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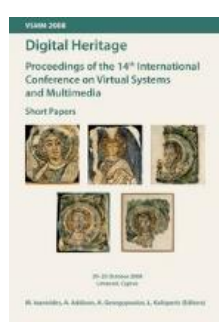
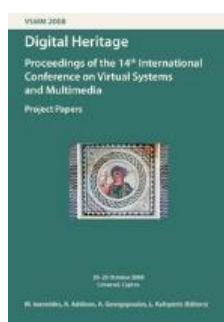
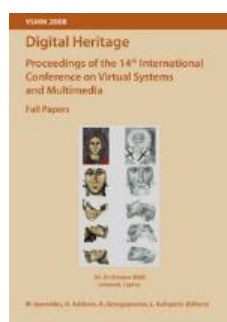
## PUBLICATIONS

**Proceedings of  
CIPA/VAST/EG/EuroMed  
2006: 37th CIPA  
international workshop  
dedicated on e-documentation and  
standardisation in cultural heritage.**



*Editors: Ioannides, M., Arnold, David, Niccolucci, F. and Mania, K.*

We present here 32 full papers, selected from 66 submissions which focus on interdisciplinary and multi-disciplinary research concerning both cutting edge Cultural Heritage Informatics and the use of technology for the representation, documentation, archiving and communication of CH knowledge.



### Digital Heritage

**Proceeding of the 14<sup>th</sup>  
International Conference on  
Virtual Systems and  
Multimedia**



*Editors: M. Ioannides, A. Addison, A. Georgopoulos, L. Kalisperis (Eds)*

This volume contains the Project Papers presented at VSMM 2008, the 14<sup>th</sup> International Conference on Virtual Systems and Multimedia which took place on the 20 to 25 October 2008 in Limassol, Cyprus. The conference title was "Digital Heritage: Our Hi-tech-STORY for the Future, Technologies to Document, Preserve, Communicate and Prevent the Destruction of our Fragile Cultural Heritage".

### Digital Heritage

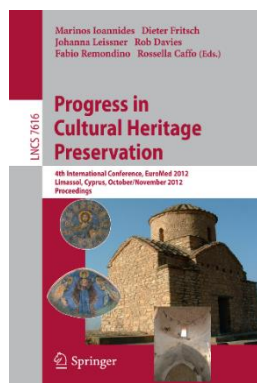
**Third International Euro-Mediterranean  
Conference, EuroMed 2010, Lemessos, Cyprus,  
November 8-13, 2010. Proceedings**



*Editors: Ioannides, M., Fellner, D., Georgopoulos, A., Hadjimitsis, D. (Eds.)*

This volume comprises the proceedings of the Third International Euro-Mediterranean Conference (EuroMed 2010) on the historical island of Cyprus. The focal point of this conference was digital heritage, which all of us involved in the documentation of cultural heritage continually strive to implement.





**Progress in Cultural Heritage  
Preservation**  
4th International Conference, EuroMed 2012,  
Lemessos, Cyprus, October 29 - November 3,  
2012, Proceedings

*Editors: Ioannides, M., Fritsch, D., Leissner,  
J., Davies, R., Remondino, F., Caffo, R. (Eds.)*

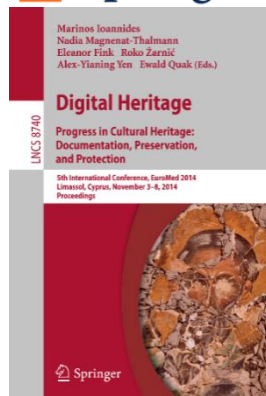
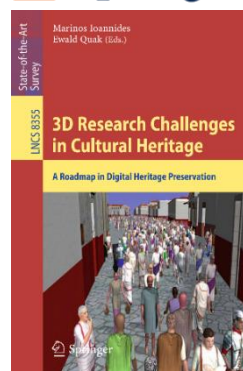
This book constitutes the refereed proceedings of the 4th International Conference on Progress in Cultural Heritage Preservation, EuroMed 2012, held in Lemesos, Cyprus, in October/November 2012. The 95 revised full papers were carefully reviewed and selected from 392 submissions.

### 3D Research Challenges in Cultural Heritage

#### A Roadmap in Digital Heritage Preservation

*Editors: Ioannides, Marinos, Quak, Ewald (Eds.)*

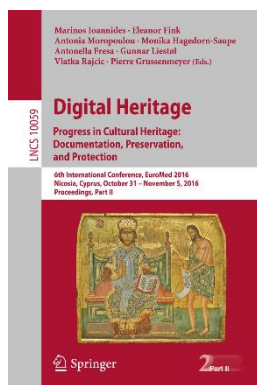
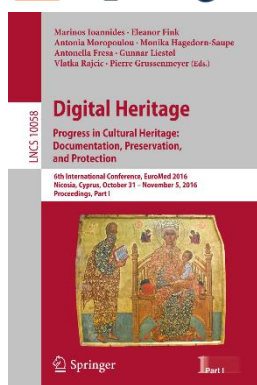
This book contains selected contributions from some of the most renowned researchers in the field of Digital Heritage and 3D representation of the Past, based in large part on invited presentations from the workshop "Computational Geometry and Ontologies for Cultural Heritage 3D Digital Libraries.



**Digital Heritage**  
**Progress in Cultural Heritage. Documentation, Preservation, and  
Protection 5th International Conference, EuroMed 2014, Limassol,  
Cyprus, November 3-8, 2014, Proceedings**

*Editors: Ioannides, M., Magnenat Thalmann, N., Fink, E., Zarnic, R., Yen, A.-  
Y., Quak, E. (Eds.)*

This book constitutes the refereed proceedings of the 5th International Conference on Digital Heritage, EuroMed 2014, held in Limassol, Cyprus, in November 2014. The 84 full and 51 short papers presented were carefully reviewed and selected from 438 submissions.



## Digital Heritage

Progress in Cultural Heritage: Documentation,  
Preservation, and Protection

**6th International Conference, EuroMed 2016, Nicosia,  
Cyprus, October 31 – November 5, 2016, Proceedings, Part I  
& II**

*Ioannides, M., Fink, E., Moropoulou, A., Hagedorn-Saupe, M., Fresca, A., Liestøl, G., Rajcic, V., Grussenmeyer, P. (Eds.)*

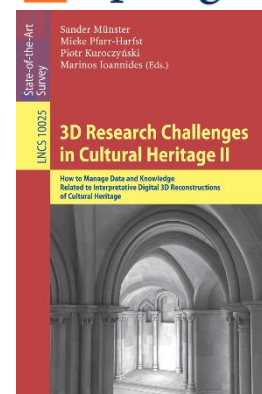
This two-volume set constitutes the refereed proceedings of the 6th International Conference on Digital Heritage, EuroMed 2016, held in Nicosia, Cyprus, in October/November 2016. The 29 full papers, 44 project papers, and 32 short papers presented were carefully reviewed and selected from 502 submissions.

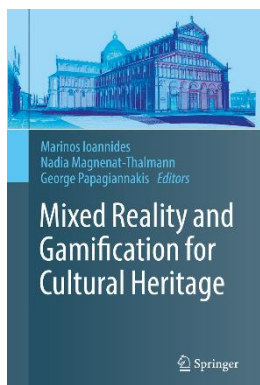
## 3D Research Challenges in Cultural Heritage II

**How to Manage Data and Knowledge Related to Interpretative  
Digital 3D Reconstructions of Cultural Heritage**

*Münster, S., Pfarr-Harfst, M., Kuroczyński, P., Ioannides, M. (Eds.)*

This book reflects a current state of the art and future perspectives of Digital Heritage focusing on interpretative reconstruction and including as well as bridging practical and theoretical perspectives, strategies and approaches. Comprehensive key challenges are related to knowledge transfer and management as well as data handling within an interpretative digital reconstruction of Cultural Heritage including aspects of digital object creation, sustainability, accessibility, documentation, presentation, preservation and more general scientific compatibility.





### **Mixed Reality and Gamification for Cultural Heritage**

*Ioannides, M., Magnenat-Thalmann, N., Papagiannakis, G. (Eds.)*

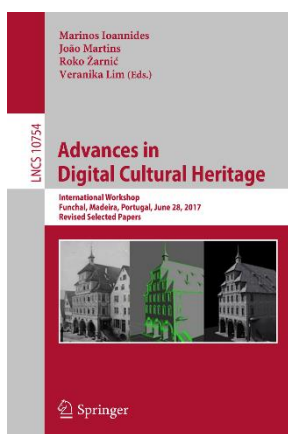
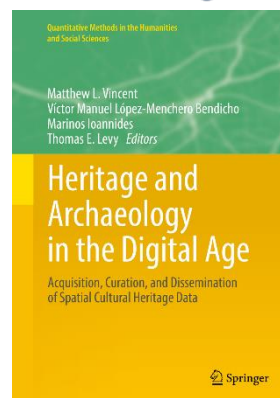
This book offers an essential introduction to the theories, development and applications of enabling technologies for mixed reality and gamified interaction in the context of cultural heritage and creative industries. Following a pedagogical model developed by the focus group of the first EU Marie S. Curie Fellowship Initial Training Network on Digital Cultural Heritage, it presents both enabling technologies and their applications to tangible and intangible cultural heritage.

### **Heritage and Archaeology in the Digital Age**

#### **Acquisition, Curation, and Dissemination of Spatial Cultural Heritage Data**

*Editors: Vincent, M.L., López-Menchero Bendicho, V.M., Ioannides, M., Levy, Th.E. (Eds.)*

Examines and outlines best practices in computational research's applications in cultural heritage, demonstrating where the field is and where it is going. Guides readers through three fundamental stages of interaction with heritage data, demonstrating best practices for acquisition, curation and dissemination chapters bring together experts from North America and Europe, as they present both transdisciplinary and transnational perspectives on heritage and technology



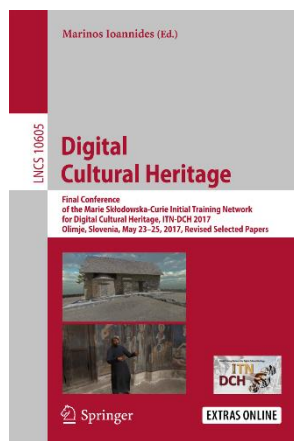
### **Advances in Digital Cultural Heritage**

**International Workshop, Funchal, Madeira, Portugal, June 28, 2017, Revised Selected Papers**

*Editors: Ioannides, M., Martins, J., Žarnić, R., Lim, V. (Eds.)*

This book constitutes the papers of the International Workshop on Analysis in Digital Cultural Heritage 2017, held in Funchal, Madeira, Portugal, in June 2017.

The 16 full and 19 poster papers were carefully reviewed and selected from 93 submissions.



### Digital Cultural Heritage

Final Conference of the Marie Skłodowska-Curie Initial Training Network for Digital Cultural Heritage, ITN-DCH 2017, Olimje, Slovenia, May 23–25, 2017, Revised Selected Papers

*Editors: Ioannides, Marinos (Ed.)*

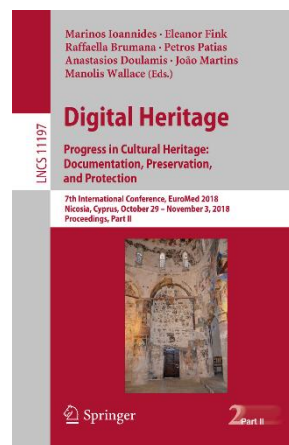
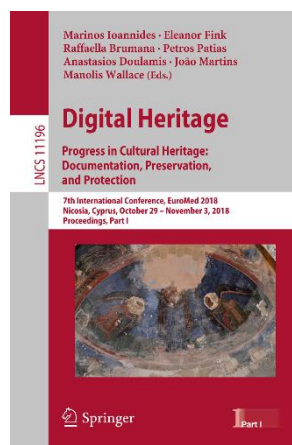
Features the state of the art in digital cultural heritage research presents interdisciplinary and multi-disciplinary research. Focuses on e-documentation and e-preservation of cultural heritage.

### Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation, and Protection



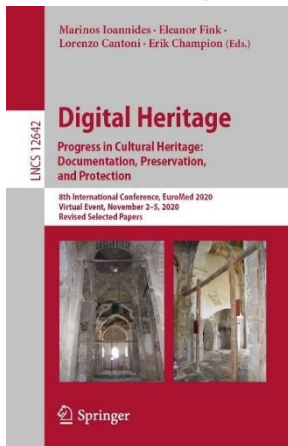
7th International Conference, EuroMed 2018, Nicosia, Cyprus, October 29–November 3, 2018, Proceedings, Part I & Part II

*Editors: Ioannides, M., Fink, E., Brumana, R., Patias, P., Doulamis, A., Martins, J., Wallace, M. (Eds.)*



This two-volume set LNCS 11196 and LNCS 11197 constitutes the refereed proceedings of the 7th International Conference on Digital Heritage, EuroMed 2018, held in Nicosia, Cyprus, in October/November 2018.

The 21 full papers, 47 project papers, and 29 short papers presented were carefully reviewed and selected from 537 submissions.



**Digital Heritage. Progress in Cultural Heritage:  
Documentation, Preservation, and Protection**

**8th International Conference, EuroMed 2020, Virtual Event,  
November 7–11, 2020, Revised Selected Papers**

*Editors: Marinos Ioannides, Eleanor Fink, Lorenzo Cantoni, Erik Champion*

This book constitutes the refereed post-conference proceedings of the 8th International Conference on Digital Heritage, EuroMed 2020, held virtually in November 2020.

The 37 revised project papers and 30 revised short papers presented were carefully reviewed and selected from 326 submissions.

## COMMITTEE

### Conference Chairs

Marinos Ioannides, Cyprus  
Eleanor Fink, USA  
Isto Huvila, Sweden  
Andreas Maier, Germany  
Costas Papadopoulos, Netherlands

### Local Organizing Committee

Athos Agapiou  
Charalambos Charalambous  
Clelia Arminiotou  
Elena Karittevli  
Eleni Nikita  
Elia Iliofotou  
Evros Alexandrou

George Tryfonos  
Kyriakos Efstathiou  
Marios Kountouris  
Orestis Rizopoulos  
Panayiota Samara  
Pantelis Panteli  
Sebough Voskeritchian

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Della Torre, Stefano	IT	Roumeliotis, Manos	GR
Doulamis, Anastasios	GR	Stathaki, Tania	UK
Doulamis, Nikolaos	GR	Tassopoulou, Maria	GR
Gattiglia, Gabriele	IT	Tavares, Alice	PT
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Giovanni, Issini	IT	Tian-Yuan Shih, Peter	TW
Granic, Andrina	HR	Tsafarakis, Stelios	GR

Grimoldi, Alberto	IT	Tsiafaki, Despoina	GR
Guiseppe Landi, Angelo	IT	Tsioukas, Vasilios	GR
Hadjidaki Marten, Elpida	GR	Tsita, Christina	GR
Handzic, Meliha	BA	Tucci, Grazia	IT
Jo, Sang-sun	KR	Von Mannen, Sebastian	DE
Kakavas, George	GR	Yen, Alex Ya-Ning	TW
Karanikolas, Nikos	GR	Zuppiroli, Marco	IT
Kerle, Norman	NL		

## KEYNOTE SPEAKERS



**Yasmine Makaroun - Ph.D.**

**Architect, archaeologist, heritage consultant - Assistant Professor, Center of Conservation and Restoration, Lebanese University, Lebanon - President of Icomos Lebanon**

Graduated in architecture from the Institute of Fines Arts at the Lebanese University in Beirut, Yasmine Makaroun qualified in management of archaeological sites and obtain a PhD in archaeology from EPHE at Paris Sorbonne. She took part in archeological excavations and handled conservation projects for major world heritage sites in the Mena Region. Her professional practice as heritage expert covers both restoration of historical monuments, archaeological site management, site museums, and urban heritage. Her publications are focusing on ancient architectural technics and vernacular architecture conservation in Lebanon. Full time assistant-professor at the Faculty of Architecture at the Lebanese University, member of universities jury's, invited lecturer, she took part in many conferences and seminars. Founder member of the Center of Conservation and Restoration, she handled the direction from 2015 to early 2022. Member of the board of Icomos Lebanon and acting as President since June 2021, she undertakes technical and evaluation missions on behalf of Unesco and capacity building training sessions for heritage experts in the Arab region.

