-world usage.

From Stones to Servers: Digital Heritage and the Future of AlUla

Nailah Qazi, United States

Amid Saudi Arabia's rapidly transforming cultural landscape, the ancient oasis of AlUla has become a focal point for digital-heritage initiatives. As a site of major archaeological and historical significance, AlUla is at the centre of large-scale efforts to preserve and present heritage through artificial intelligence (AI) and other digital technologies. This presentation critically examines how these tools are being used for documentation, interpretation and dissemination, and addresses their ethical, social and cultural implications.

Drawing on research conducted in a Master's programme in International Relations focused on cultural preservation in conflict and post-conflict contexts, the case study considers AI-enabled site documentation, immersive storytelling and enhanced visitor engagement. These innovations are especially visible in the Royal Commission for AlUla's Journey Through Time master plan, which envisions the region as a global cultural destination. AI and machine-learning methods support 3D reconstructions, automated pattern recognition in archaeological analysis and personalised visitor experiences via interactive media.

While promising for access and conservation, these technologies raise critical questions: who decides which narratives are preserved and showcased? How are local voices included—or excluded? What are the risks of commodifying heritage in the service of national identity, tourism and economic development? These issues are particularly salient where heritage is entwined with both historical continuity and contemporary state-building.

Situated within broader debates on resilient, inclusive and future-oriented heritage ecosystems, the presentation aligns with ICCROM's Sustaining Digital Heritage (SDH) initiative and the values of the Ctrl+S Culture conference. It advocates a values-based, critically engaged approach that centres local knowledge, fosters equity and upholds cultural rights. It also underscores the need for ethical frameworks for AI use in contexts where digital interventions intersect with post-conflict recovery, rapid urban development and state-led narratives. Emerging technologies can function as tools for solidarity, stewardship and sustainability—provided they are guided by inclusive processes and long-term thinking.

Creating a Modern Digital Sanborn Map: AI Large Visual Model for Identifying Historic Properties—Pioneering Surveying and Building Identification Efforts in Denver

Todd Matuszewicz, United States

The integration of artificial intelligence (AI) with perceptual and neurophysiological methods opens new avenues for understanding how humans—past and present—engage with archaeological artefacts. Traditional approaches emphasise typology, context and materials, but rarely quantify perceptual and cognitive processes underlying human–object interaction.

AI enables automated processing of high-resolution 3D data (photogrammetry, laser scanning, structured light). Machine-learning models can generate perceptual saliency maps predicting gaze focus from shape, colour, texture and composition. Combined with empirical eye-tracking, AI correlates predicted attention with observed viewing behaviour, revealing how symmetry, form or damage guide perception.

Neuroaesthetic research is further advanced through AI-assisted analysis of fNIRS, EEG and related biometrics. Classifiers detect neural patterns associated with aesthetic judgement, recognition and emotional valence. Temporal alignment of biometric signals with gaze position and 3D models allows fine-grained mapping of cognitive and affective responses to specific object features.

Beyond analysis, AI systems can modulate lighting, colour reconstruction or viewpoint based on live biometric feedback, enabling dynamic exploration of perceptual variables and simulation of original architectural or ritual contexts. Cross-cultural comparisons become possible by studying diverse participant groups.

Within a broader neuroarchaeological framework, AI functions as computational engine and hypothesis generator. By fusing multimodal datasets—3D geometry, spectral imaging, gaze tracking and haemodynamic activity—AI models perceptual hierarchies and aesthetic preferences, testing whether certain visual features consistently elicit attention or affective engagement across cultures. This integrative approach moves beyond static description toward evidence-based understanding of artefacts as perceptual and cognitive agents in human history.

AI-Based Inference and Hypothetical Spatial Modelling of Historic Floor-Plan Structures

Shiva Talaei Koochehbagh and Mahnoush Pourhosseini Akbarie, Italy

Founded in 1204, Landshut preserves one of Bavaria's most coherent mediaeval urban cores, where centuries of architectural evolution remain legible in the spatial and functional structures of historic buildings. Despite restoration surveys and cadastral archives, systematic, data-driven methods for analysing typological patterns across mixed-use heritage architecture are limited. This study addresses that gap with a pilot corpus of forty documented buildings to infer typological grammars and spatial rules underlying the historic fabric.

The dataset integrates three primary sources: detailed architectural descriptions from Stadt Landshut (Liedke, 1988); the 1810 georeferenced cadastral map compared with current building footprints; and the open-source LOD2 3D city model. The first source provides comprehensive information on architectural evolution, structural features, roof types, decorative systems, number of floors and functional categories (e.g. Wohnhaus, Gasthof, Patrizierhaus, Palais), as well as spatial components—Fletz, Durchfahrt and Innenhof—that distinguish recurring archetypes.

Attributes were systematically incorporated into a QGIS database, forming the semantic and morphological foundation of the analysis. The 1810 cadastral map enabled diachronic comparison of historical and current footprints, revealing persistent traits and later alterations. Spatial overlays identified additions that were evaluated either as meaningful typological evolution or as distortions obscuring the original grammar. The LOD2 model supplied vertical parameters, integrated in QGIS to analyse relationships between plan depth, building height and volumetric articulation.

All spatial boundaries were digitised as vector polygons for consistency between plan metrics and 3D references. Each building was decomposed into spatial units (rooms, corridors, courtyards, stair volumes), classified by type and connected via adjacency relations, then translated into a spatial-graph model encoding geometric and topological attributes (area, connectivity, vertical hierarchy). A supervised-AI framework inferred typological similarities, classified undocumented structures and reconstructed hypothetical organisations from partial data. The forty annotated cases serve as a training corpus, keeping inference grounded in architectural logic rather than purely statistical abstraction.

Preliminary results reveal distinct typological clusters dominated by elongated, courtyard-connected types, where front blocks lead to rear blocks via internal courtyards or connecting wings—defining a continuum from public to private zones.

Beyond analysis, this approach lays a foundation for hybrid generative development. Graph-based models that capture spatial reasoning can be coupled with visual representations, allowing AI systems to progress from abstract inference to plausible generative reconstructions. This trajectory bridges data interpretation and image-based modelling and opens future integration with façade analysis, where plan-derived typologies can condition façade grammars. The study demonstrates how interpretable AI can reveal, classify and re-imagine the evolving logics of historic architecture across functionally diverse urban heritage.

Keynote 2: Can Machines Dream About Art? Refik Anadol on Art and Technology

Refik Anadol

Since 2016, Refik Anadol Studio has been conducting interdisciplinary research on the relation between the human mind, aesthetics, machine learning technologies, and architecture. Coining the terms “AI Data Painting,” “AI Data Sculpture,” and “latent city,” Anadol has been reflecting on new multi-sensory forms of narrating collective memory in physical and virtual spaces and inviting his audience to imagine alternative, AI-imagined realities. In this talk, Anadol will share the research and production journeys of his Los Angeles-based Studio’s internationally renowned artworks, which collectively offer a dramatic rethinking of our many environments. The artist will also shed light on his most recent interdisciplinary collaborations with cultural institutions and communities around the world to build a bridge between beautiful data and meaningful aesthetics.

Session 2a

AI, Accessibility and Community Engagement for Inclusive Heritage Conservation

This session examines how artificial intelligence is reshaping the documentation, analysis, and exploration of cultural heritage. AI enables the reconstruction of intangible patterns, the modeling of historic floor plans, and the detection of archaeological sites, while also powering interactive access to knowledge repositories and archival collections. Across these applications, computational tools reveal hidden patterns, classify complex datasets, and generate predictive or immersive representations that support conservation, research, and public engagement.

Yet these possibilities raise critical questions. How can AI mediate cultural information without stripping it of context, meaning, or local significance? Which narratives are prioritized or marginalized when algorithms interpret heritage data? And how can AI systems be designed to ensure inclusivity, ethical stewardship, and the integration of diverse knowledge systems?

By combining technical innovation with reflective practice, this session highlights AI as both an analytical and interpretive partner. Participants will explore how data-driven insights, spatial modeling, and intelligent interfaces can advance heritage management, while emphasizing the importance of transparency, human oversight, and culturally informed deployment. Ultimately, AI emerges not only as a tool for efficiency but as a catalyst for rethinking how we understand, preserve, and experience the past.

Reclaiming Voice: Using AI to Restore Place Names and Cultural Contexts in Persian Botanical Archives

Shabnam Balouch, United Kingdom

Although Iran was never colonised, archival records created by British botanists and researchers during their travels across Persia bear the imprint of a distinctly colonial worldview. Materials housed at institutions such as the Royal Botanic Gardens, Kew—including diaries, specimen labels, field notebooks and expedition correspondence—often misrepresent or distort Persian place names, cultural references and local terminology. These distortions are not merely linguistic; they reflect broader patterns of extraction, simplification and erasure that marginalise local voices in the construction of scientific and cultural knowledge.

This presentation introduces a research-led heritage project that seeks to correct and recontextualise these archival misrepresentations through community-led voice documentation and the use of AI-enabled phonetic analysis. The project's first phase involves identifying archival materials requiring correction—particularly those containing anglicised or inaccurate place names and cultural terms. Early findings have already uncovered numerous inconsistencies in the recording and categorisation of Persian cities, regions and cultural markers by early twentieth-century British collectors.

The second phase gathers voice recordings from native Persian speakers across Iran to capture authentic pronunciation and locally rooted knowledge, with attention to dialect, accent and cultural nuance. These recordings will form a growing oral archive, serving both as a research resource and as training data for future AI-driven phonetic comparison tools. The goal is not only to enhance metadata accuracy in digital catalogues but also to

centre community voice—literally and metaphorically—in how Persian cultural landscapes are described and interpreted.

The presentation will reflect on the practical, ethical and collaborative dimensions of integrating AI tools into heritage-correction work, including issues of consent, data ownership and the avoidance of extractive practices in digital systems. Reclaiming Voice ultimately positions archives as living documents that can—and should—evolve through collaboration, care and the reintroduction of the voices they once excluded.

Harnessing Artificial Intelligence to Document Oral Traditions and Indigenous Knowledge in Central Africa

Geneviève Sandrine Avoa Mebenga Belinga, Cameroon

Central Africa is home to a rich tapestry of oral traditions, indigenous knowledge systems and linguistic diversity—much of which remains undocumented and at risk of disappearance. From ancestral proverbs and folk songs to ritual practices and ecological wisdom, these intangible cultural assets are vital to local identity and resilience. This paper explores how artificial intelligence (AI)—particularly automated transcription, natural language processing (NLP) and machine learning—can be leveraged to document, preserve and valorise these traditions in culturally sensitive, community-driven ways.

Recent initiatives such as the African Languages Lab demonstrate AI's potential to empower low-resource languages through digitisation and NLP tools, despite challenges such as data scarcity, lack of standardised orthographies and limited digital infrastructure. In Central Africa, where oral transmission predominates, AI-powered transcription offers transformative opportunities to capture and analyse spoken narratives, chants and ceremonial expressions. Platforms such as Translation.africa have begun to bridge these gaps by providing culturally attuned transcription services that respect linguistic nuance and promote accessibility.

This paper proposes a framework for deploying AI technologies in collaboration with local communities, emphasising knowledge sovereignty, ethical data collection and inclusive design. Drawing on the principles of the Abundant Intelligences research programme, it advocates for AI systems that centre Indigenous priorities and challenge conventional paradigms of computational practice. Case studies from Cameroon, Gabon and the Central African Republic illustrate how AI can support the creation of digital archives, multilingual translation and interactive storytelling rooted in local epistemologies.

By integrating AI into heritage preservation, we not only safeguard endangered cultural expressions but also strengthen intergenerational transmission and global recognition of Central African voices. The paper concludes with recommendations for policy, education and technology development aligned with UNESCO's goals for intangible cultural heritage and digital inclusion.

Digitising Culture: How AI and VR Are Preserving Uganda's Heritage

Eugene Tukei, Uganda

This presentation demonstrates how immersive technology is transforming heritage preservation into a powerful tool for education, tourism and cultural identity. Artificial intelligence (AI) is used not only to recreate spaces but to revitalise the stories, myths and historical events that define Uganda's cultural identity.

Through AI-driven storytelling and virtual simulation, events such as coronation ceremonies, initiation rites and legendary encounters—passed down orally through generations—can be reconstructed, allowing users to experience these moments as if they were present. This approach does more than preserve culture: it reanimates imagination, providing vivid, immersive understandings of how stories unfolded, what they meant and why they endure. By blending oral narratives with visual, spatial and interactive technologies, the project makes culture both memorable and meaningful to younger generations and global audiences.

The presentation showcases how:

- Virtual tours preserve endangered cultural sites and rituals by recreating them in accurate, story-driven virtual environments before they disappear due to modernisation or climate change.
- AI helps document oral traditions and languages, turning them into guided experiences within virtual spaces, making forgotten knowledge accessible and engaging.
- Community participation ensures that heritage is represented authentically and responsibly through co-creation processes.
- Immersive experiences open new opportunities for schools, museums, cultural centres and tourism operators, generating economic value while fostering pride and identity.

Virtual heritage is not only a preservation method but a bridge between generations, cultures and technologies—a way to future-proof heritage while building resilience, inclusion and sustainable economic potential.

Weaving African Women's Heritage Through AI Artistry

Portia Uwera, Republic of Uganda

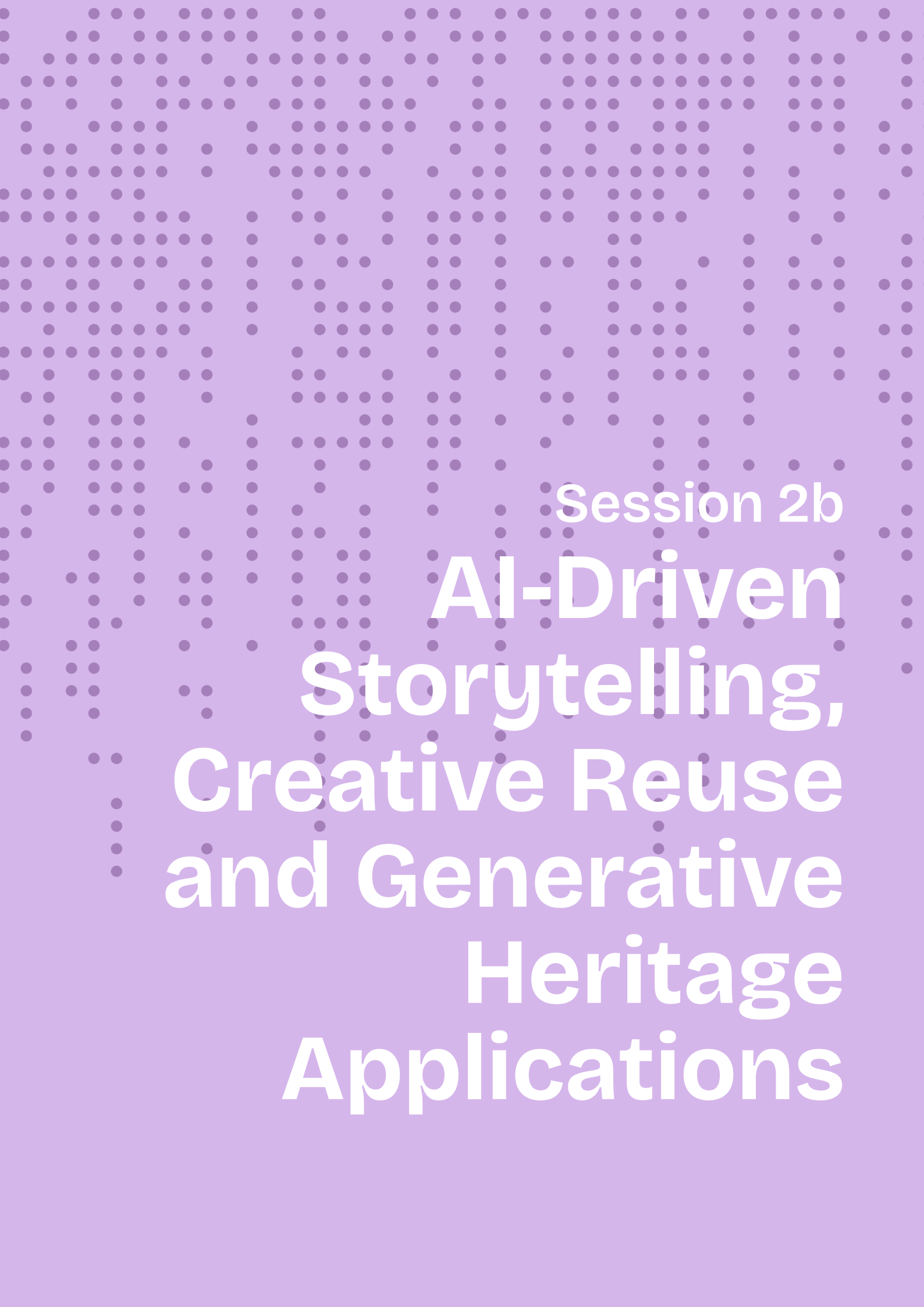
This presentation explores how artificial intelligence (AI) can preserve, amplify and reimagine women's heritage in Africa through digital artistry and film. It highlights the creative potential of AI to reconstruct lost histories, generate visual storytelling and democratise access to cultural archives.

Feminist storytellers, artists and historians in Kampala and across East Africa are increasingly using AI to revitalise underrepresented narratives. The technology transforms oral histories, archival fragments and collective memories into immersive visual experiences.

Key applications include:

- Reconstructing lost histories: using AI to analyse fragmented records and linguistic patterns to reassemble silenced narratives and visually represent historical figures and events.
- Generating visual storytelling: employing AI to create virtual art, animation and film from textual or audio descriptions, making oral traditions and testimonies vivid and impactful.
- Democratising cultural archives: leveraging AI to digitise and organise large collections, enabling virtual exhibitions and interactive engagement.

The presentation also critically reflects on the ethical and decolonial dimensions of AI in creative heritage work—addressing bias, authenticity and ownership while exploring how AI can augment human creativity, challenge dominant historical perspectives and centre the voices and experiences of African women.

The background is a solid purple color with a pattern of small, white, semi-transparent dots scattered across it, creating a textured, digital effect.

Session 2b

AI-Driven Storytelling, Creative Reuse and Generative Heritage Applications

This session examines the creative and interpretive potential of artificial intelligence in heritage practice, highlighting how AI can support storytelling, collections care, and the reimagining of cultural knowledge. Presentations explore applications ranging from museum exhibitions and youth-led heritage projects to immersive cross-cultural experiences and generative AI interventions, emphasizing both technological innovation and human-centered co-creation. AI emerges as a tool not only for preservation but also for reactivation—allowing heritage to “speak” through narrative, visual, and interactive forms while engaging diverse audiences in meaningful ways.

The session critically addresses the ethical, social, and cultural implications of AI in heritage. Key questions include: How can AI-mediated storytelling amplify underrepresented voices without appropriating or oversimplifying cultural narratives? What responsibilities do museums and digital platforms have when using publicly available content to train generative models? How do we balance technological possibilities with respect for local knowledge, community participation, and historical context? Furthermore, the session explores the tensions between accessibility and ownership, as digital heritage becomes simultaneously more open, more personalized, and more subject to market and algorithmic forces.

Through case studies from Nigeria, Jordan, China, and the UK, this session demonstrates the breadth of AI applications: predictive conservation for vulnerable collections, transcription and visualization of oral traditions, immersive cross-cultural narrative experiences, and critical reflection on AI training datasets and the digital commons. Collectively, these contributions underscore that AI can enhance heritage engagement not merely as a technical tool, but as a co-author in creative, participatory, and socially responsive heritage practices—offering both new methods for research and innovative pathways for audiences to connect with culture.

Integrating AI into Museum Work: Collections Care and Storytelling at the Olusegun Obasanjo Presidential Library

Peter Jegede, Nigeria

At the Olusegun Obasanjo Presidential Library (OOPL), daily museum practice extends beyond object display—it represents a living dialogue between collections, communities and the environment. This proposal builds on ongoing curatorial efforts at OOPL to integrate artificial intelligence (AI) meaningfully into two core areas of museum work: collections care and community-centred storytelling.

OOPL's exhibitions include the permanent Presidential exhibition, which narrates the life of President Olusegun Obasanjo—from childhood through the presidency and into his role as a continental and intercontinental statesman—interpreted through objects, documents and multimedia displays. Alongside this are rotating exhibitions such as Legacy of Leadership: Obasanjo's Enduring Impact Across Realms, Immateriality of Materials and The Aso Oke Exhibition, featuring materials such as wood, textiles, paper, metal and leather. These materials are highly vulnerable to fluctuations in temperature, humidity and light. As part of our evolving practice, we propose adopting an affordable AI-assisted tool such as Muse-Climate—a compact environmental sensor that continuously tracks microclimate conditions and offers predictive insights to support preventive conservation. This system will strengthen existing protocols with real-time data, improving daily protection of collections.

In parallel, the storytelling strategy draws from the lived experiences and memories of the Nigerian public. Within the permanent Presidential exhibition, OOPL has piloted a community-centred digital storytelling feature that integrates oral history, visitor interaction and local narratives—dismantling the traditional boundary between audience and exhibition. The next phase refines this platform through AI-powered indexing and transcription tools, enabling multilingual storytelling and the near-real-time inclusion of spontaneous visitor contributions into the exhibition narrative.

This initiative reflects OOPL's active practice rather than theory. The proposed residency will provide time and support to refine and expand these working models, deepening the relationship between people, collections and climate in a digital era. Most importantly, it positions African museums not merely as custodians of the past but as responsive, technologically adept spaces that listen, adapt and lead.