**PRESENTATION TITLE: Lebanon and its cultural heritage in stage of crisis**

### **ABSTRACT:**

Lebanon's heritage is a great combination of natural and cultural assets within an exceptional context. This presentation will expose the main components of Lebanese heritage and recent major conservation, restoration and preservation interventions involving the use of digital techniques. We will address the major challenges facing this heritage and its people in a context of unique crisis on a global scale and in particular, after the explosion of the port of Beirut in 2020, the initiatives put in place with the support of Icomos, to save its built heritage and cultural identity.



**Catharine Dass**

**Architect, UK Parliament**

Catharine Dass is an architect in the United Kingdom (UK) Parliament. She joined the Parliament in 2019 and is one of the few experts in this field. She pioneered the introduction of heritage requirements for digital construction within the UK Parliament for conservation works, working closely with the in-house teams and consultants, National Building Standards (NBS) and the BIM4Heritage group. In the past, she worked in different countries, including Malaysia, Scotland and Dubai (UAE), before joining the Ministry of Justice (MoJ) in London in 2013. She was a vital team

member responsible for using tech to design and create a digital representation of building components with the combined use of laser scanning. She graduated from the University of Malaya, Malaysia, Glasgow School of Art, Glasgow and qualified at London Metropolitan University, London. She combines her passion for architecture and heritage with the knowledge and experience gained in digital construction to transpire innovative solutions for heritage and conservation. Her innovative digital work has established Parliament as an internationally pioneering classifying requirement of conservation works through the introduction of setting prerequisites for conservation works for historic projects. Thanks to her innovative works, she has been shortlisted for several prestigious awards in 2022 and winner of the TechWomen100 award.

**PRESENTATION TITLE: The Big Ben theory... the beginning of the digital restoration**

**ABSTRACT:**

The Palace of Westminster is a working building with a fascinating mixture of ancient and modern buildings and houses an iconic collection of furniture, archives and works of art. It attracts about 1 million visitors annually. Within UK Parliament, we embrace the use of innovative digital technologies for; conservation, stakeholder engagement, visitor experiences, asset management and problem reporting to name a few. This presentation will detail the challenges faced and our digital approach to identifying, recording, and classifying conservation works to restore, preserve and protect our UNESCO World Heritage Site for future generations.



**Susan de Menil**

**Co-Founder of Art & Antiquities Blockchain Consortium**

<https://www.aabconsortium.org>

Susan de Menil is currently the founding co-president of the Art & Antiquities, Blockchain Consortium (AABC), a nonprofit 501(c)3 that uses blockchain-based infrastructure to guide the future of cultural heritage repatriation.

Since 1991, Susan has worked as the director of marketing, administration, and interior design for Francois de Menil, Architect, P.C. From 1999-2012, she served as the president and executive director of the Byzantine Fresco Foundation, the nonprofit organization that oversaw the acquisition, conservation, exhibition, stewardship, and return of frescoes that had been taken from the Church at Lysi in Cyprus. During that time, de Menil conducted in-depth ethnographic interviews with the many stakeholders in a complex international negotiation over the frescoes. Susan is the director of the forthcoming documentary on this project, *38 Pieces*.

In her research and curatorial work, de Menil co-curated *Angels & Franciscans: Innovative Architecture from Los Angeles and San Francisco*, an exhibition which was awarded Best Architecture show by the International Association of Art Critics. The catalogue (with Bill Lacey) was published by Rizzoli. She is also co-editor of the book *Sanctuary: The Spirit In/Of Architecture* based on a symposium at the Menil Collection organized in conjunction with the exhibition *Sanctuaries: The Last Works of John Hejduk*.

**JOINT PRESENTATION WITH THOMAS R. KLINE**



**Thomas R. Kline**

**OF COUNSEL**

**100 WALL STREET, 15TH FLOOR  
NEW YORK, NY 10005**

Tom, Of Counsel with Schindler Cohen & Hochman LLP, represents clients on art, cultural property and museum issues including providing advice, documenting transactions and handling claims and litigation. He is best known for such groundbreaking cases as *Cyprus v. Goldberg* (church mosaics stolen during Turkish occupation), *Quedlinburg v. Meador* (church treasures stolen by U.S. Army Lieutenant), *Goodman v. Searle* (claim of Nazi art theft) and *Vineberg v. Bissonnette* (forced sale). For 20 years, Tom co-taught a seminar on Museums and Cultural Property as Professorial Lecturer in the Museum Studies Program, George Washington University and serves as President of the Lawyers' Committee for Cultural Heritage Preservation. For protecting German Cultural Heritage, Tom was awarded the Officer's Cross of the Order of Merit of the Federal Republic of Germany (*Das Verdienstkreuz des Verdienstordens*) and has also received the Medal of Cyprus Technical University for protecting the cultural heritage of Cyprus.

**PRESENTATION TITLE: Cultural Property Disputes: The Lysi Frescoes and The Stargazer**

**ABSTRACT:**

Looking at two case studies, The Lysi frescoes and the Stargazer (Idol) statuette, the presentation will explore the problems in protecting cultural property and recovering items believed to have been improperly taken.

Following rampant looting of churches in the occupied area of Cyprus in the mid to late 1970s, the Menil Foundation of Houston, Texas purchased 13<sup>th</sup> century frescoes taken from the famed chapel of St. Euphemianos in Lysi. The dome and apse frescoes had been cut into thirty-eight pieces which The Foundation purchased on behalf of the Church of Cyprus. The Foundation restored the frescoes and displayed them in a specially built chapel consecrated by the Archbishop of Cyprus in Houston from 1997 to 2012, when they were returned to the Church of Cyprus. The landmark agreement addressed the ideas of stewardship and ownership in a forward-thinking model.

In contrast, the Republic of Turkey to date has been unable to recover an ancient marble statuette, known as an Idol or Stargazer, that it believes was looted in Turkey in the 1960s. After trial, the US court validated Turkey's 1906 Ottoman Decree declaring ownership of all antiquities found in the ground but also held that Turkey had failed to establish that the object was found after 1906 in modern-day Turkey. Turkey, as well, had fatally slept on its rights allowing decades to pass before bringing its claim. The Stargazer had been prominently exhibited and published for decades and had been well known to Turkish officials; during that time, key witnesses died, and documents were lost or destroyed. Turkey has appealed and the case is presently pending before the U.S. Court of Appeals for the Second Circuit. It is likely to be argued to the court in December 2022.

These two case studies demonstrate the numerous factual, legal and conservation issues involved in protecting and recovering cultural objects – in the one case well documented and taken from a monument and in the other, undocumented.



**Irini Stamatoudi - LL.M., Ph.D.**

**Lawyer at the Supreme Court, Greece**  
**Professor in Intellectual Property Law and in Cultural Heritage**  
**Law, Law School, University of Nicosia, Cyprus**

Irini Stamatoudi is a Law Professor at the University of Nicosia (Cyprus) and a lawyer at the Supreme Court of Athens (Greece). She is specialised in Copyright and in Cultural Heritage Law. From 2007-2018 she was the General Director of the Hellenic Copyright Organisation (Greek Ministry of Culture and Sports). For many years she acted as a legal counselor to the Ministry of Culture on issues of illegal trafficking of antiquities where she handled the famous return cases of masterpieces from the J. P. Getty Museum (in Los Angeles) and from the Leon Levy & Shelby White collection (NY). She has taught extensively on various academic courses abroad and she has published thirteen books in copyright and in cultural heritage law in Greece and abroad and several articles in academic journals worldwide.

**PRESENTATION TITLE: Copyright issues pertaining to the digitization of cultural heritage materials**

**ABSTRACT:**

The presentation will discuss copyright issues pertaining to the digitization of cultural heritage materials. We shall first discuss what constitutes the subject matter of protection, which may vary from writings and works of art to works of architecture, photographs, audiovisual works, 3D models and so on. We will then examine the prerequisites for their protection. We shall then proceed with the content of protection and how this is relevant to digitisation, including relevant exceptions and limitations, and lastly, we shall focus on methods of enforcement of such protection and tips for the effective transfer of rights and the avoidance of infringing third party rights while digitising cultural heritage material.



**Gunnar Liestøl**

**Professor, dr. philos. Dept. of Media & Communication,**  
**Universsity of Oslo**

Liestøl has a magister artium degree in general and comparative literature, and a doctorate in media studies (on Hypermedia Design), both from the University of Oslo. His research has been in the field of digital media and rhetorics with a special focus on storytelling and narrative design. He has published and co-published numerous articles and books, among them Digital Media Revisited (MIT Press). He is currently conducting experimental research on theories and design methodologies for genre development in Indirect Augmented Reality, primarily focusing on cultural heritage, archaeology and reconstructions of historical events.

**PRESENTATION TITLE: Augmented Reality Storytelling in Cultural Heritage Communication**

**ABSTRACT:**

Location-based media in general and augmented reality in particular changes the way we tell stories and design narratives in cultural heritage communication. The combination of the real environment and original artefacts with digital reconstructions and simulations on location provides a potential for rich experiences. How do we go about when creating these narratives where we encounter new contexts for digital storytelling. The presentation will draw on recent experiments with augmented reality simulations developed and tested on a series of Cultural Heritage sites. Topics include challenges with indoor/outdoor positioning, gamification, narrative flow vs. access to databases, and more.



**Dimi Dimitrov**

**Wikimedia Europe**

Dimi Dimitrov is EU Policy Director for Wikimedia in Brussels. His work includes explaining to lawmakers how self-organised online communities can moderate content on platforms, thus providing an alternative content moderation model.

He has been involved in the debates around the latest EU copyright directive and especially a provision on the digitisation of works with expired copyright.

**PRESENTATION TITLE: Digitising and sharing public domain works after the EU copyright directive**

**ABSTRACT:**

Article 14 of the latest EU copyright directive is a provision that ensures public domain works aren't protected by copyright or related rights upon digitisation. This provision allows projects like Wikipedia and essentially everyone else to publish works from museum collections such as the Thyssen Bornemisza museum in Madrid. However, the provision is not without limits. The Italian Cultural Heritage Code doesn't allow the commercial re-use of cultural heritage works in the collections of public institutions, unless royalties are paid. In my presentation I will demonstrate the limits of both provisions and give examples of what is currently legal and what not.



**Prof. Petros Patias,**

**Aristotle University of Thessaloniki, Greece**

Petros Patias is a Professor, Director of Laboratory of Photogrammetry & Remote Sensing and ex-chairman at the School of Rural and Surveying Engineering (2003-2007), The Aristotle University of Thessaloniki (AUTH), board member of the Department of Urban Planning, AUTH (2004-2012) and Vice Rector at the University of Western Macedonia (2010-2015), Greece.

Eng. (1981) The Aristotle University, MSc (1985) and PhD (1987) both from the Dept. of Geodetic Science and Surveying, The Ohio State University, USA.

Chairman of various ISPRS (International Society of Photogrammetry and Remote Sensing) WGs from 1992 onwards, ISPRS Commission V President (2000-2004), CIPA (international Committee for Architectural Photogrammetry) President (2003-2007) and Honorary President (2013-for life), ISPRS Fellow (2016-for life), President of the Hellenic Society of Photogrammetry and Remote Sensing (1992-1996). Visiting Professor at various European universities (TU Delft, ETH Zurich, Universidad del País Vasco).

Editor-in-chief of the "South-Eastern European Journal of Earth Observation and Geomatics" e-Journal (<http://ejournals.lib.auth.gr/seejeog>), Scientific reviewer to 51 Journals.

Reviewer/evaluation to numerous promotions/elections to all Greek universities. In addition, internationally, he served as evaluator to promotions at National Research Council, Canada (2004), State University of New York, USA (2011), University of Haifa, Israel (2012), Politecnico di Torino, Italy (2015, 2016).

Evaluator to research proposals (besides Greece) to NSERC Discovery Grant Applications, Canada (2013), Research Promotion Foundation Grants, Cyprus (2013), External Evaluation of Higher Education Institutions, Cyprus (2013), Israeli Ministry of Science, Technology and Space Grants, Israel (2014, 2016), Italian Research and University Evaluation Agency (ANVUR) Grants, Italy (2004-2016), Italian Ministry of Education, University and Research (MIUR) Grants, Italy (2015-2016), Ministry of Education, science and Technological Development Grants, Serbia (2016).

Supervised 101 undergraduate Diploma Theses, 73 MSc Theses and 38 PhD Dissertations.

Published work includes 6 books, 11 chapters in international books and 259 papers in journals and proceedings.

Scientific Responsible, Principal Researcher or member of Research Group to a total of 91 Research Projects funded by European or National Organizations.

#### **PRESENTATION TITLE: Object Complexity vs. Model Complexity**

##### **ABSTRACT:**

Object Complexity is very important since it has a high impact on various aspects of 3D digitization: it suggests different technologies to be used, it reflects on the required or achievable quality, it may put limits on the intended purpose of use and impacts on the time and budget of survey. Therefore, it is not surprising that the term "Complexity" is used quite often in CH documentation literature and practice.

What is not expected though, is the fact that it remains as a vague term with no clear definition, no subjective methodology of calculating, and no clear connection to Quality, Purpose-of-use, or other imposed restrictions. In other words, the tooling of "Object Complexity" as a decision-support tool remains a gap.

The major function and usefulness of a definition is to clear up concepts and to lead to a fruitful decision-making workflow. However, currently, we discuss the object complexity as a value of its own, which cannot be estimated subjectively, it can be defined only after we make all the measurements on the object (making it useless for 3D digitization planning and decision-making) and it is neutral to intended use (making it useless for choosing the best technology or setting up the technical specifications for the 3D digitization).

We propose to shift our attention from the "Object complexity" to "Model complexity". This means that our focus is not the complexity of the real object per se (which is connected to the data capture phase), but the complexity of the produced model (which is connected to the data processing phase). This may look like a conceptual compromise, but the alternatives are worse. Either we ignore this fact, or we make subjective guesses.



**Ronald Haynes**

**University of Cambridge**

**Co-Chairman of the IIIF 3D Community**

Ronald Haynes is a University Senior Computer Officer at the University of Cambridge, and has been part of academic ICT in the US and UK, spanning modems to metaverse. Extensive experience in IT Community Development at Cambridge has combined with that of other universities to form the COGenT (Cambridge-Oxford-Glasgow-Edinburgh) consortium to collaborate on HE IT professional CPD, along with colleagues at Harvard, Yale and other US universities in the HELD (Higher Education Learning & Development) group. Active technical research interests include collaborative technologies for unifying communications and sustaining distributed and learning communities, cultural and investigative potentials for 3D/XR, and other complementary physical and virtual immersive technologies, and he has presented and published in the area of the use of Augmented Reality/XR in museums. Formerly he was a consultant, technical writer, and editor in Pittsburgh (USA) and London, developing and publishing on the interworkings of the multitude of microsystems. He is a Governor of St. Mary's School (Cambridge), a Trustee of the Eckhart Society, an Associate of Cambridge Digital Humanities, and holds BCS, ACM, Computer Society, and IEEE membership. Ronald also co-chairs the IIIF (International Image Interoperability Framework) 3D Community and 3D Technical Specification Group, which is helping explore options for a UK 3D repository with the UK's AHRC (Arts & Humanities Research Council), as well as persistence and interoperability options for sustainable metaverse building with IEEE, Europeana, and UNESCO.

**PRESENTATION TITLE: IIIF 3D - Standards & Sustainability for the Model Metaverse**

**ABSTRACT:**

Following global efforts establishing IIIF use for text and images (2D) and audio and video (A/V) digital collections, there is growing commitment to extend and develop such standards for 3D content. The IIIF 3D Community Group (CG) is collaboratively evaluating common challenges and potential solutions with major 3D developers and researchers, forming the IIIF 3D Technical Specification Group (TSG) to engage extensively with specialists, user communities, and standards bodies. The combined and complementary work of CG and TSG is considering ways not only to fully extend IIIF into the 3rd dimension, but also to enable exploration of new digital opportunities, including options to try to address the concerns of decolonisation and digital/object repatriation. In addition, the TSG is considering options for creative incorporation of 2D and A/V with 3D data, enabling combinations to form digital dioramas, scene and soundscape reconstructions, and the potential to help build an inclusive metaverse.

## EU PROJECTS & CHAIRS

### UNESCO Chair on Digital Cultural Heritage

<https://digitalheritagelab.eu/>



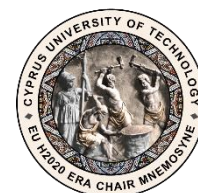
UNESCO Chair on  
Digital Cultural Heritage at  
the Cyprus University of Technology

The main objectives of the newly established UNESCO Chair on Digital Cultural Heritage at the Department of Electrical Engineering, Computer Engineering and Informatics at the Cyprus University of Technology over the next years are to:

- Carry out a wide-reaching program of awareness raising and knowledge-sharing programs on the role of Digital Cultural Heritage (DCH) in the Eastern Mediterranean region and beyond, utilizing conferences and events, web and social media channels, academic exchanges and all possible media publicity vehicles.
- Introduce model DCH curricula ('Cultural Informatics') at vocational, undergraduate and postgraduate levels and extend course availability, teaching and study facilities to students internationally through state-of-the-art e-Learning.
- Define, extend and carry out a program of research in digital heritage which will further UNESCO's cultural heritage agenda in the region and to impact its key objectives.
- Extend to communities across the region usable and affordable systems for telling the stories of their own heritage and expressing their identity online, in a context of inter-communal cooperation.

### EU ERA CHAIR on Digital Cultural Heritage – MNEMOSYNE

<http://erachair-dch.eu>



Mnemosyne is a project for a single-stage Coordination and Support Action submitted under WIDESPREAD-03-2017 – ERA Chairs.

Cultural Heritage is a strategic resource for Europe with high cultural, social, environmental and economic value. The era of Digital Cultural Heritage (DCH) is now well underway and the European research resource for DCH has grown significantly in recent years. But the visible contribution of the Widening countries to this effort remains relatively weak. The Digital Heritage Research Laboratory (DHRLab) at Cyprus University of Technology (CUT) has been an exception in this respect, becoming a beacon in the Eastern Mediterranean and for Europe in general, in particular through its leadership of key initiatives in DCH research training and in policy co-ordination and support. While the Cypriot economy gradually recovers, in order to maintain and expand its leading role in DCH research, the DHRLab needs further investment. This project is an ideal opportunity to ensure this by means of a well-designed and iterative process of strengthening its research capacity and restructuring of its role. Mnemosyne will proceed from the appointment of an outstanding researcher and research manager as the ERA Chair holder in 2018 who will attract, direct and maintain high quality human resources and negotiate and implement the necessary structural changes to achieve excellence on a

sustainable basis. The project will be carried out over a period of 5 years. Following recruitment of the ERA Chair Research Team, a three-phase research programme centred on the holistic documentation of the DCH lifecycle in support of existing and potential user needs will be carried out and extensively evaluated, with strong attention paid to exploitation. Communication activities will be strategically planned and refined from the outset of the work and will last throughout the project duration.

### **European Study on quality in 3D digitization of tangible Cultural Heritage – VIGIE 2020/654**



STUDY ON QUALITY IN 3D  
DIGITISATION OF TANGIBLE  
CULTURAL HERITAGE

<https://digitalheritagelab.eu/>

The overall aim of this study is to improve the quality of 3D digitisation projects for tangible cultural heritage, in support of European Union cultural heritage strategies. This study will enable cultural heritage professionals, institutions, content-developers, and academics to define and produce high-quality digitisation standards for tangible heritage.

### **ViRTUAL MULTIMODAL MUSEUM PLUS**



<https://www.vi-mm.eu/>

The **ViMMPlus** initiative is the successor to the ViMM Coordination and Support Action, funded under the European Union (EU) Horizon2020 programme, October 2016 - March 2019, in order to define and support high quality policies, strategic decision-making, the utilisation of breakthrough technological developments and to nurture an evidence-based view of growth and development impacted by Digital Cultural Heritage (DCH). ViMM was selected as a success story and its Manifesto, Action Plan and Roadmap were influential in the Member States Declaration Cooperation on Advancing Digitisation of Cultural Heritage in connection with EU digital day 2019. All the results of ViMM are visible on its platform <https://www.vi-mm.eu>. ViMMPlus continues to be coordinated by the Digital Heritage Research Laboratory at Cyprus University of Technology, holder of the UNESCO Chair in Digital Technology and the Horizon 2020 European Research Area Chair in Digital Technology, through its emphases on promoting international cooperation between digital heritage agencies and its work on standardisation for the holistic documentation of advanced 3D digitisation.

### **Interreg V-A (Greece – Cyprus) DigiArc: Preservation and promotion of medieval cultural heritage of Aegean and Cyprus area.**



<http://digiarc.eu/>

The challenge that the partnership needs to encounter recommends an implementation of a colossal project for the preservation and promotion medieval age monuments, which their significant value determines the cultural and

generally the natural environment of the area. The implementation will happen using cutting-edge technology (terrestrial and aerial digital capture) that will document the monument and their natural environment with excellent precision. A significant challenge is the possibility of digital reconstitution, in part with digital rehabilitation techniques and according to bibliographic documentation, where it's needed. The project focuses on medieval fortification works and castles on the islands of Rhodes and Cyprus.

## MARIE SKŁODOWSKA-CURIE ACTIONS (ITN) – CHANGE: Cultural Heritage Analysis for New Generations.



<https://change-itn.eu/>

The CHANGE project will train a new generation of early-stage researchers towards a common goal, namely the assessment of changes of tangible cultural heritage (CH) objects and their monitoring in the atmosphere and/or during their conservation treatment using multimodal imaging techniques in complement to more traditional analytical techniques. Their research will consist of optimised data capture and their analysis, visualisation and management to ensure a better documentation and long-term preservation of our common EU CH. This work will be carried out within an interdisciplinary environment involving 5 CH and 4 Information & Communication Technologies (ICT) beneficiary institutions as well as 9 CH, ICT and industrial partners from 8 EU countries.

## European Open Badges Platform (EU-OBP).

<http://eu-obp.eu/>



European Open Badges Platform, funded under the Erasmus+ program of the European Commission, wants to assess, develop and promote the common EU platform for digital badges, targeted at adult education organizations, adult educators and adult learners that also represent the main target groups. The first result of the project; the reader about the implementation of badges in adult education is now available. Click on the image to read the full document in English, German Spanish, Romanian, Slovenian, French, Greek and Swedish.

OPening cultural HERitage to communities during the central-Italy post-earthquake long-term restoration process: digital technologies and new competencies for professionals (OPHERA).



<https://ophera.beniculturali.it/>

OPHERA-OPening cultural HERitage to communities during the central-Italy post-earthquake long-term restoration process: digital technologies and new competencies for cultural professionals.

Cultural heritage damaged due to natural disasters, represents a loss of artistic and historical materials and in the same time is an immaterial loss of memory and people identity. One of the most impacting events both on communities and on cultural heritage was the 2016/2017 Central-Italy earthquake.

In Marche Region, the most affected territory, 1664 historical listed churches and 1223 listed buildings (including castles, palaces and archaeological areas) were damaged or destroyed. From those listed buildings more than 13000 movable artworks with different levels of damage were removed and stored in temporary conservation centres. In terms of landscape impact, 285 historical villages were damaged.

The OPHERA project concept is based on the awareness that the restoration of this cultural heritage is a long-term process, and will be therefore dedicated to the next generations. The project idea is therefore to make accessible part of the damaged cultural heritage and cultural-artistic contents associated to the restoration activity throughout the restoration process by mean of traditional and advanced interactive methods and tools. OPHERA project aims to reveal the restoration process cultural values, which are characterized by a rich pattern of skills and creative steps usually shared among restoration professionals (architects, artwork restorers, researchers, art managers, historians) including the most advanced technologies about preventive methods for heritage conservation in order to increase the people culture of prevention.

The project, through the training of a European team of cultural operators and artists and the organization of two Open-yards events in the restoration sites, aims to foster a cultural exchange between restoration professionals and a wider audience represented by citizens, visitors, local administrators, students, cultural association in order to transform the restoration process in a cultural event.

IMproving Sustainable Development Policies and Practices to access, diversify and foster Cultural TOURism in European regions and areas (IMPACTOUR).



<https://www.impactour.eu/>

The EU-funded IMPACTOUR project is connecting Cultural Tourism stakeholders and researchers, envisaging new approaches and methods that will support European Cultural Tourism, reinforce a feeling of belonging, value minority

cultures and promote Europeanisation. The project will elaborate on an advanced and adaptable methodology to estimate the impact of Cultural Tourism on EU regional economic growth. It will combine data analytics algorithms with machine learning and AI approaches to improve policies and actions on Cultural Tourism.

## Europeana Common Culture.

<https://pro.europeana.eu/project/europeana-common-culture>



**Europeana Common Culture**, lasting throughout 2019 and 20, has aimed to develop a harmonised and coordinated environment for Europeana's national aggregators of digital cultural heritage, collaborating, share resources and technical means, agreeing on common recommendations and standards and improving the quality of content and four million metadata records to increase user satisfaction. Experiments in semantic enrichment have been conducted to improve discoverability and indexing of Europeana records in order make them better findable and useful. An innovative pilot for a Linked Open Data Aggregator (LODA) data demonstrate is also being concluded. In its role as an Activity Leader, CUT has contributed through coordinating a rich programme of training webinars in order to increase awareness of Europeana and capacity building in the cultural sector. A wide-ranging survey of digital heritage crowdsourcing activities across Europe and their future potential within the Europeana ecosystem has also been conducted by CUT.

## Europeana Archaeology.

<https://europeanaarchaeology.carare.eu/>



The Europeana Archaeology project, which ran from February 2019 until October 2020, aimed to increase the amount of high-quality digital content for Europe's rich heritage of archaeological monuments, historic buildings, cultural landscapes and artefacts that is accessible online through Europeana and available for reuse. During the project, partners enriched the quality of existing collections, added new collections and carried out targeted digitisation. Work to map vocabularies and to increase the use of multilingual Linked Open Data has helped to raise the quality of the metadata and provided a set of services for archaeology available to Europeana aggregators and content providers. The content provided by the project is directly available to users through Europeana's Archaeology thematic collection. The project is led by the University of Vilnius. As a partner, Cyprus University of Technology has contributed with a presentation of the cultural wealth of Byzantine church of Asinou, namely its frescoes. Also the Digital Heritage Research Lab successfully enriched the quality of digital content of Europeana by creating 3D models for two of Asinou church's icons, namely the icon of Virgin Mary, known as the *Asinou icon*, and the icon of John the Baptist. Finally, Cyprus University of Technology has contributed to the promotion of the archaeological discipline with one of the most important photographs in Europe related to the excavation process the discovery of 'Horned God' in Enkomi by Porphyrios Dikaïos.

## RESEARCH INFRASTRUCTURES

### CLARIN - European Research Infrastructure for Language Resources and Technology - CYPRUS



<https://www.clarin.eu/>

CLARIN stands for "Common Language Resources and Technology Infrastructure".

It is a research infrastructure that was initiated from the vision that all digital language resources and tools from all over Europe and beyond are accessible through a single sign-on online environment for the support of researchers in the humanities and social sciences.

In 2012 CLARIN ERIC was established and took up the mission to create and maintain an infrastructure to support the sharing, use and sustainability of language data and tools for research in the humanities and social sciences. Currently CLARIN provides easy and sustainable access to digital language data (in written, spoken, or multimodal form) for scholars in the social sciences and humanities, and beyond. CLARIN also offers advanced tools to discover, explore, exploit, annotate, analyse or combine such data sets, wherever they are located. This is enabled through a networked federation of centres: language data repositories, service centres and knowledge centres, with single sign-on access for all members of the academic community in all participating countries. Tools and data from different centres are interoperable, so that data collections can be combined and tools from different sources can be chained to perform complex operations to support researchers in their work.

### DIGITAL RESEARCH INFRASTRUCTURE FOR THE ARTS AND HUMANITIES - CYPRUS



<http://www.dariah-cy.eu/>

DARIAH Cyprus is the Cypriot Digital Research Infrastructure for the Arts and Humanities, which aligns its activities with those of the central European Digital Research Infrastructure for the Arts and Humanities DARIAH-EU ([www.dariah.eu](http://www.dariah.eu)), to which Cyprus is a member state. DARIAH-EU is one of the 12 largest research infrastructures of the European Research Infrastructure Consortia (ERIC) which aims to promote and support Arts and Humanities sector on a research level. As member of this European research network, Digital Heritage Research Laboratory, dedicated to the research on the specific areas of digitization, archiving and promotion of tangible and intangible Cultural Heritage, as well as to the modelling of knowledge, actively contributes to the infrastructure of DARIAH-EU, and highlights Arts and Humanities through Culture.

## INTERNATIONAL ORGANISATIONS

### ▪ PHOTOCONSORTIUM

[www.photoconsortium.net](http://www.photoconsortium.net)

International association spin-off of Europeana Photography project, a thematic aggregator about early photography that digitized and made accessible online nearly half a million historic photographs. Within the legacy of Europeana Photography, Photoconsortium is also the curator of the travelling exhibition All Our Yesterdays.



PHOTOCONSORTIUM

### ▪ CARARE ASCOSIATION

[www.carare.eu](http://www.carare.eu)

CARARE aims to advance professional practice and foster appreciation of the digital archaeological and architectural heritage through the promotion for public benefit of digitisation, connection. Enhancement, and use of digital content nationally and internationally. It supports the creation, connection, enhancement and use of digital archaeological and architectural heritage resources, for work, research, learning and for enjoyment



carare

### ▪ MICHAEL CULTURE ASSOCIATION

<http://www.michael-culture.eu/>

Michael Culture Association constitutes a non-profit organization that supports European and national cultural policies by gathering a strong network of more than 100 public and private organizations from all over Europe.



Michael  
Culture  
Association

- EUROPA NOSTRA

<http://europanostra.org>



Europa Nostra was founded on 29 November 1963 in Paris. For over 50 years, we have celebrated, protected and lobbied for cultural heritage. Europa Nostra is today recognised as the most representative heritage organisation in Europe with members from over 40 countries.

- Marie Curie Alumni Association - Cyprus Chapter

<https://www.mariecuriealumni.eu/groups/cyprus-chapter>



The group has been created to bring closer all the Marie Curie fellows and Alumni that live in the geographical area of Cyprus under a common goal, to enhance the image of the MCAA within the Cypriot territory.

## WORKSHOPS

### **Workshop 1 - Data Space for Cultural Heritage during the digital transformation: The case of Greece and Cyprus.**

***Tuesday 8<sup>th</sup> of November: 11:00 – 13:00***

The event is organized by the H2020 MNEMOSYNE project, to discuss how cultural heritage (CH) institutions in Greece and Cyprus faces the challenges of the digital transition and to emphasize how the developed *MNEMOSYNE* methodology for a holistic digital documentation can help and support all the CH stakeholders and creative industry.

Cultural heritage assets have been constantly undergoing changes and degradations over time, due to environmental conditions, destruction by human intervention. To preserve the knowledge of the past, all the CH monuments, sites and objects should be protected with the greatest safety measures from environmental and human interventions and must be thoroughly studied and recorded holistically through digitization (tangible and intangible).

The proposed common European data space for cultural heritage is fully supporting the transformation of Europe's cultural sector, and foster the creation and reuse of content in cultural and creative sectors. Therefore, this workshop is trying to give an inside of the work achieved in the last years in key museums in Greece and Cyprus and highlight the different challenges and future risks (current technical, financial, administrative, and legal barriers).

### **Workshop 2 - Citizen Science workshop**

***Tuesday 8<sup>th</sup> of November: 16:00 – 18:30***

In the framework of the Citizen Heritage Erasmus+ project, PHOTOCONSORTIUM organizes a key event to discuss about citizen science in (digital) cultural heritage and education, also including a special co-creation activity aiming at engaging local citizens and communities with their tangible and intangible heritage. The event also builds upon the work and research carried out by successful past projects such as WeAreEuropeForCulture in Nicosia, PAGODE – Europeana China and WEAVE.

Engaging citizens in education and cultural heritage curation and research is gaining a growing attention in the cultural sector today, as cultural heritage institutions are constantly looking for new ways to involve citizens in their activities and the link with education and communities' inclusion actions is becoming more and more in focus.