Preserving Bedouin Oral Heritage in Petra through AI and Storytelling

Alia AlQawasmeh, Jordan

QISSA – A Living Legacy is a youth-led initiative founded in Petra, Jordan, to document and preserve Bedouin intangible heritage through intergenerational dialogue and storytelling. The project arose in response to growing threats to cultural heritage, including climate change, modernisation and the erosion of oral traditions among younger generations.

QISSA's core mission is to revitalise oral heritage—stories, traditions, folk games and herbal knowledge—by empowering local voices and ensuring their relevance in contemporary society. What distinguishes QISSA is its use of accessible digital tools and artificial intelligence (AI) to support heritage preservation.

QISSA employs voice-to-text transcription and natural language processing (NLP) to document and organise oral interviews. Recurring themes are tagged, and metadata systems are developed to map and analyse the content. The resulting materials are transformed into engaging formats such as podcasts, short animations and interactive heritage maps, reaching broader audiences—especially youth.

This approach blends cultural sensitivity with technological innovation. As a grassroots initiative rooted in a UNESCO World Heritage site, QISSA demonstrates how marginalised communities can use contemporary tools to safeguard their intangible cultural heritage.

This presentation explores how local initiatives like QISSA can use AI in human-centred, culturally respectful ways to protect endangered knowledge systems. Drawing on fieldwork in Petra, it examines both opportunities and challenges in applying AI to rural, oral contexts, showing how youth-led movements can help shape the future of heritage preservation.

From Disconnection to Reconnection: Cross-Cultural Communication in Cultural Heritage Studies through AI-Based Digital Storytelling

Suwen Wang, China

This research explores the transformative potential of AI-driven digital storytelling as a cross-cultural communication practice that reconnects displaced cultural heritage artefacts with their original historical, emotional and geographical contexts. Situated at the intersection of digital humanities, immersive media and intercultural narrative design, the study investigates how AI-based storytelling systems can mediate cultural differences and foster mutual understanding between diverse audiences and the heritage of distant or marginalised communities.

Using a practice-based methodology that combines ethnographic fieldwork, immersive design and computational creativity, the research develops a multisensory narrative framework that translates culturally specific meanings into emotionally resonant experiences. Employing augmented reality (AR), 3D scanning, and AI-generated text, sound and imagery, the study reanimates artefacts as narrative agents capable of “speaking” across cultures through first-person poetic monologues, synthetic voices and dynamic visual storytelling.

Crucially, the work addresses what is termed the heritage empathy gap—the emotional and contextual disconnection that often occurs when artefacts are displaced from their cultural origins and exhibited in unfamiliar contexts. By analysing how audiences interpret and emotionally engage with these reanimated objects, the study investigates how AI can be ethically integrated not merely as a tool of preservation but as a co-author in intercultural storytelling—bridging linguistic, historical and sensory divides.

Theoretically, the research proposes a new framework for cross-cultural digital restitution that centres empathy, narrative reciprocity and shared authorship. Practically, it offers scalable design strategies for museums and heritage institutions seeking inclusive, emotionally engaging experiences for globally diverse audiences. Ultimately, it calls for a shift from static, often Eurocentric preservation models toward participatory, affect-driven and culturally dialogic storytelling systems.

From Open Access to AI Assets: How AI Training Data Challenges Heritage Collections and the Democratic Promise of Cultural Access

Sami Itavuori, United Kingdom

The rise of consumer-oriented text-to-image AI generators such as Midjourney and Stable Diffusion has transformed visual culture in ways comparable to the disruption caused by online piracy in the 1990s. While these technologies were initially heralded as tools for democratising creativity, they have also complicated notions of cultural value and authority as AI systems scrape and operationalise publicly available heritage data.

Drawing on research conducted at Tate, this presentation examines how images from Tate's online collection appear within Stable Diffusion's training dataset. It compares Tate's institutional conception of digitised heritage value with the emergent practices of neural-media systems, which challenge notions of openness and access underpinning museum digital strategies. While text-to-image generators ostensibly promote public creativity, their design and market incentives reinforce narrow aesthetic preferences and platform-driven notions of taste.

The large-scale capture and re-use of images from national collections raises questions not only of copyright but of cultural value and institutional responsibility. As with the earlier proliferation of online file-sharing, control over digital images has largely vanished. Beyond legal measures, museums must reconsider the ethical and economic values guiding their online dissemination of cultural content in environments dominated by commercial algorithms and attention economies.

This presentation contributes to current debates on transparency, authorship and the political economy of generative AI models. It argues that cultural institutions must reposition themselves—not as passive providers of training data—but as critical agents shaping discourse on the social purpose, accountability and public stewardship of technology in the age of machine creativity.

Panel Discussion

AI, Heritage and Us: Co-Creating Digital Futures

Moderators:

Selin Nugent, Oxford Brookes University

Tatenda Tavingeyi, An AI of Our Own (AAOO)

Speakers:

Mutanu Kyanya, African Digital Heritage

Kristen Hopper, EAMENA, Durham University

Who determines how cultural heritage is represented in the age of artificial intelligence (AI), and whose voices are included? As algorithms increasingly shape the stories we tell about the past, urgent questions arise concerning bias, data justice and the role of communities in designing digital tools.

This panel begins with a theoretical framing of data and heritage justice and the risks of extractivism and misrepresentation inherent in AI. It then transitions to practical case studies from diverse regions. The initiative “An AI of Our Own” (AAOO), with pilot projects in South Africa and Cambodia, demonstrates how community-led approaches to data governance and sovereignty can challenge Global North-centric models and reimagine heritage practice. Complementary examples from archaeological heritage projects illustrate how community-driven design and educational initiatives that build digital-risk awareness and computer-science skills can foster sustainable, responsible local practice in contexts historically shaped by extractive and colonial research traditions.

By weaving together theory and practice, and drawing on experiences across multiple regions and communities, the panel invites dialogue on how AI can both endanger and

enrich cultural heritage. Collectively, the discussion considers how to co-create tools and frameworks that reflect diverse perspectives and promote more just, equitable and collaborative futures for cultural heritage.

Preparing to Advance AI in Archaeological Heritage: Do We Need Ethical Guardrails for Archaeological Computing?

Dr. Selin Nugent, Oxford Brookes University

Artificial intelligence is not a neutral tool in archaeology—it embodies embedded values, biases and political implications. Yet ethical reflection on its use in heritage contexts remains underdeveloped, despite archaeology's long history of extractive practices. This presentation examines the risks arising from biased training data, consent, privacy and surveillance, and explores how global technologies intersect with local communities in sensitive heritage contexts. Drawing on digital ethics and algorithmic justice, the paper argues for participatory design as a means to decentralise control, support local agency and counter Western-centric assumptions, while embedding responsibility and reflexivity into archaeological computing.

Community-Led AI in the Global South Context: A Digital Mirage or a Practical Possibility?

Tatenda Tavingeyi, An AI of Our Own (AAOO)

Guided by its manifesto, An AI of Our Own (AAOO) challenges extractivist research patterns and structural biases in the representation of Global South narratives by centring communities in the creation of AI models. Mainstream AI systems are often digital mirages, constructed upon historically biased datasets that jeopardise efforts to preserve and promote cultural heritage in its authentic and original forms. Instead, they tend to generate homogenised, algorithmic reflections of dominant Western perspectives.

Examples include large language models and image generators predominantly trained on English-language datasets, resulting in the omission of crucial cultural contexts and linguistic nuances. This presentation explores whether genuinely community-led AI in the Global South is possible—and how inclusive, context-aware approaches can move AI from abstraction to empowerment.



Day 3 – 21 November 20

AI-Enabled Creative Access and Use of Heritage

Session 1a

AI-Driven Storytelling, Creative Reuse and Generative Heritage Applications

This session explores the transformative potential of artificial intelligence in reactivating, interpreting, and creatively reusing cultural heritage. The presentations highlight how AI can mediate between archival recovery, urban and industrial landscapes, and underrepresented voices, enabling both technical innovation and ethical, community-centered engagement. Through generative models, machine learning, and advanced simulation, AI supports the reconstruction of memory, the revitalization of abandoned or marginalized spaces, and the reinterpretation of sonic and visual archives, offering new ways to engage with heritage as a living, dynamic system.

Key themes include the ethical and political dimensions of AI in heritage work: how can AI amplify voices historically excluded from archives, such as those of Black communities or post-industrial populations, without reproducing extractive or biased practices? How can AI-driven simulations and generative tools reconcile heritage preservation with urban transformation and community participation? And how do we ensure that technological interventions respect cultural specificity, memory sovereignty, and the interpretive complexity of lived experiences?

The session showcases a diversity of approaches: digitization and retrieval of personal audio archives to preserve nuanced histories and sonic experiences; AI-assisted regenerative reuse of abandoned industrial heritage; the modeling of transitional urban spaces with agent-based simulations and GIS; and the ethical management of “Black data” to reconstruct fragmented cultural narratives. Together, these contributions demonstrate that AI is not merely a technical instrument, but a medium through which heritage can be critically reimaged, interactively explored, and socially engaged—balancing innovation, historical sensitivity, and ethical responsibility.

Hearing Double: AI-Enhanced Retrieval of Personal Audio Archives and the Reshaping of Cultural Narratives

David Dunkley Gyimah & José Velázquez, United Kingdom

This paper examines historically significant personal sound archives by exploring their phenomenological meaning, symbolic interpretation and influence on listeners’ perception of the world through 1990s sound recordings, as well as their contemporary impact. To reclaim and render the archive accessible, the project deployed advanced technical procedures using artificial intelligence (AI), notably Retrieval-Augmented Generation (RAG), which the team anticipates will have substantial implications for audio producers beyond this specific case.

Before his academic career, Reader Dr David Dunkley Gyimah was a freelance BBC radio presenter and producer for London’s only talk show for Black Londoners in the early 1990s. Although recordings from BBC GLR’s programme were discarded, duplicates surfaced three decades later in Dr Gyimah’s garage. Submitted to FIAT/IFTA’s Save Our Archives, the tapes were selected as globally important. They include rare interviews—such as Fela Kuti, the father of Afrobeat, critiquing the genre—and Lord Herman Ouseley on becoming the first Black head of Britain’s Commission for Racial Equality, alongside coverage of Nelson Mandela’s 70th Birthday Tribute concert at Wembley Stadium.

The show was the first presented by second-generation Britons whose beliefs and attitudes diverged from their parents'. While radio decoding is often considered imperceptible, the programme's production methods interrogated this assumption. Made for a specific audience (Black listeners) yet appealing to a wider public, it intentionally employed W. E. B. Du Bois's "double consciousness", balancing self-perception with how non-Black audiences might perceive it.

Public access hinged on José Velázquez's technical approach: advanced digitisation for legacy media and a bespoke Media Asset Management (MAM) system incorporating RAG. RAG enables specific, nuanced engagement with the tapes by transforming user queries into targeted retrieval across the corpus—an approach with wide applicability to audio media (e.g. podcasts).

Further access is envisaged through modular exhibition design, blending art and technology via time-based media installations using single-board computers (SBCs) and custom APIs for dynamic content delivery and secure playback. The project foregrounds sound's role in research—revealing histories, shaping identity and contributing to interdisciplinary methodologies through its sonic dimensions.

From Mining Memory to Digital Ethics: Applying AI to the Regenerative Reuse of Trozza's Industrial Heritage

Héla Oueslati, Tunisia

Jebel Trozza, a once-thriving mining village in central Tunisia, is now abandoned—yet its layered heritage persists: colonial-era industrial infrastructures, intangible memories of a mining community and an ecologically strategic site within Djebel Serj National Park. This Ignite Talk presents a decolonial, community-centred, ethically driven project that leverages artificial intelligence (AI) to reactivate, reinterpret and regenerate this complex heritage.

The case is not a mere digitisation effort; it proposes a regenerative design methodology treating heritage as a living system intertwined with memory, identity and ecological futures. It aims to pilot an eco-heritage neighbourhood through three interlinked trajectories:

1. **Technological.** AI for conservation: computer vision and machine learning to map degradation, generate adaptive-reuse scenarios and produce interactive digital twins for participatory design—using context-specific tools informed by vernacular materials, local climate logics and rituals of care.
2. **Narrative.** AI for memory reconstruction: generative models, oral-history mining and participatory storytelling platforms to recover fragmented narratives from former miners' families, archival photographs and local myths—building a polyphonic, decentralised memory infrastructure.
3. **Ethical.** Governance of heritage data: who owns the digital memory of a place, and how can extractivism be prevented? Drawing on African digital-ethics and data-sovereignty frameworks, the project proposes a governance model rooted in transparency, reciprocity and co-design.

Trozza thus becomes a model for rethinking AI, heritage and justice in African contexts, moving beyond technosolutionism toward care-based, situated innovation. By embedding critical AI within a post-industrial landscape, the project seeks non-extractive futures for neglected heritage sites and explores design and technology as agents of reconciliation—mediating between colonial memory, territorial healing and planetary repair.

From Margins to Meaning: Using ABM, GIS and AI to Reimagine Transitional Urban Spaces

Marjan Alikhanzadeh, Cyprus

Urban growth and densification have led to the neglect of liminal spaces—alleys, sidewalks and narrow corridors that mediate between larger urban structures. Despite their everyday social functions, these transitional areas are often treated as residual zones, resulting in underuse and physical decline. This study investigates how digital simulation and artificial intelligence (AI) can help understand and reactivate such spaces as living cultural infrastructures.

The research combines Agent-Based Modelling (ABM) in NetLogo with Geographic Information Systems (GIS) to examine how people move through and inhabit transitional environments. ABM captures individual and collective behaviours under changing conditions (density, accessibility, cultural use), while GIS situates simulations in real spatial contexts, integrating data on morphology and socio-economic factors. The Sichan Takiyeh in Isfahan, a historic gathering space merging sacred and communal functions, serves as a reference to demonstrate how traditional precedents can inform renewal of neglected thresholds.

Beyond simulation, generative AI can propose adaptive design options, enabling researchers, communities and planners to visualise futures that are heritage-grounded yet responsive to contemporary needs. Together, ABM, GIS and AI create participatory platforms that support heritage-sensitive decision-making.

The approach offers opportunities—and cautions. AI-powered simulations can make liminal spaces safer, more welcoming and culturally meaningful, but raise ethical questions about data bias, cultural specificity and control over digital heritage. AI must therefore support—not supplant—local knowledge and community voices. Early findings suggest that AI-enhanced simulations can revitalise liminal spaces as flexible areas that respect tradition while adapting to new demands, with historic precedents like the Takiyeh providing inspiration for resilient urban design.

Archives, Algorithms and Afterlives: AI, Black Data and the Future of Cultural Heritage

Angela Tate, United States

Artificial intelligence (AI) is reshaping how cultural heritage is preserved, interpreted and experienced, while raising fundamental questions: who benefits; whose stories are recovered or erased; and how AI can support ethical stewardship of histories long fragmented or suppressed. This presentation addresses these issues through curatorial practice and ongoing work with collections, archives and digital humanities.

Drawing on scholarship in African American and African Diaspora history, the paper examines the ethical stakes of “Black data”—traces of Black lives recorded in archives and heritage sites, often fragmentary or distorted. Engaged critically and imaginatively, these fragments can be illuminated through AI that links dispersed records, reconstructs lost contexts and enables histories long denied. In this sense, AI functions not merely as an efficiency tool but as an instrument of justice.

At the author’s institution, AI is being explored for cataloguing, collections research and interpretation amidst challenges—gaps in metadata, underfunded infrastructure and contested ownership of community-derived data. Nevertheless, natural language processing, computer vision and knowledge graphs can connect objects across institutions, reconstruct cultural networks and enable new forms of public storytelling. Experience with TEI and digital-humanities frameworks informs an approach that recognises technologies as encoded with representational decisions; AI continues this tradition and demands deeper ethical reflection.

The presentation develops three themes: (1) Opportunities—expanding access, reconstructing fragmented histories and amplifying community voices; (2) Ethical challenges—risk of reproducing structural inequalities, extracting cultural data without consent and erasing context through pattern recognition; and (3) Futures—envisioning heritage sites where visitors encounter dynamic, AI-driven narratives connecting local and global histories with accountability to the communities concerned.

The argument positions heritage professionals as critical interlocutors shaping AI’s application. To steward Black data and other marginalised archives responsibly, the field must interrogate algorithms, resist technosolutionism and adopt frameworks rooted in care, justice and cultural specificity. AI cannot fully restore what was lost, but it can help imagine futures for fragments—where the dignity of the past meets the innovation of the present.



Session 1b

AI, Accessibility and Community Engagement for Inclusive Heritage Conservation

This session examines how artificial intelligence can be mobilized to make heritage more accessible, inclusive, and ethically grounded, with particular attention to community engagement, decolonial practice, and responsible data management. Presentations explore how AI tools—ranging from generative models to metadata-driven systems—intersect with social, cultural, and legal dimensions of heritage work, revealing both opportunities and challenges in preserving, interpreting, and sharing knowledge.

Central themes include questions of equity, representation, and cultural sovereignty. Papers interrogate how AI can inadvertently reproduce colonial or Eurocentric biases, marginalize indigenous knowledge systems, or obscure contested narratives if integrated uncritically into museum, archival, or conservation contexts. They also explore strategies to counteract these risks through participatory metadata creation, community-centered co-curation, and ethical frameworks that respect local epistemologies and intellectual property rights.

The session showcases a spectrum of approaches: applying AI to digitization and restoration of paper-based heritage; integrating algorithmic tools in museum storytelling while foregrounding cultural accountability; addressing “metadata debt” to ensure media generation reflects diverse voices; and theorizing decolonial AI practices that prioritize epistemic plurality and community custodianship. Together, these contributions highlight that AI is not only a technical instrument but also a cultural actor, whose design, deployment, and governance carry profound ethical and social implications. The session emphasizes that inclusive AI in heritage requires human-centered strategies that amplify underrepresented voices, ensure accessibility, and cultivate trust between technology, communities, and cultural memory.

Decolonising Heritage Artificial Intelligence (AI): Whose Intelligence Counts?

Munyika Sibanda, Zimbabwe

As artificial intelligence (AI) becomes increasingly embedded in heritage practices—from digitisation and metadata creation to curatorial decision-making and storytelling—urgent questions arise regarding whose histories are being preserved, interpreted and prioritised. In African contexts such as Zimbabwe, where tangible and intangible heritage has been shaped by colonial extraction and epistemic violence, the integration of AI into cultural heritage work risks reinforcing historical power imbalances rather than dismantling them.

This paper critically examines how AI systems—trained primarily on Eurocentric datasets and guided by Global North technocultural norms—can reproduce colonial biases in the classification, representation and valuation of African heritage. Drawing on examples from digital archives, museum AI tools and cultural-heritage chatbots, the study demonstrates how language models and algorithms may marginalise indigenous knowledge systems, flatten cultural complexity and obscure contested narratives, particularly those surrounding liberation histories, oral traditions and vernacular epistemologies.

Grounded in decolonial theory, postcolonial digital humanities and African-centred knowledge frameworks, the paper interrogates what it means to decolonise AI in heritage settings—not simply by diversifying datasets or localising interfaces, but by rethinking whose intelligence is coded, valued and preserved. It proposes a conceptual framework for decolonial heritage AI rooted in four principles:

1. **Epistemic plurality** – recognising multiple ways of knowing;
2. **Community custodianship** – ensuring shared authority and participation;
3. **Algorithmic transparency** – revealing processes of selection and bias;
4. **Contextual metadata ethics** – embedding cultural specificity in data description.

Illustrated through participatory metadata creation, co-curation of AI storytelling tools and the incorporation of African languages and indigenous ontologies in training cultural AI models, the paper argues that the future of AI in cultural heritage must move beyond technical efficiency or digital access towards an inclusive, justice-oriented model. Without such reimagining, efforts to “preserve” African heritage risk re-encoding the very systems of erasure they seek to challenge.

Current Situation and New Opportunities: An Analysis of the Application of Artificial Intelligence in the Preservation and Restoration of Paper-Based Cultural Heritage

Mengling Cai, China

Since the early 2020s, the application of modern technology to traditional cultural development has received extensive attention and policy support in China. National guidelines have provided new impetus for the revitalisation of traditional culture and the high-quality growth of the cultural digitisation industry. Within this context, this paper presents a comprehensive review of AI applications in the preservation of paper-based cultural heritage, including material composition testing, ageing analysis, damage detection, environmental monitoring and restoration practices.

Prominent examples include the use of Generative AI (AIGC) in digitally restoring the Dunhuang manuscripts; the project AI-Assisted Conservation of Calligraphies, Paintings and Archival Documents in Western Fujian; and the National Archives Administration’s Research on the Paper Gene Bank of Republican-Era Archives.

By analysing AI’s impact on conservation principles, methods and practices—particularly the challenges it poses to notions of authenticity, minimal intervention and human expertise—the paper discusses emerging tensions between empirical knowledge and algorithmic decision-making. It also considers dilemmas surrounding transparency and the shifting of responsibility from conservator to system.

To address these challenges, the paper proposes:

- establishing an ethical-assessment framework for restoration principles;
- developing human-machine collaborative models to balance expertise and automation; and
- constructing a four-tier governance system for practical standardisation in conservation work.

Together, these strategies offer pathways for AI-empowered conservation that uphold authenticity, accountability and cultural integrity, contributing to technological innovation and best practice in safeguarding paper-based heritage.