Convincing exemplary projects have demonstrated how citizen engagement appeal and digital participation are essential in crisis situations such as climate change and pandemics. Yet the potential or the scope of community involvement in scientific research haven't been fully explored so far, also in the light of adding to the process of inclusion and diversity representation, by bringing on the table the different views and counter-voices to what has been considered so far – and often unjustly – as canonized socio-historical and cultural narratives.

Citizen Heritage project takes the citizen science approach to the world of cultural heritage, where the digital realm creates new opportunities to reach out to broader audiences and allow collective knowledge to bring new inputs to humanities and research. Additionally, in the post-covid scenario it is more important than ever to reconnect with local communities and the tangible and intangible heritage they feel represented with: this can be enabled by deploying

compelling user engagement actions such as user-driven storytelling, co-creation, crowdsourcing and citizen participation. This workshop will allow participants to expand knowledge about concepts and enabling tools for citizen engagement with cultural heritage resources and research. It is addressed to cultural heritage professionals, digital humanities researchers, higher and secondary education sector, citizens, culture lovers and other interested users.

### **Workshop 3 - Cultural Tourism workshop.**

***Wednesday 9<sup>th</sup> of November: 16:00 – 18:30***

The event is organized by H2020 project INCULTUM, to discuss about the role of community engagement and citizen participation in enhancing and promoting sustainable tourism in peripheral areas that are not often part of the mass tourism itineraries. INCULTUM research, experiments and findings are oriented to foster positive impacts of cultural tourism, and to demonstrate the high potential of the marginal and peripheral places, cultural heritage and resources when managed by local communities and stakeholders.

This workshop is addressed to cultural managers, cultural heritage institutions, local communities with a stake on tourism potential of their areas, policy makers and researchers on sustainable tourism and local promotion.

Tourism is more than travelling and consumption; it has great potential when it comes to culture, nature, knowledge and personal experiences. Travelling is a way to learn and improve oneself, to enrich one's vision and improve mutual understanding. The INCULTUM project deals with the challenges and opportunities of cultural tourism with the aim of furthering sustainable social, cultural and economic development. It is exploring the full potential of marginal and peripheral areas when managed by local communities and stakeholders. Innovative participatory approaches are adopted, transforming locals into protagonists, able to reduce negative impacts, learning from and improving good practices to be replicated and translated into strategies and policies.

Ten pilot cases of living territories and communities are investigated, and are expected to generate new knowledge about tourism sustainability and promotion. The implementation of advanced econometric methods and the pioneering introduction of machine-learning tools into tourism research will support data-driven solutions. Findings will suggest recommendations for effective and sustainable policies, create new synergies among public and private stakeholders, and new paths to market for tourism promotion of local territories.

### **Workshop 4 - Workshop: Digital Technologies and the future of Illicit trafficking of Cultural Property.**

***Thursday 10<sup>th</sup> of November 11:00 – 13:00***

This workshop focuses on the latest developments in the use of technologies in the field of illicit antiquities research and on the multidisciplinary dimensions of heritage protection. Various academics will present some of the most important and recent projects, including cross-disciplinary research on already repatriated antiquities and the monitoring of the international antiquities market. European and national funding enabled these academics to research new paths involving technological tools for monitoring, safeguarding, and protecting cultural goods through enhancing authenticity, provenance and traceability. The purpose of the workshop is both to inform the cultural heritage stakeholders and the public about the latest projects related to illicit antiquities research, and, most importantly, to widen the discussion on

new institutional approaches and on developing interdisciplinary projects and methodologies for implementing technological tools.

## **Workshop 5 - Scaffolding Creativity: Framework, toolchain, and case studies on how to Create Virtual Exhibitions.**

***Thursday 10<sup>th</sup> of November: 14:00 - 18:30***

Due to COVID-19 pandemic museums have closed their premises for an extended period of time and artists have faced serious economic and social challenges, since the pandemic crisis demolished literally real-world exhibitions. In similar cases, ICT can provide valuable help to foster creativity and help museums and artists to present their artworks. From a technological perspective, eXtended Reality (XR) technologies, like mixed reality (MR), augmented reality (AR) and virtual reality (VR), represent emerging research fields which allow real-time streaming and replication of physical artifacts through 5G. Such challenges are common; therefore, they require a cross-sectoral perspective to achieve and incorporate far-reaching solutions allowing to understand the diverse needs and challenges of virtual exhibitions. The vision to scaffold the creativity by supporting museums and artists to create, publish and disseminate various kinds of virtual exhibitions in a seamless, innovative, and easy-to-use way is by definition a multi-disciplinary research and development endeavor.

The event will provide an opportunity for stakeholders and all those interested to learn about the recent developments in virtual exhibitions to share, exchange and discuss their expertise as well as practices in this field. This will enable them to gain insights in relation to this expanding field from a variety of perspectives. The event will focus on identifying technologies of digitization, documentation, digital preservation, dissemination, and presentation bringing together researchers and practitioners that will present best practices, success stories and use cases from various leveraging issues on virtual museums, digital collections, technologies, and open-source tools. Emphasis will also be given to identifying ways forward, especially in relation to synthesizing existing approaches, as well as improving or adapting them for specific needs or contexts, through the exchange of suggestions offered by participating stakeholders.

The workshop is organized by the ERASMUS+ project 'Scaffolding Creativity of Arts Students: Framework, Toolchain, and Educational Material on how to Create their Own Virtual Exhibitions' – For more info about the project you can visit the project website: <http://creams-project.eu/index.php>.

## Monday 7th of November

### Keynote speakers

Monday 7th of November	
9:00 - 9:30	<b>Opening Ceremony</b>
9:30 - 10:00	<b>Keynote Mrs. Catharine DASS, UK Parliament</b>
10:00 - 10:30	<b>Keynote Prof. Yasmine MAKAROUN, ICOMOS, Lebanon</b>
16:00 - 17:00	<b>Joint Keynote Mrs. Susan de Menil and Mr. Thomas Kline</b>
Monday 7th of November	

## PAPER SESSIONS

SESSION
<ul style="list-style-type: none"> <li>• EU Study VIGIE 2020/654 on quality in 3D digitisation of tangible cultural heritage</li> <li>• Atlas into Digital Twin: quality and complexity in mass digitization. The Parco Archeologico dell' Appia Antica</li> <li>• Replicating History through the Digitization of Cultural Heritage Artefacts</li> <li>• Digital Suvey, 3D Modelling and Historical Recreation of Cultural Heritage using Terrestrial Laser Scanning, Unmanned Aerial Vehicles and Mixed Reality Methodologies: The case of DigiArc Project</li> <li>• 5D-ARCH-AID / UFO Project: Air Documentation of Architectural Heritage at Risk</li> <li>• Inverse rendering for 3D reconstruction of glass cultural heritage objects: a volumetric approach</li> <li>• Towards complete digital twins in cultural heritage with ART3mis 3D artifacts annotator</li> </ul>
<ul style="list-style-type: none"> <li>• A Machine Learning Approach to Assist Architectural Research by Matching Images Directly with Text</li> <li>• CFD Simulation and 3D Visualization on Cultural Heritage sites: The Castle of Mytilene</li> <li>• Digital Permanence of the Old City of Aleppo Through Analysis, Conservation and Digital Storytelling</li> <li>• Comprehensive processing of information on surface stone working on a set of buildings of the Prague UNESCO World Heritage Site- methods and outputs</li> <li>• Application of 3D technology to create a detachable filling for an earthenware skyphos</li> <li>• Developing innovative tools for maximization of cultural experience: The Cave3 project</li> </ul>
<ul style="list-style-type: none"> <li>• Interactive virtual representation and digital proxemics for tangible and intangible heritage: shaping the ways we interact with knowledge, architecture and space in virtual reality</li> <li>• Errant Artworks and Patrimony in evolution: the virtual reconstruction of the crypt in Santa Maria dei Bianchi Gubbio, Italy</li> <li>• Digital Photo- realistic Documentation of Ancient Mosaics</li> <li>• IoT infrastructure for the support of preventive measures and actions regarding the environmental conditions of cultural heritage collections</li> </ul>

- **EU Study VIGIE 2020/654 on quality in 3D digitisation of tangible cultural heritage (Project Paper)**

*Marinos Ioannides et al.*

**Abstract:**

The main objective of the EU VIGIE2020/654 study was to map parameters, formats, standards, benchmarks, methodologies and guidelines which relate to 3D digitisation of tangible cultural heritage, to different potential purposes or uses and to general-purpose visualisation, by type of tangible cultural heritage, whether immovable or movable, and by degree of complexity. A key goal of the study was to produce a framework that would enable cultural heritage professionals, institutions and other custodians of cultural heritage, providers of 3D digitisation services for cultural heritage and other researchers in 3D digitisation technologies to define and produce high quality in the context of specific 3D digitisation projects for tangible cultural heritage.

The study results have been published by the European Commission under gold open access: <https://bit.ly/3T1PV43>

- **Atlas into Digital Twin: quality and complexity in mass digitization. The Parco Archeologico dell'Appia Antica (Project Paper)**

*Raffaella Brumana et al.*

**Abstract:**

The article discusses the research aspects related to the mass digitization undertaken by the Parco Archeologico dell'Appia Antica (PAAA), the Archaeological Park of the Appian Way, to build a digital infrastructure supporting the needs in terms of knowledge enhancement, conservation, communication and fruition. It addresses the question of how to combine the requirements of massive digitization in quantitative terms, related to the vastness of its precious complexes, with the quality assurance of the results in terms of accuracy, from surveying to the data processing flow, to the informative modelling including usability by all (Scan-to-HBIM-to-XR). The paper discusses shift of geographical atlas towards 4D Digital Twins (DT): the DT is conceived as a harmonious Vitruvian digital man, moving in space and time, linking past and future, supporting cross-relationships, and helping to decode the complexities under natural and anthropic threats. The DT combines three level scales (environmental & landscape, architectural & archeological scale, movable objects) in the immersive fluid hybrid space of Appian Way 11 km merging technologies (as MMS and Spheric Cameras) in support of the design projects as the slow mobility, the preservation of fragile remains, as well as the virtual re-positioning of digitized sculptural artifacts scattered in museums; the Atlas is embodied by informative models nodes (HBIM) conceived as e-4D Object Libraries with vocabularies, as in the case of the Aqueduct Claudio-Anio Novus, supporting comparisons among nodes: 3D volume stratigraphy and building archeology HBIM nodes convey all the information within the PAAA geographic hub as gears transferring their richness raising people awareness as a source of health and wellbeing as a meter of quality. The first year allows the first assessment fostering quality standards and benchmarks toward people re-use: a radar chart from the VIGIE Study on quality and complexity in CH 3D digitization within EU digital-strategy is exploited.

▪ **Replicating History through the Digitization of Cultural Heritage Artefacts (Project Paper)**

*Kyriacos Themistocleous et al.*

**Abstract:**

Valuable artefacts that can be viewed only in collections and museums can be replicated into a digital model to make it available for researchers and the public. Artefacts are delicate and often unavailable to researchers to examine in detail. Digital replication can be valuable in order to make artefacts available to scientists so they can study these artefacts without damaging them. 3D printing can be a valuable tool to physically replicate the artefact and study its use as originally intended. The methodology of securely digitally documenting an artefact from the museum/collection setting by using the necessary precautions to prevent any damage, reproducing the artefact to a digital model, and replicating the artefact to a physical model using 3D printing is described in this paper.

▪ **Digital Survey, 3D Modelling and Historical Recreation of Cultural Heritage using Terrestrial Laser Scanning, Unmanned Aerial Vehicles and Mixed Reality Methodologies: The case of DigiArc Project (Project Paper)**

*Christos-Nikolaos Anagnostopoulos et al.*

**Abstract:**

The preservation and safeguarding of our Cultural Heritage (CH) from the unpredictability of hazards must be seen as a duty towards whole humanity. During recent years, Terrestrial Laser Scanning (TLS), Unmanned Aerial Vehicle (UAV) Photogrammetry and Mixed Reality (MR) applications have found a wide and prominent purpose in the field of Cultural Heritage map-ping, recording, preservation and promotion. The present article aims to pre-sent a holistic approach from 3D surveying to 3D representation and promo-tion of Medieval Cultural Heritage, giving an overview of the methodologies implemented. With the combination of TLS and UAV photogrammetry techniques, a complete digital record/portfolio of the Medieval Fortification in Rhodes and Cyprus is acquired in the context of INTERREG VI GR-CY DigiArc project. This record forms the basis for historical documentation and recreation using the HBIM concept and for further development of various Mixed Reality applications that increase the of visibility, accessibility and visitability of the Monuments.

▪ **5D-ARCH-AID / UFO Project: Air Documentation of Architectural Heritage at Risk (Project Paper)**

*Pavlos Chatzigrigoriou et al.*

**Abstract:**

The European Heritage Building stock is getting older, and historic places' abandonment is a fact in many regions. The considerable potential of herit-age-led regeneration in historic cities, villages, and the countryside can be-come a real game-changer toward a greener and more sustainable Europe, en-abling and amplifying its social and economic recovery. Consequently, the digital methodologies for documenting, recording, and protecting monu-ments and historic buildings have expanded over the last decade. Small Fly-ing Objects (SFO) can play an essential role in this direction, speeding up the processes and providing more accurate data. In the project "5-Dimension Architectural Air Documentation" (5D-ARCH-AID), we devel-oped an innovative service that combines a well-established historic build-ing documentation methodology (HERMeS) and SFOs' technology for 3D reconstruction to create a conservation plan that can further engage

the re-search and the local community. The project uses the protected medieval historic settlement of Ano Syros, Cyclades, Greece, as a case study. The produced digital heritage data are integrated and openly available in an inclusive online portal with maps (2D), models (3D), history and oral testimonies (4D), and conservation data (5D) as a final product for further re-search exploration. The outcome is at the disposal of local administration and public authorities, visitors, heritage enthusiasts, experts, professionals, other SMEs, and the creative sector. Furthermore, we assume it constitutes an advanced transferable solution at domestic and international levels to generate conservation plans, shape decisions, make interventions, engage the community, and attract tourism.

- **Inverse rendering for 3D reconstruction of glass cultural heritage objects: a volumetric approach (Project Paper)**

*Petros Stavroulakis et al.*

**Abstract:**

The practical mass 3D reconstruction of fragile, transparent Cultural Heritage (CH) objects, typically made of glass, requires cost-efficient, non-contact 3D reconstruction methods. Object reconstruction using optics and visible spectrum illumination, is currently the most cost-effective, non-contact method of digitizing CH artefacts, but is limited to objects with mostly opaque and diffusive Lambertian surfaces. Extending the use of such practical optical 3D reconstruction methods for transparent objects is an open problem. The difficulty encountered is due to the interaction of visible light with transparent objects, which produces low levels of reflectivity and, worse even, high-levels of refraction and interreflection. In this work, we revisit inverse rendering as a candidate technology, to reconstruct stained and clear, transparent CH artefacts made of glass. It is shown that volumetric-based inverse rendering has the potential to acquire the external surfaces of glass objects in less than 100 optimization iterations/epochs. The accuracy of the reconstructed external surfaces of CH-like glass objects, were referenced to a metrological-grade structured-light reconstruction apparatus, and were found to be acceptable for less demanding CH applications, having a mean dimensional error between 0.57-1.74 mm on the objects measured. Keywords: Inverse rendering, Cultural Heritage, Transparent Glass Artefacts, Digital Preservation.

- **Towards complete digital twins in cultural heritage with ART3mis 3D artifacts annotator (Project Paper)**

*Dimitrios Karamatskos et al.*

**Abstract:**

Archaeologists, as well as specialists and practitioners in cultural heritage, require applications with additional functions, such as the annotation and attachment of metadata to specific regions of the 3D digital artifacts, to go beyond the simplistic three-dimensional (3D) visualization. Different strategies addressed this issue, most of which are excellent in their particular area of application, but their capacity is limited to their design's purpose; they lack generalization and interoperability. This paper introduces ART3mis, a general-purpose, user-friendly, feature-rich, interactive web-based textual annotation tool for 3D objects. Moreover, it enables the communication, distribution, and reuse of information as it complies with the W3C Web Annotation Data Model. It is primarily designed to help cultural heritage conservators, restorers, and curators who lack technical expertise in 3D imaging and graphics, handle, segment, and annotate 3D digital replicas of artifacts with ease.