Collecting in Code: Rethinking Representation and Knowledge in Digital Museums

Khushi Kesari and Shivani Singh, India

The integration of artificial intelligence (AI) into museums is reshaping not only the technical modalities of digitisation but also the cultural, ethical and legal frameworks that underpin heritage governance. While AI-driven tools enable new forms of storytelling, interpretation and audience engagement, they also raise questions about authorship, ownership and accountability. This paper argues that AI in museums operates simultaneously at two levels: the creative—through narrative production and the reuse of heritage—and the juridical—through the regulation of cultural materials under law and policy.

AI-driven storytelling expands access to heritage by automating metadata, enabling multilingual search and generating immersive narratives. Projects employing generative AI to reconstruct lost or fragmented artefacts demonstrate the potential to reactivate collections and connect publics across borders. Yet these interventions also destabilise curatorial practice and challenge assumptions about authenticity, interpretation and authority. When AI reimagines a sacred object or community-owned story, it does not simply reproduce heritage—it transforms its meaning, often without adequate consent or contextual awareness.

This transformation cannot be separated from the law. Intellectual-property regimes—long criticised for failing to protect traditional knowledge—face new challenges when human creativity converges with algorithmic production. Questions of cultural sovereignty, indigenous rights and restitution are amplified by the opacity and scale of AI systems. As global AI infrastructures increasingly mediate access to heritage, they risk reinscribing colonial asymmetries by privileging universalised datasets over local cultural protocols.

Drawing on case studies from museum contexts, the paper explores how AI both facilitates inclusive engagement (e.g. multilingual access) and reproduces bias or decontextualisation. It concludes that the future of AI in museums requires a reimagined governance framework that integrates transparency, community participation and cultural rights. Storytelling through AI cannot be divorced from legal and ethical accountability. By viewing AI as a socio-technical system embedded in power relations, this contribution calls for models of governance that enable museums to remain custodians of shared memory while ensuring justice and equity in digital representation.

Making Data Speak: Addressing Metadata Debt for Ethical Media Generation

Ignacio Garnham, Denmark

Media-generation models are trained on datasets that exclude an estimated 90 per cent of the world's cultures, identities and aesthetics. This absence has produced stereotyped, biased and racist outputs—well documented across platforms. With generative AI projected to redefine online visual culture by 2027, the challenge of dataset diversity is acute. Yet large commercial developers—such as OpenAI, Google and Stability—are unlikely to invest the resources required for retraining. Instead, this paper argues for post-training interventions at the user scale.

Implementing such approaches faces several barriers: technical complexity, cost and the expertise required for data preprocessing, post-training and model maintenance. Beyond these lies a subtler challenge—motivating users to invest time and effort in making their voices heard within AI systems. While vast archives of digital media exist across cloud storage platforms, most lack the metadata and semantic structure necessary for AI to interpret content in the voice of its creators. This condition—termed metadata debt—poses one of the greatest obstacles to building AI systems that respect user intent.

Addressing metadata debt is not solely a technical task but a behavioural one. It requires designing systems that engage users in transforming raw media into structured, representative and ethically grounded datasets. Drawing on interviews with developers and users of media-generation models, this research shares early findings on:

- the feasibility of user-generated post-training datasets,
- the challenges of sustaining user participation in ethical data practices, and
- the potential of hybrid-intelligence frameworks to embed user intent directly into model design.

By reframing data creation as a participatory cultural process, this work calls for new methods to ensure that generative AI reflects the diversity, values and ethics of its users.

Keynote 1: Neck-Deep in Digital Oil? Public Broadcasting Archives as AI Training Dataset

Brecht Declercq, Head of Archives, RSI

Public broadcasting archives—digitised at significant public cost—have become highly sought-after datasets for AI training. The surge in demand, coupled with lawsuits and lucrative contracts, reveals a new dynamic that challenges the traditional role of public archives as shared cultural resources. Should these institutions grant access to technology firms, and if so, under what safeguards?

This keynote examines the strategic, legal and ethical implications of using broadcasting archives for AI development, focusing on financial incentives, copyright and data-protection constraints, reputational risk and the potential erosion of democratic values. Drawing on European and global case studies, it argues that archives must balance

openness with responsibility, ensuring that engagement with AI aligns with their long-term public missions rather than short-term commercial gain. Only through transparent governance and principled negotiation can public archives remain both accessible and accountable in the era of data commodification.

Panel Discussion

Resurrecting Memory: AI for Film, Photo and Sound Archives

Moderator:

Kara Van Malssen, Partner and Managing Director, AVP

Speakers:

Fabio Bedoya Huerta, Duplitech

Anna Yanenko, National Preserve “Kyiv-Pechersk Lavra”

This panel examines how artificial intelligence (AI) is creating new opportunities to transform the preservation, restoration, authentication and reuse of audiovisual and photographic archives. Panelists will present projects that employ AI to recover or enrich film, photographic and audio materials, including their associated metadata.

Through case studies from Uganda, Peru and Ukraine, the discussion explores both the potential and the limitations of AI technologies in protecting recorded heritage and in responsibly reactivating archival materials for new audiences. The session highlights practical examples of how machine learning and data-driven approaches can support historical research, conservation decision-making and creative reuse—while addressing ethical, technical and curatorial questions that accompany the integration of AI into archival practice.

Exploring Experimental Machine Learning in Film Restoration

Fabio Bedoya Huerta, Peru

This research demonstrates how custom machine-learning (ML) models can advance film restoration by recovering colour and spatial features even in the absence of direct references. Unlike traditional filter-based techniques or general-purpose video-generation models—which often introduce artefacts or lack temporal consistency—tailored ML models offer precision, control and adaptability for complex restoration challenges.

Innovative methods such as gauge, analogue and generation recovery enable restoration tasks previously considered impossible. By leveraging these targeted ML approaches, deteriorated films can be revived with enhanced fidelity and historical accuracy, ensuring the long-term preservation of cinematic heritage for future generations.

Attribution as a Challenge: Glass Negatives from the National Preserve “Kyiv-Pechersk Lavra” Collection

Anna Yanenko, Ukraine

The National Preserve “Kyiv-Pechersk Lavra” holds approximately 9,000 photographic negatives and glass plates, many dating from the late 19th to early 20th centuries. These images document church interiors, clergy, museum activities during the 1920s–30s and the evolution of the Lavra as a cultural preserve.

World War II and subsequent Soviet restructuring fragmented the collection, leaving many works misattributed or undocumented. Ongoing digitisation of the Negatives group now enables more accurate dating, attribution and contextual research. Digital tools—including AI-assisted image search and metadata enrichment—are increasingly used to support this process. Nevertheless, expert visual and historical analysis remains essential to fully unlock the collection’s historical and cultural value.

Resurrecting Memory: AI for Film, Photo, and Sound Archives

Jim Joel, Uganda

Page 4 (www.page-4.com) is an interdisciplinary archive initiative in Uganda that leverages AI to preserve and reinterpret East African cinema heritage (1930s–2000s). The project applies machine learning to analyze architectural features of cinema halls, restore fragile posters and photographs, and digitize archival materials at risk of loss. Natural language processing enhances oral history cataloguing, making narratives searchable and accessible. Combined with XR-based immersive storytelling, these AI-driven methods expand reach and impact while raising critical questions of ethics, ownership, and inclusivity. Page 4 demonstrates how emerging technologies can revitalize endangered cultural histories through innovative, community-driven practices.

The background is a solid purple color with a pattern of small, white, semi-transparent dots scattered across it. The dots are arranged in a somewhat regular grid but with some randomness, creating a textured effect.

Session 2

AI, Accessibility and Community Engagement for Inclusive Heritage Conservation

This session explores the intersection of artificial intelligence, community engagement, and inclusive heritage conservation, emphasizing both technological innovation and ethical responsibility. Presentations examine how AI can support the documentation, preservation, and revitalization of cultural heritage, from physical sites and archival collections to intangible practices such as performance and oral traditions. Central concerns include accessibility, data governance, and the active involvement of communities whose cultural assets are being preserved or represented.

Speakers address the opportunities offered by AI for protective monitoring, digital reconstruction, metadata enrichment, and large-scale annotation, while critically interrogating the risks of exclusion, bias, and cultural misrepresentation. Key issues include algorithmic marginalization of indigenous voices, the reinforcement of Western-centric or commercialized narratives, and the ethical challenges of ownership, consent, and transparency in AI-mediated heritage practices.

The session presents a diverse array of case studies: AI-supported contingency planning for World Heritage sites; ethical frameworks for documenting Southeast Asian puppetry; community-informed AI metadata pipelines in Flemish archives; and speculative governance models for urban heritage under digital and commercial pressures. Together, these contributions illustrate that AI is not a neutral tool but a cultural actor whose deployment requires careful stewardship, participatory governance, and alignment with principles of justice, inclusivity, and cultural integrity.

By situating AI within both technical and socio-cultural contexts, this session highlights the potential for digital technologies to enhance heritage conservation while foregrounding community voice, ethical accountability, and long-term sustainability.

Decolonising the Algorithm: The Imperative for Inclusive AI in Preserving African Heritage

Eric Takukam, Cameroon

In the digital age, artificial intelligence (AI) offers powerful pathways for the preservation and revitalisation of cultural heritage. Yet for many indigenous creators, these tools reflect and reinforce Western-centric worldviews, threatening the authenticity and integrity of non-Western cultures. This paper examines the critical shortcomings of current AI systems when applied to the diverse heritage of the African continent.

Drawing on practical experience from an artistic residency at the Akademie für Theater und Digitalität, the study identifies specific challenges:

- AI's inability to recognise indigenous dialects;
- its failure to accurately render authentic African cultural artefacts; and
- its tendency to conflate diverse African identities into monolithic, often Afro-American, representations.

These issues stem from deep-rooted biases in training data, resulting in Africa's cultural legacy being underrepresented and misinterpreted. This digital marginalisation risks perpetuating historical inequities into the technological future.

The paper calls for an urgent paradigm shift towards decolonised, inclusive AI. Indigenous communities must be active participants in dataset creation and algorithmic design. Only by embedding local voices in every stage of development can AI become a genuine tool for preservation—empowering indigenous artists to protect, reinterpret and champion their heritage without compromising its originality for future generations.

AI-Assisted Contingency Planning for Cultural Heritage under the EU AI Act: Legal and Ethical Dilemmas

Yasmina Esther Ramada Lahoz, Spain

Cultural heritage, as defined by UNESCO, represents both a legacy and a responsibility to future generations. Today, it faces increasing risks—from natural hazards and environmental change to human negligence and intentional destruction. Artificial intelligence (AI) is increasingly adopted as a tool for preventive conservation and contingency planning, capable of monitoring environmental conditions, modelling risks and proposing protective strategies. Yet, when applied to World Heritage properties, AI introduces complex legal and ethical dilemmas.

This paper analyses these challenges through the framework of the European Union’s Artificial Intelligence Act (AI Act, 2024) and the proposed AI Liability Directive, in relation to the preventive obligations of the 1972 UNESCO World Heritage Convention. Within the EU framework, contingency planning for cultural heritage is considered a “high-risk” AI application, requiring robust risk management, data governance, transparency and meaningful human oversight.

The paper examines the distribution of responsibilities among public authorities, cultural institutions and technology providers, arguing that AI must remain a support tool rather than a substitute for human judgement. At stake are not only issues of legal liability but also broader ethical concerns surrounding “algorithmic heritage”—the danger that what AI does not digitise or prioritise effectively becomes invisible.

By linking law, ethics and conservation practice, this contribution highlights both the opportunities and the limits of AI in safeguarding heritage. It calls on practitioners, policymakers and scholars to approach AI not as a shortcut, but as a carefully governed partner in the stewardship of cultural heritage.

From Strings to Signals: AI, Southeast Asian Puppetry and the Ethics of Digital Heritage

Alex Wen Jie Lew, Thailand

This presentation explores the convergence of artificial intelligence (AI) and traditional performing arts through the cases of Myanmar and Vietnamese marionette puppetry—two fragile art forms threatened by conflict, displacement and generational shifts. Drawing on the ongoing initiative Silent Actors, the research interrogates how AI can be used to document, simulate and disseminate endangered performance heritage without erasing the human and cultural context embedded within it.

The paper presents a pilot AI-supported archiving prototype that employs motion-capture and machine-learning tools to replicate marionette gestures and map their choreographic variations across regional forms. The project raises crucial ethical questions: *Who owns the digital puppet? What are the risks of detaching heritage from its cultural custodians when AI becomes the curator?*

Community-informed approaches to digitisation—centred on transparency, consent and collaboration—are proposed, integrating oral history, data ethics and performance studies. The research also reflects on how young heritage practitioners across ASEAN are responding to AI through grassroots digital-humanities projects, proposing a framework for AI Cultural Ethics grounded in indigenous knowledge, intergenerational dialogue and digital sovereignty.

By fusing traditional puppetry with algorithmic interpretation, the presentation invites critical discussion on how AI can act as a tool for co-creation rather than cultural extraction, ensuring that digital innovation remains accountable to the communities from which it emerges.

AI and Digital Cultural Heritage at meemoo – Flemish Institute for Archives: Ethics, Collaboration and Shared Data Governance

Bart Magnus, Belgium

How can artificial intelligence be applied at scale to annotate digital cultural heritage and improve findability, while remaining compliant with ethical and legal frameworks? As a service organisation supporting more than 180 partners in the cultural, media and government sectors in Flanders, meemoo addresses this challenge through a collaborative and cross-sectoral approach.

The GIVE project implemented AI metadata pipelines for speech-to-text, named entity recognition and facial recognition across audiovisual materials in meemoo's archive system. Content partners were invited to shape project directions and engage in ethical discussions—particularly around facial recognition. A shared reference set of usable face crops was created and maintained collectively.

The follow-up project, VNA, scales this approach to support digital registration processes and metadata creation. As an aggregation tool, VNA aims to uniquely identify people relevant to cultural heritage in and from Flanders across institutions and collections. It builds on minimal descriptive metadata derived from partners' authority data, links to external authorities such as Wikidata or VIAF and integrates a centrally maintained reference set of face crops.

By combining scalable AI solutions, ethical data governance and cross-sector collaboration, meemoo demonstrates a sustainable model for the responsible use of AI in cultural heritage preservation.

Algorithmic Authenticity: AI, Commercialisation and the Future of Urban Heritage Governance at Shanghai Xintiandi

Yun Tan, China

Shanghai Xintiandi is internationally recognised as a paradigm of heritage-led urban revitalisation, showcasing the adaptive reuse of historic Shikumen architecture within a commercially successful development model. Yet, behind its global acclaim lie persistent critiques of eroded authenticity, displacement of local communities and the imposition of elite-driven narratives. This paper examines how the rise of artificial intelligence (AI) may both amplify and challenge this dynamic, questioning whether AI will foster more inclusive engagement with heritage—or deepen processes of exclusion.

Without a critical governance framework, the integration of AI into heritage sites like Xintiandi—particularly through digital marketing, automated narrative generation and visitor analytics—risks reinforcing the logics of commercialisation and top-down control. Drawing on theories of platform capitalism and algorithmic governance, the paper introduces two concepts:

- Algorithmic authenticity – AI-generated narratives and aesthetics optimised for engagement rather than accuracy;
- Digital gentrification – AI-driven marketing that tailors heritage experiences for affluent audiences while digitally marginalising others.

Through a critical case study of Xintiandi, the research analyses its current digital footprint across platforms such as WeChat and Xiaohongshu and uses speculative analysis to explore the potential social and ethical implications of AI integration. It assesses, for instance, how natural language processing (NLP) for sentiment analysis could entrench market-driven narratives or how generative AI reconstructions might distort collective memory.

As a counterpoint to what is termed “heritage platform capitalism”, the paper proposes a Heritage DAO (Decentralised Autonomous Organisation)—a blockchain-based governance model allowing diverse stakeholders (former residents, conservation experts, local artists and visitors) to participate in decision-making on budgets, programming and ethical technology use.

This speculative model contributes to the conference’s central themes, offering new insights into the ethical and philosophical impacts of AI, its role in shaping heritage narratives and the urgent need for equitable, community-driven governance in the digital age.

The background of the slide features a series of overlapping, wavy lines that create a sense of depth and movement. The lines are primarily red and blue, with some white space between them. The lines are more densely packed in some areas, creating a textured effect. The overall composition is abstract and modern.

INSPIRING MINDS

Speakers & Team

Conference team

Keynotes

Anastasia Bondar

Anastasia Bondar is the Deputy Minister of Culture and Strategic Communications of Ukraine, responsible for digital development, international cooperation, and cultural innovation. She leads national strategies for digital transformation in the cultural sector, including the creation of state electronic registries, museum digitization, Culture for Recovery programs, integrating culture into Ukraine's resilience and reconstruction. With experience in regional administration and international corporations, she combines strategic vision with creative problem-solving. Ms. Bondar actively represents Ukraine on global platforms, advocating for cultural heritage protection, international partnerships, and the role of culture as a pillar of national security and recovery.

Natalia Makovetskaya

Natalia Makovetskaya holds a double MSc degree in Architecture with a specialization in Cultural Heritage Preservation and in Development Practice. She began her career with the Russian National World Heritage Committee, coordinating state of conservation missions and developing buffer zone plans. Later, as an urban consultant, she focused on safeguarding and revitalizing cultural and natural heritage sites, particularly in small historic towns. For over eight years, Natalia advised global firms on climate action plans for corporations, cities and regions. Today, she works as a sustainability consultant and independent advisor, bridging cultural heritage, climate resilience, and emerging technologies, including AI, to advance future-oriented approaches to preservation and development.

Fred Truyen

Prof. Dr. Fred Truyen is Professor of Digital Humanities at KU Leuven, where he teaches cultural studies and digital heritage. As Director of CS Digital, he leads initiatives on digitization, metadata, and digital storytelling, promoting open access and participatory approaches to cultural heritage. He has coordinated numerous European projects on digital culture, including EuropeanaPhotography and ViMM, and serves as an advisor to institutions on digital transformation and heritage innovation. Combining academic leadership with advocacy for cultural equity in the digital age, Prof. Truyen actively bridges technology, heritage, and education across international networks.

Refik Anadol

Refik Anadol is an internationally acclaimed media artist, director, and pioneer in the field of data and machine intelligence aesthetics. Founder of Refik Anadol Studio and Lecturer at UCLA's Department of Design Media Arts, his work explores the intersection of architecture, AI, and immersive environments. Using data as his primary material, Anadol creates large-scale public installations and digital artworks that transform cultural and environmental information into multisensory experiences. Exhibited globally at venues such as MoMA and the Venice Biennale, his practice redefines the role of AI in shaping collective memory and contemporary art.

Brecht Declercq

Brecht Declercq, MA, MSc, is Head of Archives at RSI, the public broadcaster of Italian-speaking Switzerland. Previously, he managed digitisation and acquisition at meemoo (2013–2022) and led major projects at Flemish public broadcaster VRT (2004–2013). Within FIAT/IFTA, the global network of media archives, he chaired the Preservation and Migration Commission, served as General Secretary, and was President from 2020 to 2024. A frequent conference curator, speaker, and author, Declercq is widely consulted by policymakers, audiovisual archives, and media organizations worldwide.

Speakers

In alphabetical order

Alikhanzadeh, Marjan

Marjan Alikhanzadeh is a PhD candidate at Cyprus International University under the supervision of Assoc. Prof. Dr. Payam Mahasti Shotorbani. Her research focuses on architecture, heritage, and the integration of digital technologies in conservation and cultural documentation.

Asgary, Ali

Dr. Ali Asgary is a disaster and emergency management professor, director of CIFAL York, and executive director of ADERSIM at York University. His teaching and research focus on post-disaster recovery and reconstruction, climate change and cultural heritage, and applications of modeling, simulations, AI, and geomatics in disaster and emergency management.

Ambani, Jui

Jui Ambani is a Conservation Architect and Programme Officer with ICCROM's First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR) Programme, specialising in disaster risk management, crisis response and climate action for heritage. She has coordinated international initiatives addressing heritage protection in Ukraine, Myanmar and other regions affected by conflict and natural hazards. Her work integrates innovation with practice, including the development of GIS-based risk mapping tools and mobile applications for on-site assessments. By combining heritage expertise, policy insight and data-driven innovation, she advances inclusive approaches to safeguarding both tangible and intangible heritage in complex global contexts.

AlQawasmeh, Alia

Alia AlQawasmeh is the founder of QISSA – A Living Legacy, a youth-led initiative in Petra, Jordan, dedicated to preserving Bedouin oral heritage through storytelling and intergenerational dialogue. Her work integrates AI-supported tools such as voice-to-text transcription and metadata tagging to document traditions, folk games, and herbal knowledge, transforming them into podcasts, animations, and interactive heritage maps for wider engagement.

Alcon Quintanilha, Rodrigo

Rodrigo Alcon Quintanilha is a visual artist, museologist, photographer, and exhibition installer with experience at the Museum of Modern Art of Buenos Aires. He specializes in the conservation of historical materials and environmental preservation of artworks, using

image, video, and sound editing technologies. His current work explores programming, robotics, 3D modeling, and augmented reality for heritage applications.

Andrade, Bruno

Bruno Andrade is an architect and urban planner with degrees from UFES and UFMG and a PhD in Geodesign. He has international experience at UNIFI (Italy) and TUWien (Austria) and completed a postdoc at UCD (Ireland) on digital citizen participation in climate adaptation. Currently a researcher with UFBA's EtniCidades group, he co-coordinates the ICOMOS–National Geographic project Preserving Legacies: A Future to Our Past, focusing on digital and AI-driven heritage design and management.

Avoa Mebenga Belinga, Geneviève Sandrine

Geneviève Sandrine Avoa Mebenga Belinga is a heritage educator and consultant with over 13 years of experience promoting Cameroonian languages and cultures. She is the founder of a cultural enterprise showcasing local traditions through cosmetics and a consultant for UNESCO's Regional Office for Central Africa. Her work bridges academic insight and community engagement, focusing on indigenous knowledge systems, oral traditions, and digital tools for inclusive cultural preservation.