- **A Machine Learning Approach to Assist Architectural Research by Matching Images Directly with Text (Short Paper)**

*Cindy Kröber et al.*

**Abstract:**

This paper presents a work in progress of the ongoing, multi-institutional HistKI (Historische Künstliche Intelligenz, or Historical Artificial intelligence) project seeking to make architectural elements from 2D images and 3D models searchable using text. The project is a collaboration of researchers from across Germany specializing in Art History, Computer Linguistics, and Computer Vision. This article focuses upon the textual aspect of the project, outlining the research pipeline from identifying the necessary texts to the application of Machine Learning (ML) techniques in order to link the architectural terms found within the texts to their respective images. To this end, we have selected the palatial complex known as the Zwinger in Dresden, Germany, as a case study because featuring a multitude of architectural elements specific to the Baroque period, for which many scholarly texts exist. In addition to the texts regarding the Zwinger, we have collected a corpus of 2D images from Wikimedia Commons of Baroque palaces to automatically produce 3D point clouds in order to train the computer to recognize the architectural elements described by the terms in the texts. Furthermore, we have accumulated a corpus of curated historical photographs of the Zwinger in order to create a 4D model of its form over time, which will also be linked to the architectural terms drawn from the texts. The possibility to search for architectural elements directly from images rather than relying upon captions will provide researchers an immense advantage towards identifying architectural features and trends over time.

- **CFD Simulation and 3D Visualization on Cultural Heritage sites: The Castle of Mytilene (Project Paper)**

*Orfeas -Theodoros Eleftheriou et al.*

**Abstract:**

This paper presents a CFD and 3D Visualization pipeline to simulate wind flow over a heritage site and then visualize the results. As case study, a coarse 3D geometry model of the Fortress of Mytilene, Lesvos island, Greece and its surrounding was generated from open access Digital Elevation Models. The CFD simulation of the air flow on the wider heritage site area was performed using the steady-state version of the in-house flow solver IBOFlow® (Immersed Boundary Octree Flow Solver) developed at Fraunhofer-Chalmers Research Centre. All the simulations were completed considering the mean wind direction and wind speed during the last 22 years from actual weather data retrieved from Open Weather Map. The visualization results were achieved through Unreal Engine, using built-in visualization tools and a tailored-made plugin to visualize the air flow over the monument and on the monument's wall. As discussed in the conclusion section, the overall process proposed in this paper can be implemented for an initial assessment of the effect of environmental parameters over any heritage site and moreover, it may form the basis for valuable assistive tool for conservators and engineers.

- **Digital Permanence of the Old City of Aleppo Through Analysis, Conservation and Digital Storytelling (Short Paper)**

*Rahaf Orabi et al.*

**Abstract:**

The war damage sustained by the Old City of Aleppo constitutes a massive challenge for cultural heritage specialists, both local and international. For this excessive damage, digital technology offers an innovative multifaced approach for documentation, analysis, and dis-semination of endangered historical centers. This paper presents a local project that employs technological advancement in the context of a post-war study of a section of the Old City of Aleppo on three fronts. Firstly, regarding the research and analysis possibilities provided by the digital datasets, such as Digital Elevation Models (DEMs) as a vital tool for an accurate representation of the city and a prerequisite and base for any following study or analysis. Secondly, it investigates the possibilities of an HBIM approach as a platform for preparing conservation and restoration plans and presents an example for possible implementation in al- Madrassa al- Halawiyya. Finally, it highlights the prospects of immersive experiences and digital story-telling, such as gaming experiences and virtual tours as a tool for disseminating, raising awareness, and achieving digital permanence for the Old city of Aleppo.

- **Comprehensive processing of information on surface stone working on a set of buildings of the Prague UNESCO World Heritage Site - methods and outputs (Short Paper)**

*Jaroslav Valach et al.*

**Abstract:**

The article deals with the methods of digital documentation of stone working of historical buildings as a tool for determining the craftsmanship and materials used. The comprehensive body of knowledge not only allows to record the development of the craft in a selected locality, but also can be used to date objects with stone-worked surfaces, and in addition it helps to clarify the development of the stone craft as such, the share of foreign influence and domestic traditions. The individual records are based on complementary methods digital and traditional such as hand drawing, and in addition, are supplemented by methods of studying surface traces known from other disciplines. It appears that a prerequisite for both the production and application of these findings is the extension of heritage conservation to the level of surface micro-topography, as discussed in a separate section. To conclude this paper, the outputs of the body of knowledge are demonstrated using selected examples.

- **Application of 3D technology to create a detachable filling for an earthenware skyphos (Project Paper)**

*Rani De Vos et al.*

**Abstract:**

The current paper aims to demonstrate an innovative way of creating a detachable filling for an Ancient Greek vessel from the Geometric period, using both 3D technology and traditional ceramic restoration procedures. The followed restoration procedure is explained step by step, i) starting with a condition assessment of the object and removal of previous restoration materials, ii) through digital acquisition of the object and modeling of the missing part, iii) ending with 3D printing and retouching of the final filling. Based on a literature review two 3D printing materials, Polyamide 12 and Polypropylene, were selected and analyzed to compare their mechanical behavior and yellowing resistance to that

of Polyfilla, a plaster-based filling material commonly used in ceramics restoration. In general, 3D printed pol-yamide showed promising mechanical properties and yellowing resistance and was therefore selected for the final restoration.

- **Developing innovative tools for maximization of cultural experience: The Cave3 project (Project Paper)**

*Charisios Achillas et al.*

**Abstract:**

Utilization of modern three-dimensional technologies and creation of innovative and attractive digital applications for the promotion of the cultural heritage is constantly attracting wide attention at international level. Digital culture is widely exploited for the promotion of cultural content, the maximization of visitors' experience, the education of the wide public, the deepening of visitors into cultural principles, while also for the enhancement of accessibility for all. This paper presents the key results of the (on-going) Cave3 project that is co-financed by the European Regional Development Fund of the European Union and Greek national funds. In this work, the results of the visitors' requirements survey for digital tools are presented. The results of the survey show a high preference of visitors for new, advanced ICT tools. Moreover, the key project results from the digitization of the cultural content, the creation of serious games, the design and development of the open lab for the virtual conservation of the speleology and paleoanthropology artifacts and the architecture of the virtual museum to be developed within the framework of the project, are discussed. The paper concludes with interesting managerial insights from the Cave3 project's lifetime.

- **Implementation of the IIIF Presentation API 3.0 based on Software Support: Use Case of an Incremental IIIF Deployment within a Citizen Science Project (Project Paper)**

*Julien Antoine Raemy et al.*

**Abstract:**

As part of the Participatory Knowledge Practices in Analogue and Digital Image Archives (PIA) research project, we have been implementing Linked Open Usable Data (LOUD) standards including the International Image Interoperability Framework (IIIF) specifications to disseminate digital objects, their related metadata and streamline our processes. We have taken an incremental approach to IIIF deployment, first by installing the Simple Image Presentation Interface (SIPI), a IIIF Image API 3.0 server, followed by conceiving a workflow based on cookbook recipes created and vetted by the IIIF community for the generation of resources compatible with the IIIF Presentation API 3.0, one of the key components of our architecture. This workflow resulted in a monitoring exercise of this community-driven effort, principally to align the requirements of PIA and the IIIF Presentation API support of software clients.

- **Research Trends Analysis of using Artificial Intelligence in Cultural Heritage: An Overview of the Last Five Years (Short Paper)**

*Florin Girbacia et al.*

**Abstract:**

Artificial Intelligence (AI) has been implemented in various ways to assist re-searchers and cultural heritage (CH) practitioners. The purpose of this paper is to examine the research trends and present current applications of using AI and CH. A scientometric study of the research publications from 2017 to 2021 related to the use of AI in CH was conducted on the Web of Science and Scopus databases. ScientoPy software was used to identify the trending topics from authors keywords. An overview of the latest research in the field is also presented, including the way in which the artificial intelligence can be applied to assist in the discovery, description, classification and preservation of cultural heritage. The article provides insight into the major research topics of using AI in CH and can be a valuable guide for researchers, practitioners and funding agencies.

- **Development of Semantic Web Application for The Balinese Cultural Tradition (Project Paper)**

*Cokorda Pramatha et al.*

**Abstract:**

Traditional heritage is one of the reasons why many international and do-mestic tourists visit Bali. This diverse tradition has been practiced across the island and is based on the Balinese philosophical concept of Desa Kala Patra (space, time, and context). The Balinese traditions are strongly influ-enced by multi-cultural religions and local customs (adat). Many Balinese activities are highly related to a traditional ceremony that requires an offer-ing (Banten). Different places (villages) use different offerings for each cer-emony. This Balinese cultural heritage understanding usually passes to dif-ferent generations through socialization. Our digital humanities project takes advantage of the surge in enthusiasm and need for online learning in the current context of COVID-19. This study focuses on developing a knowledge-based system as an online heritage preservation and learning re-source in the form of the semantic web application to address a clear gap in Balinese digital humanity. The prototyping system development method was utilized for this project. Moreover, the ontology was developed as the backbone of the system following the Methodology development method. Two main features of semantic browsing and semantic searching were em-bedded in the system. An evaluation of functional requirements with a Black-Box method and non-functional requirements with a Technology Ac-ceptance Model (TAM) was conducted. The evaluation results indicated that the system meets the functional requirement, and the non-functional requirement evaluation showed that the developed system is useful and easy to use.

- **Blockchain-based revenue sharing system for empowering cultural heritage (Short Paper)**

*Mihai Duguleana et al.*

**Abstract:**

Nowadays, many factors endanger various cultural heritage assets, whether we refer to goods inside museums and art galleries or outside, as historical landmarks. Current geopolitical issues (COVID epidemic, military activities, food crisis) are causing a financial destabilization that translates into smaller involvement in conserving and promoting cultural

heritage assets. With the advent and development of blockchain technology, it is possible, to some extent, to outsource the resolution of this situation (this technology can also play an essential role in promoting these heritage elements). The system proposed by us addresses the three target groups: the initial stakeholders (museums, art galleries, local, national, and international authorities, and even companies), investors (the general public, companies, NGOs), and visitors. This system facilitates the financing of any cultural objectives with the help of a smart contract which, in practice, gives investors the chance to invest in a list curated by the initial stakeholders. Cultural assets are transformed into unique digital assets and offered to investors in the initial stage of digital "acquisition." Regular visitors will be able to use an application to give these goods a particular score in the exploitation stage. Within the limit of a part of the entrance ticket cost, investors will receive an income based on the score given by visitors. Following the implementation of a case study, the results are promising. Initial capital can be created to preserve cultural heritage, while investors become advocates of the good and sustainably try to raise awareness. Visitors are motivated to support things they like, knowing that part of the funds goes directly to the owners/backers/investors of those particular goods. Future studies will include various methods of lowering system costs (based, for example, on Optimistic Rollups / ZK Rollups) and integrating augmented and virtual reality technologies into this system.

- **Interactive virtual representation and digital proxemics for tangible and intangible heritage: shaping the ways we interact with knowledge, architecture and space in virtual reality (Project Paper)**

*Fabrizio Banfi et al.*

**Abstract:**

Digital architectural representation and 3D modelling are key factors in increasing the information value of virtual reality (VR) projects through multi-user and interactive logic. Man and space represent the binomial on which the discipline of architecture is based. It is essential to investigate the fundamental characteristics of the two elements and the connections between them, the space and the information associated with them to understand this dualism in VR. In order to raise awareness of this interaction, this study intends to investigate how the representation and the visual factor affect the perception and understanding of the VR environment itself by inducing different spatial sensations depending on the change of some factors, whether they belong to the place or belong to the user. Thanks to the development of a VR project, the most advanced forms of digital architectural representation, information sharing and visual programming language (VPL) are investigated from a theoretical, scientific and applied point of view, trying to increase the paradigms of interactivity of immersive environments. In this context, digital proxemics understood as the relationship between the user and virtual interactive objects (IVOs), is investigated to analyse sustainable and applicable parameters for developing an interactive virtual representation (IVR) of a complex scenario of high historical and cultural value as the Ar-quata del Tronto fortress (AP), after the earthquake that seriously damaged central Italy in 2016

- **Errant Artworks and Patrimony in evolution: the virtual reconstruction of the crypt in Santa Maria dei Bianchi in Gubbio, Italy (Project Paper)**

*Giorgio Verdiani et al.*

**Abstract:**

Every architecture and work of art is built in its time under good hopes and goodwill, and then time and events can bring incredible transformations. Tracking and telling these stories may require a multi-layered sequence of operations: accurately documenting the state of the building, reading/interpreting the transformation, laying foundations for

communication and dissemination of complex content, and then leaving a shareable record and products that can be used for future stewardship and protection are all tasks and goals that any digital intervention should consider. The case study presented here is based on the small church of Santa Maria dei Bianchi in Gubbio, Italy, an architecture that originated in the Middle Ages and has undergone many changes over time. It is a complex mix of changes and events that need to be communicated to visitors in an appropriate way, and the need to define a proper strategy for planning the next steps in the management of this architectural and artistic heritage. By using digital surveying with lasergrammetry and photogrammetry, integrating the creation of virtual immersive environments and applying consolidated procedures for digital reconstruction, the final result will define a system based on a virtual tour and precise content that will help the visitor understand the articulated history of the site and manage the entire architectural and artistic system.

▪ **Digital Photo-realistic Documentation of Ancient Mosaics (Project Paper)**

*Orestis Kourakis et al.*

**Abstract:**

The photo-realistic documentation of ancient mosaics is the process that accurately represents a mosaic's shape, volume, and texture, as well as the colors and shadows that occur in the original material. Many existing documentation techniques fall short in some of the above, reducing this way the realistic depiction of mosaics. The purpose of this study is to highlight and address the challenges associated with the digital photo-realistic documentation of ancient mosaics and offer distinct solutions with reference to specific case studies. This paper presents the methodology used for high precision, and realistic digital photographic documentation of mosaics aiming to the study, research, and display of ancient mosaics. The proposed techniques for the photo-realistic documentation of mosaics vary depending on the situation. However, the use of a digital camera and subsequent special digital processing is required to produce optimal results in all cases.

▪ **IoT infrastructure for the support of preventive measures and actions regarding the environmental conditions of cultural heritage collections (Project Paper)**

*Konstantinos Michalakis et al.*

**Abstract:**

Cultural institutions consistently incorporate preventive measures and actions to preserve their collections, by monitoring and controlling the environmental conditions. Internet of Things infrastructure can be exploited by allowing automated collection of environmental data and actuation in case of emergencies. Furthermore, machine learning tools can be applied to collected data and provide insightful information concerning the efficiency of the environmental regulation system used by the institution. A prototype system exploiting both IoT and ML technologies was implemented and evaluated with real data collected from a cultural space. The system provides real time monitoring and alerting, assessment of the environmental regulation system based on short-term and seasonal measurements and visualization of measured data, annotated with insightful information exported by the data analysis process. The evaluation of the system showed its efficiency to identify the class of control the environmental control system, the fluctuation patterns of environmental parameters and real-time monitoring of the environmental parameters of cultural spaces.

**Tuesday 8th of November**

**Keynote Speaker**

**Tuesday 8th of November**

9:00 -  
9:30

**Keynote Prof. Gunnar Liestøl**

14:00 -  
14:30

**Keynote Ronald Haynes, University of Cambridge Co-Chairman of the IIF  
3D Community**

TIME	SESSION
<b>09:30 - 10:35</b>	<ul style="list-style-type: none"> <li>• Virtual Musepedia</li> <li>• Towards an art exhibition framework for scaffolding art student's creativity</li> <li>• From augmented artefact documentation to storytelling: The Voeska project approach</li> <li>• Schnitzelbank - e - Archive For the protection of an essential part of the UNESCO intangible cultural heritage Basel Carnival</li> <li>• IN - ATHENS: Stories of an Invisible Athens</li> <li>• How do you feel about this? Engaging the audience with the music archive of N. Skalkottas through XR</li> <li>• Transforming storytelling into a story-living virtual museum: EPANASTASIS-1821</li> <li>• Accesible Sculptures for Disabled Subjects in the Public and/or Museum Space: A Pilot Project Proposal for the Archaeological Museum of Paros</li> </ul>
<b>14:00 - 15:30</b>	<ul style="list-style-type: none"> <li>• Spaces of Historical Narrative: An Immersive Archaeological Experience</li> <li>• Design and evaluation of a mobile application for an Italian villa-museum</li> <li>• A requiem for genocide, virtually commemorated and transmitted</li> <li>• 3D Digitisation of Cultural Heritage: Methods and challenges, traditional silversmithing of Ioannina, Greece</li> <li>• An analysis of alternative learning modes and scenarios of use in Digital Humanities in the form of MOOCs</li> <li>• Art-making digital activities of the Archaeological Museum of Thessaloniki: A tool for providing cultural and aesthetic education</li> <li>• Citizen and Open Science Practices in Cultural Heritage: Analysing the Openness Scope through a Nine Factor Typology</li> <li>• Processing of LiDAR and photogrammetric data and interpretative problems for the protection of archaeology in the Mayan Biosphere of El Peten in Guatemala</li> <li>• From ancestors' self protection, to the care of the Pelasgian's Era- The protection of the organized group of his descendants, nowadays, as well as in the future.</li> <li>• Protection of Religious Heritage: A Comparative Study Between Four EU Member States and Recommendations for Training, Education and Communication</li> <li>• Forms of citizen engagement in cultural heritage preservation: examples from the war in Ukraine</li> </ul>

▪ **Virtual Musepedia (Project Paper)**

*Osama Elrawi et al.*

**Abstract:**

The term Musepedia is derived from two words “museum” and “encyclopedia”. Virtual Musepedia is a triple-combination between three components: Virtual Reality (VR) as a three-dimensional, computer-generated environment which can get people into immersive, multisensory, and interactive environment. The concept of museum as a medium for exhibiting, communication, research, conservation and acquiring tangible and intangible heritage of humanity and its environment for the purpose of education, study, and enjoyment. The concept of encyclopedia as a multivolume compendium of all available knowledge, complete with maps and detailed index, as well as numerous adjuncts such bibliographies, illustrations, list of abbreviations and foreign expressions, gazetteers and so on. The concept of Virtual Musepedia could be applied and implemented in various types of knowledge, for example, Egyptian Civilizations, Virtual Musepedia of Egyptian Civilization (VMEC), other fields of study and research such as As-tronomy Virtual Musepedia of Astronomy (VMAs), and Aviation Virtual Musepedia of Aviation (VMAv), etc. This project paper is an implementation of this concept on Islamic Civilization; Virtual Musepedia of Islamic Civilization (VMIC).

▪ **Towards an art exhibition framework for scaffolding art students’ creativity (Project Paper)**

*Dimitrios Koukopoulos et al.*

**Abstract:**

Nowadays there is a necessity for the development of tools offering digital services in various learning environments due to the pandemic conditions. Art education is a learning environment where the provision of such tools is fragmentary. Especially in the field of art exhibitions, there is not a framework that can support all stakeholders, i.e. students offering them tools at all the stages of the exhibition procedure from the digitization of their artworks to the authorization and visualization of art exhibitions, as well as art school teachers providing them with suitable exhibition initiation and assessment services and visitors giving them applications (web-based or mobile apps) to have multimodal experiences ranging from virtual reality indoor art exhibitions, to augmented reality outdoor or in-home exhibitions, and mixed reality interactive exhibitions. Another issue that arises in such environments is the need for personalization due to their human-centric nature. In this work, we attempt to give a first answer to those needs by presenting an art exhibition framework for scaffolding art students’ creativity that is the outcome of the research conducted within an EU-funded research project, namely CREAMS. The first focus group evaluation results suggest that stakeholders are positive concerning the supported framework tools.

▪ **From augmented artefact documentation to storytelling: The Voeska project approach (Project Paper)**

*Maria Boile et al.*

**Abstract:**

Storytelling has been recognized as a powerful means for engaging visitors of cultural heritage and fostering historical empathy. The creators of storytelling and other types of cultural heritage experiences are in need of reliable sources of information and inspiration that are often difficult to access. In this article we present the Voeska project: a fully featured project that aims to facilitate the creation of such experiences through an augmented type of documentation of artifacts

and monuments and a series of digital tools for authoring and presenting them. The augmented documentation reveals hidden aspects of the cultural heritage assets and highlights links between them and our own everyday lives. The creators can draw ideas and inspiration from this alternate view of the antiquities and use the Voeska authoring applications to create meaningful and original cultural heritage experiences.

- **Schnitzelbank - eArchive for the protection of an essential part of the UNESCO intangible cultural heritage Basel Carnival (Project Paper)**

*Vera Chiquet et al.*

**Abstract:**

By the combination of well-chosen standard digital software components we were able to create an open web archive for the Schnitzelbänke of the Basler Fasnacht - a UNESCO world cultural heritage. This living web archive combines digitization, registration, meta dating, contextualizing, and storytelling of the intangible cultural heritage. At the same time, it offers the platform to be a digital basis for the future curation of this annual recurring event. It acts as a site of documentation and archive of the past times. Technological simplicity of operation means active curation and a living, therefore attractive archive. The project shows that well-planned, but pragmatic technological approaches lead to robust and easy-to-use solutions.

- **"IN-ATHENS: Stories of an Invisible Athens" (Project Paper)**

*Vasiliki Nikolakopoulou et al.*

**Abstract:**

The digitization of cultural heritage constitutes an evolving scientific field aiming to increase citizen participation by creating a unified perspective on heritage. However, many digital cultural applications tend to reproduce instead of transform and reshape heritage. The project "IN-ATHENS: Stories of an In-visible Athens" aims to revise the common tactics in digital culture by converting a significant historical archive into a series of digital (mobile, web) storytelling applications and participatory tools for the citizens. The project's multidisciplinary team integrates four methodologies to produce a multilayered history of the city by recording, documenting, 3D reconstructing, and highlighting its timeless identity as a place formed by the inhabitants of Athens and lost in different periods. To emphasize the city's ancient, newer, and modern cultural heritage, the narrative is built around the streets and buildings of a specific area of study, and it provides four different dialogue levels: ancient past (archaeological remains) with modern and contemporary history (classicism, 19th, 20th century); buildings with the natural landscape; buildings with the people through oral testimonies and interviews of residents; diverse cartographic data representations of early maps. The project's scope is not to prove the "undisturbed city's historical continuity" but to offer free and open digital tools to citizens, school students, and researchers, such as a GIS-based digital archive, a Location-Based Social Net-work, and an educational toolkit produced through participatory training work-shops for raising awareness and mobilization towards the preservation and promotion of the city's cultural heritage.

- **How do you feel about this? Engaging the audience with the music archive of N. Skalkottas through XR (Project Paper)**

*Lori Kougioumtzian et al.*

**Abstract:**

In this paper we present the results of a design and evaluation workshop to examine different approaches to affective tagging to promote engagement with music archives. As a part of the ongoing project ARIA (Augmenting the Reception of music through innovative solutions and archives), this work aims at understanding how the audience can react to the music of the Greek composer Nikos Skalkottas and express the felt emotions through three different means: 1) Writing on paper, 2) selecting from a board of emotions in Virtual Reality (VR), and 3) through embodied interaction in VR. The workshop were participants divided into two groups; one with expert VR designers but no previous background on music or familiarity with Nikos Skalkottas, and one with music experts. The results provided insight as to the (physical or digital) design of activities that can motivate users to engage with archival music and as well as to the opportunities and implications of the individual and social process of reacting emotionally to music through verbalising, tagging, or moving.

- **Transforming storytelling into a story-living virtual museum: EPANASTASIS-1821 (Project Paper)**

*Georgia Georgiou et al.*

**Abstract:**

This contribution is a step-by-step description of the development of the virtual museum EPANASTASIS-1821. Its core scope is to indicate the pipeline applied for the creation of a full-immersive virtual museum, from the conception of the original idea to the evaluation process of the final production. The contribution aims to specify the perspectives of virtual museology in contradiction to digital exhibition of cultural material, to indicate the limitations and the potentials of incorporating the technologies of virtual reality and of serious games in the production of full-immersive cultural experiences and to shed light on the aspects of future digital museum practice. The virtual museum EPANASTASIS-1821 is a museum that exhibits historical material, nevertheless its virtual and gamified form made possible the transformation of the passive museum experience into an interactive, participatory one, that strengthens designers' creativity, enhances the interpretation's impact and, in an overall perspective, leads to a more democratized perception of cultural heritage.

- **ACCESIBLE SCULPTURES FOR DISABLED SUBJECTS IN THE PUBLIC AND/OR MUSEUM SPACE; A PILOT PROJECT PROPOSAL FOR THE ARCHAEOLOGICAL MUSEUM OF PAROS (Project Paper)**

*Ourania Anastasiadou et al.*

**Abstract:**

The paper proposes a universal designed project related to accessibility in the Archaeological Museum of Paros associated to the environment, the information and communications technologies, and international development policies and good practices with reference to the objectives of sustainability, equity and inclusiveness. The paper notes that accessibility is a major theme in international disability instruments, in the light of its contribution to promoting opportunities for all subjects to participate on the basis of equality in development and access to the cultural places. The research team strives to develop innovative practices, accessible products and services for an inclusive museum based on the universal critical discussion in the context of a cultural policy beyond the stereotypes of disability.

▪ **Spaces of Historical Narrative: An Immersive Archaeological Experience. (Project Paper)**

*Prof. Emeritus Eleni Maistrou et al.*

**Abstract:**

InterArch is an ongoing research in the design of a site-based digital application for archaeological sites and outdoor guided tours. The program will be completed by July 2023 and will run as a pilot project for Ancient Messene, a place of outstanding natural beauty in the west of Peloponnese. Archaeological sites, situated in such places of natural beauty are the majority throughout Greece. They are also considered as important cultural landmarks of significant heritage value, defined by UNESCO, as the 'combined works of nature and man, areas of outstanding universal value from the historic, aesthetic, ethnological or anthropological point of view'. As a unique expression of human achievement, their recording must follow the necessary recommendations and guidelines, as specified by the International Institutions and Committees for the conservation and maintenance of cultural heritage. New digital technologies play a very important role, not only in recording and safely storing of archaeological data, but also, in the unravelling of the multidimensional character of the archaeological landscape. At this stage of research, a conceptual mock-up is built that helps us assess the available technological tools and apply them efficiently on the real-world environment of the archaeological site. This fusion of the real-world environment with its digital components, does not only add up the increasing information to the archaeological site, but also deepens our understanding about the memory of place, in a non-linear manner, that exceeds time and place dependent narration, through the multiple semantic associations and interpretations of knowledge.

▪ **A requiem for genocide, virtually commemorated and transmitted (Project Paper)**

*Konstantinos Moraitis et al.*

**Abstract:**

Critical approach of history must be considered as an important didactic element for societies, a didactic approach that could offer to us a better insight of our possible present and future. The decision to present and commemorate history in the open-air public space is a well known tendency usually expressed through conventional material means. Our proposal refers to the effort to intensify this public space historical presentation, through virtual narration. Metallic plates inlaid in the surface of two squares in the municipality of Kaisariani in Athens, Greece would invite the visitors of the squares or even the common passersby, to participate to a number of proposed narrations through the use of QR codes. Nevertheless, what may be considered as more important than the technical innovative identity of the project, is the context of the narration; its reference to the genocide, to the atrocities directed against the Greek inhabitants of west Minor Asia and the Pontic Greeks of the coastline of the Black Sea, during the second and the third decade of the 20th century.

▪ **3D Digitisation of Cultural Heritage: Methods and challenges, traditional silversmithing of Ioannina, Greece (Short Paper)**

*Efthimios Apostolakis et al.*

**Abstract:**

Silversmithing in the region of Ioannina, Greece is a traditional folk art that dates back on the 14th century AC. In today's digital era and with the assistance of digital tools, the preservation and dissemination of our Cultural Heritage opens up new possibilities and challenges. This paper investigates the optimum process for such purposes in order to be used by

the local technicians and silversmithing professionals. Upon comparison of scanning methods and different 3D scanning equipment we selected structure light 3D scanning and the Einscan SE 3D scanner as the optimum digitization procedure of scanning silversmithing local artifacts. The final outcomes were satisfactory in terms of cost, time and quality despite the difficulties presented in scanning filigran and silver chain structures.

- **An analysis of alternative learning modes and scenarios of use in Digital Humanities in the form of MOOCs (Short Paper)**

*Angeliki Antoniou et al.*

**Abstract:**

The paper provides a clarification of the terms used in alternative learning modes and their potential use in the teaching of Digital Humanities. Terms like hybrid, blended and mixed learning are often used interchangeably and a clarification is necessary for providing a basis for further research and implementation in the field. Limitations and opportunities of digital tools for teaching and learning are also provided, as well as a suggestion for the use of MOOCs for the teaching of Digital Humanities.

- **Art-making digital activities of the Archaeological Museum of Thessaloniki: A tool for providing art and archaeology education. (Short Paper)**

*Chrysanthi Fotiadou et al.*

**Abstract:**

Arts prove to be very important for understanding the cultural, and artistic heritage, as both their practical and informed enjoyment involve the observation, analysis, and evaluation of the personal and social experience and approach the cultural heritage by highlighting aspects that facilitate the understanding of reason and way of creating a work. The museum, as a place of cultural experience and not simply as a place for the study and preservation of ancient works, can contribute to shaping the conditions, to handle the dimension of information in different organized ways, so that contact with culture is not limited to the encyclopedic type of knowledge. The present paper presents the art-making digital activities of the Archaeological Museum of Thessaloniki during the years 2021 and 2022, attempts to study the relationship of aesthetic education with museum education and looks for ways in which the museum exhibits will be able to function as pictorial or visual historical sources that will mobilize the historical imagination and provide cultural and aesthetic education to the museum's audience groups.

- **Citizen and Open Science Practices in Cultural Heritage: Analysing the Openness Scope through a Nine-Factor Typology (Project Paper)**

*Mariana Ziku et al.*

**Abstract:**

Open and citizen science are broadly understood as enablers of knowledge production and sharing on an international and European level. The current study contributes to an understanding of open and citizen science by looking at the cultural heritage sector and in particular at initiatives in which universities and cultural heritage organisations collaborate in participatory, citizen-enabled initiatives. The paper proposes and applies a methodological approach for assessing the degree of openness. This maps an openness-in-action framework by providing a nine-factor typology (open access, open

data, open metadata, open metrics, open software, open results, open formats, open documentation, open datasets) against which a range of European citizen science projects in the cultural heritage field is being analysed. From a methodological perspective, we adopt a data analysis and visualisation approach (Ward, 2010) to compare all the selected initiatives against common criteria that serve to display results across the various selected projects, thus increasing transparency and comparability of practices in a largely uncharted field. Challenges and future directions are further discussed, including open data management, evaluation and quality assessment in citizen-enabled research within the cultural heritage field. The present paper is a synthesis of findings from an extensive publication that is available open access (Zourou & Ziku, 2022) and on Tableau (publicly shared interactive data visualisations).

▪ **Processing of LiDAR and photogrammetric data and interpretative problems for the protection of archeology in the Mayan Biosphere of El Petén in Guatemala (Short Paper)**

*Carolina Collaro et al*

**Abstract:**

The use of lidar has greatly increased the number of monuments we can identify and record in certain areas. Our case study in the context of the Research Doctorate in Spacial Archeology, conducted by me at the University of Jaén, Spain, is carried out in collaboration with the University of San Carlos de Guatemala. Right in the Petén region in the north of Guatemala, on the border with Belize, we are conducting our research with the help of BVTOL drones, Lidar sensors, and RGB oblique cameras. The most important aspect is the strong environmental conditioning which proved even more problematic than expected, even if hypothesized. Although we were in a National Protected Park, places' inaccessibility, climate unpredictability, and tropical vegetation density considerably affected the archaeological research. Since the first expedition, our study was oriented toward documenting the less explored parts of the Park. Subsequently, thanks to the partnership agreement established with the German company Quantum Systems, the attention was focused on using the LiDAR sensor mounted on the Trinity + 90. LiDAR technology allows us to penetrate the vegetation and have a cloud of points of everything below the Canopy, ultimately discover new archaeological remains or map potential new archaeological sites in digital cartography, DEM, and DTM, which we will expose the interpretative challenges. Lidar is a georeferenced dataset, it doesn't require the rectification process for oblique and vertical photographs. It also provides a ready-made 3D view on the screen, while vertical aerial photographs require processing with SfM software to be displayed in 3D. However, we plan to use RGB photos to build Digital twins models of the major monumental pyramids, especially for the top ends that are not covered by vegetation and require preventive conservation to combat anthropogenic and environmental threats. Lidar technology allowed a macro redimensioning of the ancient Maya in terms of their settlements density interaction, interconnection, infrastructure, and management of landscape, and also the collaborative approach could produce many important scientific results. Anyway, we still need specific guidelines and shared standards with accuracy tests and quality management of these digital data.