Bai, Nan

Nan Bai is an Assistant Professor in section Heritage & Architecture at TU Delft. With a multi-disciplinary background, Nan always has a broad interest in the application of data science, artificial intelligence, and computational social science in historic urban settings, especially the perceptions of UNESCO World Heritage reflected in social media.

Balouch, Shabnam

Shabnam Balouch is a Preventive Conservation Officer and cultural heritage researcher based in London. As guest curator at Kew Gardens, she leads the exhibition Persia Reimagined: From Herbarium to Heritage, exploring overlooked Persian materials in colonial archives. Her research focuses on linguistic heritage, oral memory, and digital ethics, developing community-led archives and AI-assisted pronunciation databases to restore authenticity in historical records.

Beevi, Sanira

Sanira Beevi is Assistant Director and Senior Conservator at the National Archives of Singapore, part of the National Library Board. As Head of the Archives Conservation Lab, she oversees the preservation of paper-based records and leads outreach initiatives to make conservation education accessible to the public, advancing Singapore's documentary heritage preservation.

Bedoya, Fabio

Fabio Bedoya is an independent researcher focused on machine learning for audiovisual heritage preservation, specializing in ethical, context-aware AI to recover color and spatial detail in degraded films. He works as a restoration technician at Duplitech in California and serves as a master trainer for Filmworkz, supporting institutions worldwide in advanced restoration tools. His practice emphasizes transparent, locally trained models that uphold the integrity of analog formats while expanding restoration possibilities.

Cai, Mengling

Dr. Mengling Cai is an Associate Professor at Soochow University and a recipient of the Jiangsu Outstanding Postdoctoral Fellowship. She holds a PhD in Archival Science from Renmin University of China with joint training at the University of Hamburg. Her research focuses on paper conservation, material composition analysis, and cultural heritage protection, supported by multiple government-funded projects and over 20 peer-reviewed publications.

Carboni, Nicola

Dr. Nicola Carboni is an Assistant Professor at the iSchool, University of Illinois. His research integrates knowledge representation and data analysis for cultural heritage, focusing on iconography, spatiotemporal data, and digital humanities. He has held positions at the University of Geneva, the Harvard Center for Italian Renaissance Studies, and the French National Research Center.

ChemiNova Project Team

The ChemiNova consortium combines expertise in conservation, risk management, heritage science, and AI under the Horizon Europe project Novel Technologies for On-Site and Remote Collaborative Enriched Monitoring. Team members include Rohit Jigyasu (ICCROM), Noémie Gabay (ICCROM), Alessandra Bonazza (CNR-ISAC), Franz Rottensteiner, and Mohammadreza Heidarianbaei. Their collective research advances remote diagnostics and monitoring of chemical and structural damage in heritage assets.

Cohen, Elah

Elah Cohen is a medical student at the University of Aberdeen and contributor to the Heritage of War and Peace project. Formerly trained in Arabic and International Relations at the University of St Andrews, her academic work explores the intersection of memory, conflict, and heritage.

Coulibaly, Drissa Sinaly

Drissa Sinaly Coulibaly holds a Master's in Development with a specialization in Cultural Heritage Management and is pursuing a joint PhD between Université Paris Nanterre and the Université des Sciences Sociales et de Gestion de Bamako. His research examines post-conflict protection of World Heritage properties in Timbuktu and heritage resilience amid crises and climate change.

Crawford, Katherine

Dr. Katherine Crawford is a Senior GIS Specialist at Chronicle Heritage, where she integrates geospatial technologies into archaeological and heritage management. Her expertise includes GIS, database design, and machine learning for archaeological data. Her research applies emerging technologies to improve fieldwork methodologies and heritage interpretation.

Dang, Fanghong

Fanghong Dang is a master's student in Environmental Design at Tianjin Academy of Fine Arts, holding a bachelor's degree in Visual Culture Planning and Management. Their research explores AI-driven reinterpretation of cultural heritage, focusing on transforming traditional patterns in contemporary spatial design.

Đurić, Isidora

Dr. Isidora Đurić is an Assistant Professor at the Faculty of Technical Sciences, University of Novi Sad. She holds BS and MS degrees in Architecture and a PhD in Computer Graphics. Her research explores digital technologies in architectural visualization and heritage conservation.

Dunkley Gyimah, David

Dr. David Dunkley Gyimah is a Reader at the Cardiff School of Journalism, Media and Culture. His research focuses on innovation, digital storytelling, and media labs. A former BBC and Channel 4 journalist, he has received international awards and previously served as artist-in-residence at the Southbank Centre.

Garnham, Ignacio

Dr. Ignacio Garnham is an AI researcher and entrepreneur specializing in responsible AI, ethics, and social complexity. With a background in design, anthropology, and complexity science, he explores the co-evolution of AI and social systems. He is founder of Nainty and Me, a startup creating no-code ethical media generation tools.

HajjAli, Hassan

Hassan HajjAli is a PhD candidate in Cultural Heritage at Sapienza University of Rome, supported by the Honor Frost Foundation. His research integrates GIS, photogrammetry, and AI for maritime heritage management in Lebanon, focusing on risk-informed and sustainable conservation.

Itävuori, Sami P.

Sami P. Itävuori is a London-based researcher, curator, and cultural programmer specializing in audiovisual cultures and advanced technologies. A PhD student at London South Bank University, the Royal College of Art, and Tate, his work promotes community-centered and experimental approaches to digital heritage.

Jegede, Peter

Peter Jegede is a museum curator and conservator with over 13 years of experience in material culture and public engagement. He consults for the Olusegun Obasanjo Presidential Library in Nigeria and specializes in preventive conservation, exhibition design, and AI-supported strategies for climate-resilient collections.

Jiang, Yutting

Yuting Jiang is a double-degree PhD candidate in the program of Architecture Heritage at Politecnico di Torino and Tongji University for the program of Architecture design. Her research focuses on heritage-led urban regeneration through mixed-use development. It focuses on how adaptive reuse of urban heritage influences user behavior and cultural perception, aiming to identify culturally adaptable strategies in governance and community engagement.

Joel, Jim

Jim Joel is a Ugandan curator, archivist, and interdisciplinary artist whose practice blends photography, walking, and public history. Founder of Page 4, he documents East African film culture and defunct cinemas through photo walks, oral histories, and immersive media. His projects integrate AI, XR, and digital storytelling to expand archival access and cultural memory. Exhibited across Africa, his work emphasizes participatory, sensory-rich archives that preserve and share African heritage in innovative, inclusive ways.

Khan, Muhammad Tehmash

Dr. Muhammad Tehmash Khan is the University Archivist at Aga Khan University, leading archival programs across Pakistan, East Africa, and the UK. With over a decade of experience, his work focuses on digital preservation, institutional archiving, and community-based heritage conservation.

Kesari, Khushi

Khushi Kesari is an Assistant Professor and Program Officer at SGT University's History Lab, Advanced Study Institute of Asia. Her research explores history, heritage, and traditional knowledge systems, with emphasis on craft economies, digital history, and material culture.

Kılıç, Alper Can

Alper Can Kılıç, born in Istanbul, is a permaculture designer and instructor holding degrees in economics and innovation strategy. Active in ecological projects, he promotes sustainable food systems, open knowledge, and community-driven environmental education.

Li, Xincheng

Xincheng Li is a PhD student in the Architecture Heritage program at Politecnico di Torino. Her research focuses on artificial intelligence in cultural heritage, garden heritage digitalization, surveying, 3D reconstruction, virtual presentation, and heritage management. She is particularly interested in integrating digital technologies and innovative AI methods into heritage conservation, exploring interdisciplinary approaches for heritage value transmission and sustainable management.

Liang, Xiaoxu

Xiaoxu Liang is a postdoctoral researcher and adjunct professor at the Department of Architecture and Design, Politecnico di Torino. Her research expertise lies in the utilization of cutting-edge digital tools and analytical frameworks to document contemporary urban transformations and assess associated risks. Recently, Xiaoxu specializes pioneering approaches, such as empowering minority groups with digital tools, in comprehensive cultural heritage management.

Lozano, Julio Cesar Maya

Julio Cesar Maya Lozano is a Colombian architect based in Argentina specializing in conservation and restoration of built heritage. Educated at Universidad Nacional de La Plata and Universidad Torcuato Di Tella, he has led award-winning restoration projects, including Casa sobre el Arroyo, and writes on architecture and urban history.

Magnus, Bart

Bart Magnus is an expertise officer at meemoo, the Flemish Institute for Archives. His work focuses on metadata enrichment, Wikimedia collaboration, and the ethical and legal aspects of digital heritage access.

Makovetskaya, Natalia

Natalia Makovetskaya holds an MSc in Architecture with a focus on heritage preservation. She has worked with the Russian National World Heritage Committee and as an urban consultant on regeneration and climate action planning for historic towns and cultural landscapes.

Matuszewicz, Todd

Todd Matuszewicz is a Denver-based preservationist specializing in neon sign conservation. With backgrounds in chemistry and education, he is completing a Master's in Historic Preservation at the University of Colorado Denver. He co-founded Save the Signs, Colorado, and works with Historic Denver and History Colorado on heritage documentation.

Mustafayev, Tural

Tural Mustafayev is an Associate Programme Specialist at the Culture and Emergencies Entity of UNESCO's Culture Sector in Paris, where he works to strengthen the protection of cultural property in armed conflict and disaster situations. With a background in international law and heritage protection, he focuses on capacity building, policy development, and crisis resilience for cultural heritage worldwide.

Mwenje, Mohammed

Mohammed Mwenje is the Curator of Lamu Museums, Sites, and Monuments in Kenya. Trained in Building Engineering, he has extensive experience in urban conservation and heritage management. He has coordinated conservation reporting for Lamu Old Town since 2007 and led numerous restoration and capacity-building projects.

Nayebi, Maleknaz

Dr. Maleknaz Nayebi is an Associate Professor at York University and Associate Director of CIFAL York. Her research focuses on software engineering, AI for social good, and human-centered technology design. She leads interdisciplinary projects that bridge technical innovation with community impact.

Nugent, Selin

Dr. Selin Nugent is an Associate Professor of Digital Heritage and Deputy Director of the Centre for AI, Culture & Society at Oxford Brookes University. Her research explores how AI and data science influence cultural heritage, identity, and archaeological practice, with an emphasis on equity and community benefit. Combining computational, ethnographic, and field-based approaches, she has conducted fieldwork across Western Asia and co-directs the Bat Archaeological Project in Oman, focusing on digital heritage and community engagement.

Nurdiana, Mayca Sita

Mayca Sita Nurdiana is a heritage cartographer from Indonesia. A graduate of Universitas Gadjah Mada, she has mapped cultural heritage in Aceh and North Sumatra and is pursuing a master's in archaeology to strengthen her expertise in cultural heritage management.