▪ **From ancestors' self-protection, to the care of the Pelasgian's Era - The protection of the organized group of his descendants, nowadays, as well as in the future. (Project Paper)**

*Ioannis Th Chamizidis et al.*

**Abstracts:**

Homo sapiens, as a thinking human being wandering around nature, collects food protecting himself/herself, at the same time. During his/her evolution, however, he/she discovers new ways of safeguarding his/her survival. The climate conditions, as ice melts, force him/her to live on mountainous places, known as "graiks" ("γραικ"). Those remaining on

the fields, should find solutions, in order to manage the water. Stakes provide them with safety, while they build houses on the water, as they are the traditional Selloi (“Σελλοί”). When the lagoons start to dry, Graikoi and Selloi (“Γραικοί” and “Σελλοί”) organize their new settlements on the fields in common again. These organized societies of Ancient Greece, act in a scheduled manner, while their protective measures vary: The wall, the protective trench, the deforested land as a prohibitive one, the thorny bushes, the dense reforestation plantation, the well, the torch-the lamp of the time around the streets, are some of them. Our own way nowadays, due to the development level, is more effective and faster. The needs for protection of an organized society are the same nowadays, as we should find solutions to manage the Climate Change. At present, as we have recklessly abused the benefits of the Industrial Revolution, the Climate Change is punishing us. If we re-think wisely to reduce costs, the burning waste will not pollute the environment, when we become sane and active citizens, instead of speculators. All of us know that the rain drops, when stop falling on the ground, they create a feeling of calmness. As the negative ions flood everywhere through the rain drops, Tesla, imitating that, invented the ionizer of negative ions for closed places. According to an ancestral tradition, the world-widely known “menirs” (“μηνίρ”) successfully clean the area from the earthly local negative magnetic fields. Can we naturally create negative ionization nowadays? Bees may help us. In the same way, we can transform various dirts, into atmospheric honey. Negative ions. The overheat of the Earth is the Nemesis of our arbitrariness, while the price we pay is the desertification. Maybe the answer is more flora. Studies on environmental management strategies may give us some answers about the comeback of forgotten illnesses and, why not, about Covid-19. Science advances, when case studies through observation, research and experiments, lead to a result.

- **Protection of Religious Heritage: A Comparative Study Among Four EU Member States and Recommendations for Training, Education and Communication (Project Paper)**

*Constanti Panayiota et al.*

**Abstract:**

Terrorist attacks and religious hate crimes have escalated in recent years, putting places of worship in greater danger around the world especially in Europe. Short- and long-term consequences of such attacks, according to the European Commission, include acute physical injuries to people and/or irreparable destruction to highly significant religious artefacts, as well as long-term psychological traumas and increased terror in society. Despite EU and worldwide efforts to defend places of worship, there remains a scarcity of information on the reasons of such assaults and how to prevent them in the future. This paper shares original desk and field research conducted with law enforcement agents, religious leaders, and members of religious communities regarding the social ecosystem analysis of protecting religious heritage in the four partner countries as part of the PROSECUEW Project, which is co-funded by the EU (Cyprus, Greece, Germany, and Portugal). Despite the multiplicity of situations, research findings point to a common need for better communication and understanding among members of various religious communities, as well as further training and education for acceptance of diversity, as crucial tools for religious site protection. The paper concludes with key security and protection recommendations for places of worship, including the adoption of novel approaches and instruments to both strengthen security and protect religious heritage.

- **Forms of citizen engagement in cultural heritage preservation: examples from the war in Ukraine (Project Paper)**

*Katerina Zourou et al.*

**Abstract:**

How can citizens contribute to the preservation of cultural heritage (CH) in a time of crisis, such as an armed conflict? Are there any existing examples of cooperation between cultural heritage stakeholders and citizens and how can these inform any future action taken in times of crises? By using the war in Ukraine as a case study, the aim of this paper is twofold. Firstly, it aims to raise awareness about the potential of citizen engagement for heritage protection in a social participation realm which is gaining traction in contemporary societies. Secondly, it delivers concrete examples on initiatives that matched these groups (citizens, CH professionals) in the Ukrainian conflict. This paper is grounded on a collection and analysis of examples taken since February 2022. They are depicted in four categories, namely: 1) open innovation actions, 2) cultural heritage networks triggering citizen engagement actions, 3) museum-driven actions, and 4) citizen-driven actions. The paper also discusses examples based on four key themes: technology and the diaspora; forms of activism; immediacy and action, and the role of culture to bridge dichotomies. More broadly, this presentation urges for a closer collaboration between cultural heritage professionals and citizens/communities engaged in cultural heritage, whose experience is often, though not exclusively, culturally and socially shaped, especially in a time of crisis. By having citizen engagement as a common denominator, this paper should be seen as an interdisciplinary effort to bridge the fields of cultural heritage with those of open innovation, humanitarian aid and technology-enhanced learning, where active citizenship drives (open) innovation.

**Wednesday 9th of November**

TIME	SESSION
<b>09:00 - 10:35</b>	<ul style="list-style-type: none"> <li>• ARTEST: Enhancing education programmes in Arts and Humanities via European STEM methods and tools</li> <li>• Explore Gaugin via XR Technologies: Go Again Experience</li> <li>• Reconstruction and restoration of the wooden case of a box mirror using a 3D scanner</li> <li>• Designing an Innovative e-learning Platform for the Art of the Cretan Hagiography</li> <li>• A content management system as a key factor to dynamically integrate Cultural Content on mobile Augmented Reality Application</li> <li>• The challenging role of 3d projection mapping and emerging technologies in shaping historical experiences in multiple museum contexts in Greece. The case of the exhibition "The Greek Revolution of 1821 in Chalcidice</li> <li>• Ethroned Late Minoan Goddess with Upraised Arms Goes Digital: A Case Study of Photogrammetric Documentation and Restitution</li> <li>• Simple Cellular Automata Model for Flood Estimation and Determination of Cultural Heritage at Risk</li> <li>• Digital Technologies assist in the Communication of Disaster Risks Management of Cultural Heritage</li> <li>• Post-disaster Recovery and Adaptation Strategies for Architectural Heritage</li> </ul>
<b>11:00 - 15:30</b>	<ul style="list-style-type: none"> <li>• Condition Assessment of a Masonry Bridge Using Accelerometers Sensors: A Preliminary Study</li> <li>• The Research on Human's Management of Nature in Cultural Landscape</li> <li>• HERitage MONitoring (HER-MON) in the Climate Change Era</li> <li>• Drawing and geometrical interpretation of historical constructive elements for conservation activities: the Sixteenth Century coffered wooden ceilings and the "camorcanna" vault of Villa Cicogna Mozzoni</li> <li>• Digital Preservation of Military Fortifications heritage: A case study of Magong Ancient Castle in Penghu, Taiwan</li> <li>• Verification of Software for Planning Maintenance and Restoration of Historic Buildings in case study</li> <li>• Digital Color Planning for a New Construction Near Historical Buildings</li> <li>• Holistic Documentation of Cypriot ceramic zoomorphic rhyta dating to the Hellenistic Period</li> <li>• A non-destructive approach for pigments identification of the Byzantine wall paintings in the church of Saint Euphemianos in Cyprus</li> <li>• A superhydrophobic and oleophobic composite coating for the protection of marble</li> <li>• Digital-Virtual Representations of Cultural Routes</li> <li>• Digital Technology and Cultural Itineraries in the context of "Smart" Cities</li> <li>• The wine and cultural regions of Vinhos Verdes and Douro: analysis of the website's usability and accessibility</li> <li>• Underwater Cultural Heritage Protection and Sustainable Tourism Management and New Technologies. The Case of Greece</li> <li>• Sustainable Cultural Tourism Strategy and Promotion: An ICT Management Platform</li> <li>• Assessment of tourist's acceptance of a VR multisensory system</li> <li>• Beyond the Ionian Film Office metaverse: design and development of a tourism location guide for Ionian Islands in Greece</li> <li>• From symbol to place: A tourist review study of informal intangible cultural heritage in Guangzhou (China) and Krakow (Poland)</li> <li>• ECHOES: An Interdisciplinary Approach in Digital Reviving of</li> <li>• Archaeo-anthropological Material</li> </ul>

- **ARTEST: Enhancing education programmes in Arts and Humanities via European STEM methods and tools (Short Paper)**

*Manolis Wallace et al.*

**Abstract:**

ARTEST is an Erasmus+ project that aims at rethinking education in humanities in Russia and Mongolia in line with European standards, research and practices to catch up with the latest trends of the labour market. It is designed to reinforce education in humanities by adopting digital methods of research and education. The project started in 2021 and is still ongoing. In this paper we present the goals of the project and the outline of its work-plan. In addition to discussing what has already been achieved and what is planned for the immediate future, we also address two major upsetting factors (the COVID-19 pandemic and the war in Ukraine) and explain how the project is responding to them.

- **Explore Gauguin via XR Technologies: Go Again Experience (Short Paper)**

*Markella-Elpida Tsihla et al.*

**Abstract:**

“In Paris there is nothing for me to paint”, Gauguin had said shortly before sailing to the Polynesian islands in the South Pacific Ocean. At the same time, at the end of the 19th century, many visual artists from various parts of Europe and America had chosen Paris, the undisputed artistic center of Europe, for study and inspiration: the artistic avant-garde in full development. Therefore, there were deeper reasons that motivated the great French painter to travel, live and work in the exotic islands of Polynesia almost till the end of his life. Gauguin was found in a primitive environment that influenced his socio-psychological perception of the world, as the return to the primitive way of living, to the beginnings of life itself and of the human culture, had political-ideological motives. This attitude came as a reaction to the European lifestyle and the technological culture. The artist became part of an environment that was a mixture of European culture and the primitive and pantheistic conceptions of the natives, as a result of colonialism and the exploitation of goods. Gauguin's art is characterized by the unnatural symbolism of the absurd, detached from the political and economic problems that were troubling Europe in end of the century. Tahiti was transformed into a field of dream images with a strong magical, sometimes surreal, dimension, where eroticism was the essential driving force. At the same time, Gauguin gave to sexuality a manipulative character, by focusing more on female presence, so that, to a certain extent, his women become bearers of the changes both in human history independently and beyond the forms of power imposed by colonialism, as it is depicted in his work. From where we are coming; Who we are; Where are we going; (1897), The goal of the present paper is to transfuse to the modern viewer the multiplicity of man's relationship with the history and power using digital media, and especially XR technology. The outcome of this transformation of Gauguin's artworks via new technologies is going to be presented at the exhibition “Beyond Expo”, in Helexpo-Thessaloniki.

- **Reconstruction and restoration of the wooden case of a box mirror using a 3D scanner (Short Paper)**

*Evagelia Papathoma et al.*

**Abstract:**

This wooden case of a box mirror which is displayed at the Archaeological Museum of Marathon perhaps is a unique find, which has been preserved until today. It was discovered in the 60s and was conserved in the laboratory of the National Archaeological Museum of Athens. However, the restoration that had been applied to the two parts of the object, resulted in the change of its final dimensions. In addition, the way it was exhibited caused mechanical stress on the moving part of the object. These were some of the reasons that made it necessary to rearrange and restore the wooden case. However, the severely biodegraded state of the wood limited the choices of filling techniques and materials. Therefore, 3D scanning was chosen as the most suitable solution.

- **Designing an Innovative e-learning Platform for the Art of the Cretan Hagiography (Short Paper)**

*Eleftherios Anastasovitis et al.*

**Abstract:**

This contribution presents the design and the implementation of an e-learning programme that is dedicated to the training in the art of the Cretan Hagiography. Through the use of open-source solutions regarding the educational platform, the backbone of the e-HAGIOGRAPHY is enforced with three-dimensional graphics, as well as with virtual spaces that offer additional learning interactions, under the prism of adult education. The initial evaluation of the platform by a group of experts in the art of iconography, confirms the suggested pipeline as a pilot for future implementations in distance learning of Fine Arts and Cultural Heritage. Moreover, the scheduled assessment of the e-learning platform by end-users will provide useful information regarding the adoption of creative industries and immersive technologies in the educational process of Fine Arts. The e-HAGIOGRAPHY project is a work in progress that is expected to contribute in the effective training of experts in the field of Digital Cultural Heritage.

- **A content management system as a key factor to dynamically integrate Cultural Content on mobile Augmented Reality application (Short Paper)**

*Petros Patias et al.*

**Abstract:**

Digi-Orch is an ongoing research program that aims at developing a prototype system for information visualization using images and other brochures' content through the deployment of digital markers. In this context, the audience of a concert can enrich their typical acoustic experience with means and functionalities, taking advantage of simple and easy-to-use tools and applications, available through their smartphone. Through the screen of the mobile device and using the smartphone's camera (AR technology), the end user will be able to visualize more data than the concise information included in the printed communication material by "superimposing" photos, static/moving images, videos, and audio files. The system will be tested in actual concerts to assess its efficiency and proof-of-concept. All this information is managed through a central content management system that will provide the administrator with an interface to upload content, connect it to the printed material and provide the mobile application with a remote url endpoint. The mobile

device accesses the output of this system in a json format to download and integrate this content to the corresponding mobile app. The application creates dynamically the interface to support the related content. The backbone of the system is the main content management system database and the automated mechanism to populate the mobile interface based on the json files output.

- **The challenging role of 3d projection mapping and emerging technologies in shaping historical experiences in multiple museum contexts in Greece. The case of the exhibition “The Greek Revolution of 1821 in Chalcidice”. (Project Paper)**

*Chrysoula-Valentini Adamou et al.*

**Abstract:**

Last years there is an increased focus on the use of audio-visual media technology and digital presentation tools in order the stories of the past, antiquities, monuments and historical events to be effectively interpreted and presented to the wider public. The use of 3d projection mapping technology is constantly gaining ground in the preferences of many cultural institutions, in order to provide an integrated experience of past stories to the general public. The Ephorate of Antiquities of Chalcidice and Mount Athos, wishing to adopt a different approach to present and exhibit the historical event of the Greek Revolution in Chalcidice undertook the research, planning and implementation of a particularly successful communication exhibition project using 3d projection mapping technology as a main part of a temporary exhibition entitled “The Greek Revolution of 1821 in Chalcidice”. The exhibition is organized in two levels, where the one is that of the exhibition presentation with the objects and the interactive screen and the second of the panoramic audio-visual 3d projection mapping installation in a shaped room. By examining the above project as implemented in the archaeological site of Nea Flogita, Chalcidice, in this paper we will attempt to explore and present how fragmented and diverse types of information (objects, archives, written sources) from a historical Greek past could be interpreted and presented in an integrated way, which could use effective synergies and interdisciplinary with new technologies, 3d projection mapping, art, history and monuments. We will then focus on discussing the intent and the efficiency of that process to provide the possibilities offered by modern image technologies and the interactive composition and coexistence of practices, which contributed to the visualization of the historical narratives.

- **Enthroned Late Minoan Goddess with Upraised Arms Goes Digital: A Case Study of Photogrammetric Documentation and Restitution (Short Paper)**

*Yigit Zafer Helvaci et al.*

**Abstract:**

This poster presents a work in progress - case study on the utilisation of digital heritage, in particular photogrammetry and 3D processing softwares, for the documentation, study and potentially virtual reconstruction of archaeological objects. In this endeavor, an assemblage of Minoan clay artifacts from Kefala Vasiliki – Crete has been photographed following the «structure from motion» technique and the resulting data has been processed using Agisoft Metashape software for creating the digital 3D model of the objects. As a next step, the exported models were assembled using Blender software for the virtual visualisation to discover and elaborate the hypothetical spatial correlations that exist between the fragments. In effect, this workflow appears to be a valuable tool in small-scale conservation laboratory environments, as they provide a digital asset for the documentation and preservation of the object and providing a valuable visual tool before and during the conservation treatment and restitution of objects.