Oueslati, H  la

Dr. H  la Oueslati holds a PhD in Design Science and Technology and is a trained architect. With over 15 years of professional experience, she directs HO DESIGN, teaches in higher education, and researches spatial justice and design within the Erasmus Mundus DYCLAM+ framework.

Pourhosseini Akbarie, Mahnoush

Mahnoush Pourhosseini Akbarie is a PhD researcher in the National Doctorate in Heritage Science at Sapienza University. She also contributes to HighEst AI Lab (Turin University), Solomei AI, and Brunello Cucinelli Company. Her work merges art history, AI, and heritage to create new forms of cultural engagement.

Qazi, Nailah

Nailah Qazi is a cultural heritage researcher with a Master's in International Relations. Her work focuses on digital technologies and AI for ethical heritage preservation in West and Central Asia, including research on heritage initiatives in Saudi Arabia's AlUla region.

Ramalho Lahoz, Yasmina Esther

Yasmina Esther Ramada Lahoz is a public officer with the Regional Government of Madrid and Segovia City Hall, specializing in cultural governance and heritage law. Her work focuses on policy design, cultural rights, and the intersection of governance and heritage management.

Rihal, Satwant

Dr. Satwant Rihal is Professor Emeritus of Architectural Engineering at Cal Poly State University, San Luis Obispo. An expert in earthquake safety and structural conservation, he serves on ICOMOS committees ISCARSAH and CIPA and the SEWC board. His work advances global collaboration in heritage preservation and disaster resilience.

Rosenkranz, Naomi

Naomi Rosenkranz is a PhD student in the UCLA/Getty Program in the Conservation of Cultural Heritage. With a background in physics from Barnard College, she researches historical craft techniques and materials, co-editing *Secrets of Craft and Nature in Renaissance France*.

Sibanda, Munyika

Munyika Sibanda is a Lecturer at Great Zimbabwe University's Department of Heritage and Sustainable Development and a former National Archives archivist with 11 years of experience. His PhD in Archival Science examines the trustworthiness of digital records in Zimbabwe's public sector.

Suazo, Antonio

Antonio Suazo is an architect and doctoral researcher at Pontificia Universidad Católica de Chile. His work focuses on applying AI and deep learning to analyze historical photographs for risk management and heritage conservation. He collaborates with Chilean institutions such as CNCR, CMN, and DEPA-MOP.

Talaei Koochehbagh, Shiva

Shiva Talaei Koochehbagh holds a Bachelor's in Architecture from Iran and a Master's in Restoration from Sapienza University of Rome, graduating with highest honors. Now a PhD student in Heritage Science, she has five years' experience in urban regeneration and explores technology's role in revitalizing heritage.

Takukam, Eric

Eric Takukam is a Cameroonian digital artist whose work merges African cultural heritage with technology through AR, VR, and AI. His immersive installations explore decolonization, mental health, and ecology, and have been exhibited internationally.

Tan, Yun

Yun Tan is a researcher in cultural heritage management and digital studies. His work examines how digital platforms, AI, and platform cooperativism reshape urban heritage, focusing on algorithmic governance and community-based digital heritage models.

Tate, Angela

Angela T. Tate is Chief Curator and Director of Collections at the Museum of African American History, Boston and Nantucket, and a doctoral candidate at Northwestern University. Her dissertation examines Cold War-era cultural diplomacy through Etta Moten Barnett's radio work.

Tavingeyi, Tatenda

Tatenda Tavingeyi is a heritage professional and AI researcher with interests in indigenous knowledge systems, AI governance, and ethics. He is the founder of the AI for Cultural Heritage Institute and Conservatech AI, organizations promoting inclusive, community-centered approaches to heritage preservation and sustainable development through AI and participatory technologies. He currently serves as Project Coordinator for the An AI Our Own (AAOO) initiative under Cambodia Living Arts International, advancing ethical and locally grounded applications of AI in cultural heritage.

Tukei, Eugene

Eugene Tukei is founder of Realevr African Heritage Tours in Uganda, which uses AI and VR to digitally preserve and present cultural heritage. His work promotes accessibility, tourism, and intergenerational engagement with African heritage.

Varol, Ersun

Dr. Ersun Varol is a city planner and researcher with over 19 years of experience in environmental planning and cultural heritage conservation. His work focuses on GeoAI-supported models for climate adaptation and resilience of heritage sites, with international collaborations through UNDP.

Velázquez, José

José Velázquez is an archivist and multimedia producer with over 20 years' experience developing interoperable media systems. He has consulted for the BBC, IBM, and Google and lectures on Digital Humanities at the University of Pablo de Olavide.

Verbeeck, Muriel

Dr. Muriel Verbeeck is a Professor of Conservation at ESA Saint-Luc de Liège and researcher at the University of Liège. She serves as Editor-in-Chief of CeROArt and Visiting Professor at France's Institut National du Patrimoine. Her research promotes participatory, multilingual, and digital approaches to conservation.

Uwera, Portia

Portia Uwera is the founder of Because of Her Uganda, an initiative documenting and amplifying the stories of African women. Her work connects heritage, media, and public engagement to preserve women's contributions across East Africa's history and culture.

Van Malssen, Kara

Kara Van Malssen is a Partner and Managing Director at AVP, a digital asset and data management consultancy. Kara has worked in technology and cultural heritage for nearly 20 years, supporting digital asset management, digital preservation, and data management initiatives within organizations and communities. A long-time ICCROM collaborator, Kara has been curriculum developer, instructor, and researcher for the SOIMA and Sustaining Digital Heritage programmes. She holds an MA in Moving Image Archiving and Preservation from NYU.

Wang, Suwen

Suwen Wang is a London-based artist and researcher whose work bridges AI, storytelling, and cultural heritage. A student at the Royal College of Art, he explores immersive design and the emotional reconnection of displaced artifacts through digital media.

Wang, Tianlian

Tianlian Wang is a PhD candidate in Architecture at Tianjin University, developing AI-driven tools for heritage resilience. Using drone photogrammetry and predictive analytics, their work models climate impacts on heritage structures and advocates participatory digital stewardship for communities.

Yanenko, Anna

Anna Yanenko is a researcher at the National Preserve "Kyiv-Pechersk Lavra" (Ukraine) and a 2024-2025 non-residential fellow at the French Research Center in Humanities and Social Sciences (CEFRES). She co-founded the Research Workshop on the History of the Humanities in Ukraine and coordinates conferences on humanities, archaeology, and museums. Holding a PhD in Archaeology, her research focuses on Ukrainian museums of the 1920-30s, visual museum history, and Soviet-era narratives. She is a member of the Ukrainian Association of Archaeologists, ICOM Ukraine, and IFoPH.

Zhou, Yan

Yan Zhou is currently a Ph.D. candidate at Faculty of Architecture and Built Environment, Delft University of Technology. She has her master's degree in architecture history and theory at School of Architecture, Tsinghua University. Her research interests include Chinese architectural history, diasporic heritage, and participatory heritage management.

Conference team

Conference coordination

Aparna Tandon, Hilke Arijs & Jui Ambani

Scientific Committee

In alphabetical order

Ali Asgary, Jui Ambani, Hilke Arijs, Anastasia Bondar, Brecht Declercq, Ilse De Vos, Maleknaz Nayebi, Linda Neruba, Aparna Tandon, Kara Van Malssen.

Core team

Tandon, Aparna

Senior Programme Leader, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR) and Sustaining Digital Heritage Programmes, ICCROM

Aparna Tandon is an internationally recognised expert in cultural heritage risk management and capacity development, with over 25 years of experience across more than 120 countries. She has trained over 2,500 professionals and led multi-donor initiatives linking heritage protection with climate action, peacebuilding and sustainable development. As the principal author of the ISO standard for First Aid to Cultural Heritage in Crises, she pioneered a globally adopted methodology for safeguarding tangible, intangible and digital heritage. Her work in conflict, post-disaster and climate-vulnerable contexts has helped transform heritage protection into an inclusive, coordinated and resilient global field of practice.

Arijs, Hilke

Cultural Heritage Consultant, Sustaining Digital Heritage Programme, ICCROM

Hilke Arijs is a Cultural Heritage Consultant and staff member at Erfgoedcel Denderland, with a background in art history and audiovisual engineering. She has extensive expertise in collection care, value assessment, and the management of digital and audiovisual heritage. With years of hands-on experience working with heritage collections in both Europe and Africa, she is also a long-standing resource person for ICCROM's SOIMA Programme, where she teaches the sustainable preservation of sound and image collections. Hilke works closely with heritage communities, conducting in situ assessments that integrate tangible and intangible elements, and she actively advocates for open data and accessibility in the cultural heritage sector.

Ambani, Jui

Programme Officer, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR) Programme, ICCROM

See speakers and scientific committee section

Chakraborty, Mohona

Programme Officer, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR) Programme, ICCROM

Mohona Chakraborty is a Conservation Architect and Project Officer at ICCROM's FAR Programme. Holding a Master's degree in Architectural Conservation from La Sapienza University of Rome, she has worked with UNESCO and DRONAH on major conservation projects in India. Since joining ICCROM in 2020, she has co-developed training resources such as the Peacebuilding Assessment Tool for Heritage Recovery and Rehabilitation (PATH) and other FAR learning materials on disaster risk reduction. She has extensive experience organising hybrid workshops and mentoring heritage professionals. Mohona currently coordinates Net Zero: Heritage for Climate Action, promoting Indigenous knowledge for climate resilience and sustainable resource management.

Khodja, Imene

Intern, First Aid and Resilience for Cultural Heritage in Times of Crisis (FAR) Programme, ICCROM

Imene Khodja is an architect specialising in cultural heritage management, conservation and promotion. A graduate of the Erasmus Mundus DYCLAM+ Master's programme, she trained at leading European universities in heritage conservation, diplomacy and landscape management. She has collaborated with ICOMOS Portugal and French institutions on documentation and restoration projects, including dry-stone heritage. At ICCROM's FAR Programme, she contributes to capacity building, policy research and the integration of heritage into disaster risk management. Imene's work bridges international practice and local action, focusing on sustainable approaches that link cultural resilience with community development and environmental stewardship.

Heyman, Ryfka

Consultant, ICCROM

Ryfka Heyman is a consultant supporting the organisation and logistics of the Ctrl+S Culture: AI and Heritage in a Digital World conference and contributed to ICCROM's Sustainable Digital Heritage online course, a nine-month international capacity-building initiative in 2023. She holds a Master's degree in Sociology from the Free University of Brussels and works with an European federation of energy communities, coordinating operations and stakeholder engagement. A trained professional organiser and author of a book on decluttering, Ryfka combines analytical, logistical and creative expertise to strengthen collaboration, efficiency and accessibility across international cultural and sustainability projects.



ICCROM

Sustaining Digital Heritage

In Close Collaboration With:



unitar
United Nations
Institute for Training and Research