- **Simple Cellular Automata Model for Flood Estimation and Determination of Culture Heritage at Risk (Project Paper)**

*Franz J. Zakrajsek et al.*

**Abstract:**

Climate changes cause extreme events that pose a serious threat to cultural heritage. The paper presents the model CAFEs developed to predict flood risk areas, including anticipated scenarios of climate changes. The model responds to work in Central Europe project STRECH where partners used Copernicus satellite data to visualize the predicted climate change events. Evaluations showed that for those data to be usable in the urban planning context in assessing flood risks in the small local area, Vipava Valley, downscaling was necessary. Authors developed and implemented a simple cellular automata flood evaluation model CAFEs using LIDAR relief to determine potential flood risk areas and identify heritage at risk in Vipava Valley. The CAFEs model is a promising method for “downscaling” climate data using Lidar data to a resolution appropriate for use on a local level. The model gives reliable results when estimating future flood areas. The data are ready for use in several phases of cultural heritage protection.

- **Digital Technologies assist in the Communication of Disaster Risks Management of Cultural Heritage (Project Paper)**

*Alex et al*

**Abstract:**

Disaster risk management (DRM) in the conservation of cultural heritage has become an unavoidable issue in the field of preservation. The development of digital technology has changed the way of thinking and living style of global human beings in the 21st century, and how to use digital technology to assist in the DRM of cultural heritage is the main topic of this research. This research takes the integrated project of MOST (Ministry of Science and Technology) 2019-2022 "Research on the Harmonization of Cultural Heritage Disaster Prevention under the Thinking of Disaster Prevention Technology" as an example, which expands the objects of preservation from single-point monuments and historical buildings to historical urban districts and settlements. Under the support of the New Taipei Municipal Government, this project selects the Zhongzheng Road Historic District in Tamsui District, New Taipei City as an example to carry out the "Wide Area Composite Disaster Risk Exercise", which also includes the simulation of digital technology. This research finds, (1). Visual simulation is an important advantage of digital technology, through different digital work, can enable participants/stakeholders at different stages into the digital situation, effectively achieve the purpose of risk communication. (2). The content of DRM of cultural heritage is very extensive, from the regional background, the information on immovable cultural heritage in a single monument, coupled with the human factor, resulting in a considerable amount of content that needs to be communicated, and GIS can be used as an important platform for data exchange, communication and decision-making.

▪ **Post-disaster Recovery and Adaptation Strategies for Architectural Heritage (Project Paper)**

*Yi-Jen Tseng et al.*

**Abstract:**

Kinmen was not affected by modernization due to the 43 years of military control during the Cold War in the 20th century. Therefore, a large number of traditional buildings have been retained. It is damaged, especially the un-manned or lack of maintenance. Kinmen's terrain is flat. On the occasion of summer and autumn, typhoons have the influence of typhoons or heavy rain, causing these distinctive cultural heritages to be severely damaged. Such a phenomenon highlights the problem of traditional buildings that are not conducive to preventing disasters and insufficient recovery capabilities after the disaster. The government is aware of the devastating impact of disasters on heritage, and has gradually increased the actions of disaster prevention in recent years. This article takes the architectural heritage of Kinmen as an example to discuss the treatment measures under the influence of the typhoon or fire. And under the threat of climate change, disaster prevention and adaptation strategies for architectural heritage.

▪ **Condition Assessment of a Masonry Bridge Using Accelerometers Sensors: A Preliminary Study (Short Paper)**

*Govardhan Polepally et al.*

**Abstract:**

The most recognizable historic form of transportation infrastructure world-wide is a masonry bridge. Engineers continue to struggle with how well and how fast their structures will cope under increasing traffic loads and speeds. As a result, the research community must quickly suggest a successful methodology and validate it using real-time bridges. The purpose of the re-search being presented is to use wireless accelerometer sensors to evaluate the structural health of an 80-year-old stone masonry railway bridge in India. The bridge has 44 spans that are each 24.2 meters long, and each pier is 13 meters tall and rests on a solid base. Ambient vibrations from moving traffic at various speeds were captured in order to calculate the dynamic characteris-tic properties of the bridge. The recorded vibrations were then compared with the three-dimensional numerical model developed using finite element-based software. The comparison of frequencies acquired from the experimental testing carried out on different spans leads to the findings concerning the weaker or deteriorating masonry piers.

▪ **The Research on Human's Management of Nature in Cultural Landscape (Project Paper)**

*Min-Chieh Yen et al.*

**Abstract:**

Cultural landscape is a kind of change that occurs when the natural environment is affected by internal and external social and economic forces under restricted conditions. Human behavior towards nature is not only limited to the development of the surface, but through different behaviors to create natural landscapes, it also obtains tangible or intangible resources, beliefs, art, etc., so as to enrich human life and emotions, whether deliberately or unintentionally, directly or indirectly change the natural landscape and style, and the difference in human depth of nature will produce different landscape presentations. This research will firstly analyze the time, space, and registration criteria of 118 cultural landscapes in the World Heritage Site, and cooperate with the description of each cultural landscape to explore the types, content and characteristics of cul-tural landscapes, and understand the cultural landscape. The natural behavioral pattern

of human management. Cultural landscape should be regarded as the de-gree to which humans enter nature, and consider the trade-off ratio and mutual re-lationship between the two. Human beings continue to interact with nature based on the acquisition of resource.

▪ **HERitage MONitoring (HER-MON) in the Climate Change Era (Project Paper)**

*Pavlos Chatzigrigoriou et al.*

**Abstract:**

As an implementation study funded by "The Greek Green Fund," the project "HERitage MONitoring" aims to investigate whether it is possible to monitor and predict the alteration and collapse of historic buildings due to the changing environmental conditions caused by climate change. With the medium- and long-term study of the data in combination with the prevailing climatic conditions, conclusions will be drawn about the relations between them, and a system of early intervention will be proposed to deal with possible collapses and losses of essential elements of the monuments. The pilot application is in the city of Ermoupolis (Syros, Greece), where ten historic buildings from the digital database "HERMES" were selected in the first phase for monitoring. These buildings have an adequate geographical dispersion within the city and belong to different typologies and pathology phases. Buildings owned by the Municipality (or legal entities that the Municipality also participates in), the wider public sector, unknown owners, and well-known owners who gave their consent were selected. Along with the selection of buildings, the choice of parameters monitored in real-time was made. To record the values of the parameters, the basic infrastructure for the collection, transmission, storage, and visualization of data (databases, application server) was developed with the supply, installation, and trial operation of the equipment to evaluate and implement its final installation in the selected buildings. The data are collected in real-time and digital form using special sensors connected and powered by a small unit with a battery installed in the buildings. The collection of these data and their study will allow the categorization of problems in buildings according to their criticality risk. This enables targeted priority conservation and better use of human, technical and financial resources. The visualization of data in a web application allows remote access to them and thus both their study by external researchers and the information and awareness of citizens and the planning of interventions by the competent services. Finally, innovative data collection and transmission technologies should allow the system to be further exploited for use in other areas of interest (environment, health, urban mobility).

▪ **Drawing and geometrical interpretation of historical constructive elements for conservation activities: the Sixteenth Century coffered wooden ceilings and the “camorcanna” vault of Villa Cicogna Mozzoni (Project Paper)**

*Daniela Oreni et al.*

**Abstract:**

Villa Cicogna Mozzoni is located in Bisuschio, north of the city of Varese and a short distance from Lake Lugano, on the border between Lombardy and Swit-zerland. Archival and bibliographical sources trace the existence of an original nucleus of the present Villa to the 1540s, but it was configured as a hunting lodge owned by the Mozzoni family. Major works in the sixteenth century transformed the hunting lodge into a “villa di delizia”, with the addition of gar-dens around it and a rich decorative apparatus of both the interior and exterior surfaces of the Villa's rooms, much of which has come down to us. The subject of this article, is the account of a work of accurate geometric analy-sis of the geometries of the building and its structural elements, starting from la-ser scanner and photogrammetric data surveyed in 2021. In particular, this re-search work, which is still in progress, focused on the study of the wooden cof-fered ceilings covering

the rooms on the first floor of the Villa and the “camor-canna” wooden fake vault of the grand staircase of honor. From the study and interpretation of the geometric data obtained on these structures, together with comparison with historical and recent manuals, it was possible to derive morphological-constructive information and the state of conservation of the elements considered so as to provide fundamental information for the diagnostic and restoration project.

▪ **Digital Preservation of Military Fortifications heritage: A Case Study of Magong Ancient Castle in Penghu, Taiwan (Project Paper)**

*Wun-Bin Yang et al.*

**Abstract:**

One of the themes of ICOMOS conference in 2023 is digital heritage, which represents the importance of digital preservation of cultural heritage. Therefore, digital preservation technology should be applied to the study of digital preservation of cultural heritage. In October 2021, ICOMOS International Scientific Committee on Fortifications and Military Heritage (ICOFORT) firstly proposed the "ICOMOS Guidelines on Fortifications and Military Heritage" for the types of military fortifications heritage, in which Item 3 of Article 3 states that military fortifications heritage needs to be systematically studied and recorded by relevant technical and professional personnel. Since the late Ming Dynasty, Qing Dynasty, Japanese occupation and other periods to the present, the status of military fortress and related facilities of the Magong Ancient Castle in Penghu have been coexisting with the region. For a long time, military affairs have become an important feature of the urban culture. This project is based on the development of digital preservation concept and technology, using the technologies of 3D laser scanning and control measurement, photogrammetry etc. to carry out digital records of the Magong Ancient Castle in Penghu. The results include 3D point cloud model, orthophotos and 3D model, so as to provide the application of future cultural heritage in education, exhibition and related aspects.

▪ **Verification of Software for Planning Maintenance and Restoration of Historic Buildings in a Case Study (Project Paper)**

*Daniel Macek et al.*

**Abstract:**

The article deals with the issue of the valuation of construction works on historical buildings. This is a complicated matter because historical buildings are unique, they have a historical value that must be preserved for future generations, and they use many special technological and construction procedures. For this purpose, the research team developed methodological procedures and the software, which can draw up maintenance and restoration plans for historic buildings including the calculation of planned costs. The use of the software is shown on the case study of the general repair and construction modifications of the historical building of the Dobrovice Parish. The paper describes the original state of the historical building. Photos of the original condition are shown for illustration. The scope of the construction work carried out is also shown, including illustrative photos after the reconstruction. The paper ends with a demonstration of a sample calculation of the costs of reconstruction works in the software.

▪ **Digital Color Planning for a New Construction Near Historical Buildings (Project Paper)**

*Wei, Shuo-Ting et al.*

**Abstract:**

A new construction is planned to be built on the former site of the Taipei City Council. This study measured environmental colors near the site, including facade colors of the 3 historic buildings and 3 main buildings near former site of Taipei City Council and colors of street trees. According to the measurement results, we proposed an appropriate ranges of color schemes for a new construction project in the site. The results of color measurement show that most of the facade colors around the new construction site are warm colors such as orange, yellow and green. These colors have soft and weak tones with mid and high lightness. The facade of the 3 historical buildings are three-color combinations. They are the combinations of brick colors with soft and dull yellows of pebble washed finish, granite and porcelain tiles. Colors of the modern buildings look lighter and more colorful than those of the historical buildings. Color scheme for the new construction are provided according to the results of color measurement. For the podium parts, it is recommended to use colors that are similar to the 3 historical buildings, i.e. a three-color-combination scheme. For the main buildings covered with curtain walls, it is recommended to use lighter colors with CIELAB chroma not exceeded 25. Color harmony principles should also be considered for color scheming.

▪ **Holistic documentation of Cypriot ceramic zoomorphic rhyta dating to the Hellenistic Period (Project Paper)**

*Kyriakos Efsthathiou et al.*

**Abstract:**

Cultural assets of historical value need to be holistically documented to ensure their long-term preservation. A key component of the holistic documentation of a cultural heritage object is the materials' characterization by means of analytical techniques. In this work we have employed non-invasive analytical techniques (x-ray fluorescence, Raman spectroscopy and computed tomography) for the study of three ceramic zoomorphic rhyta, belonging to the museum of George and Nefeli Giabra Pierides located at the Bank of Cyprus Cultural Foundation in Nicosia, Cyprus. The plain ware rhyta in the form of a he-goat are dating to the Hellenistic period (310-30 B.C). We have used non-invasive portable XRF and Raman spectroscopy for the in situ chemical characterization of color traces preserved at the surface of the three zoomorphic rhyta. In addition, we have employed Computed Tomography (CT) as a non-invasive method to investigate the manufacturing technique of the ceramics. CT was used to visualize manufacturing details and to provide the accurate profiles of the ceramics, especially of the closed shapes. CT enabled a closer examination of the objects and generated a three-dimensional (3D) digital model of the artefacts which was used to replicate them using additive manufacturing (3D printing).

- **A non-destructive approach for pigments identification of the Byzantine wall paintings in the church of Saint Euphemianos in Cyprus (Project Paper)**

*Theodoros Ganetsos et al.*

**Abstract:**

In this research article we present identification of pigments using non-destructive techniques. The geographic location of Cyprus at the crossroads of Europe, Asia, and Africa, the meeting point of great civilizations reflects the factors that have influenced the course of the island's history and its rich cultural heritage. We studied the frescoes of the church of Saint Euphemianos or Themonianos in Cyprus. Various natural mineral pigments, as well as artificially produced inorganic pigments were identified in the wall paintings by means of pXRF and pRaman Spectroscopy. The local mineral varieties included mainly red and yellow ochre, umber, green earth. The foreign natural inorganic pigments included lapis lazuli, consisting mainly of lazurite and cinnabar. The artificially produced inorganic pigments included lead white. The pigments seem to have been used pure or in mixtures and were applied in a single or multiple layer. The yellow paints consisted mainly of yellow ochre, while the brown-reds consisted of different hues of red ochre, yellow ochre, and umbers applied pure or in combination with each other.

- **A superhydrophobic and oleophobic composite coating for the protection of marble (Project Paper)**

*Zebunnisa Chughtai et al.*

**Abstract:**

A superhydrophobic and highly oleophobic coating was produced on marble by embedding silica (SiO<sub>2</sub>) nanoparticles and a C6 fluorocarbon polymer in-to a polysiloxane binder. Nanoparticles were responsible for the formation of a two-length-scale hierarchical structure whereas fluoropolymer lowered the surface energy of the composite, resulting in extreme wetting properties which were evidenced by the large contact angles of water (=160°) and oil (=137°) drops. The distinctive roles of the nanoparticles and fluoropolymer on the wettability of the composite coating were elucidated using Scanning Electron Microscopy. The superhydrophobic coating offered good protection against water penetration by capillarity and had practically no significant effect on the original colour of marble substrate. Finally, it is reported that the composite coating maintained enhanced hydrophobic character, after multiple cycles of the tape peeling and the sandpaper abrasion tests.

- **Digital-Virtual Representations of Cultural Routes (Project Paper)**

*Cecilia Maria Bolognesi et al.*

**Abstract:**

This paper describes a personal engagement with the dissemination of the Route of Sant'Agostino in Lombardy to support cultural heritage as a shared value and as a tribute to our culture, democracy, and way of life. The research tested the possibility of creating a reality-based information model that can also be enjoyed virtually. The work presents the processing and sharing flow developed starting from the integrated digital survey (laser scanners and drone photogrammetry) to the reconstruction of the model and its associated information. The goal is to be able to navigate it within an immersive mode by enjoying the uploaded information but also remotely when embedded in a platform. Indeed, the services dedicated to digital model fruition allow to directly dispose of multimedia content that add value to

the user experience for a more in-depth and immediate knowledge of the heritage. In this way, we intend to participate spontaneously in the development of the involvement of populations in the discovery of a cultural path, the Route of St. Augustine, recently formed.

▪ **Digital Technology and Cultural Itineraries in the context of "Smart" Cities (Project Paper)**

*Christina Keramida Papadatou et al.*

**Abstract:**

Smart cities are no longer a science fiction "utopia" but an augmented reality. More and more cities are making use of digital technologies, developing the appropriate "intelligence" with the aim of facing the challenges of intense urbanization, towards a more efficient governance and the improvement of the quality of life of the inhabitants. Cultural tourism has taken different forms over the centuries revealing its multiple - social, political, geographical, economic, religious and cultural background. From commercial routes to pilgrimage trails and from guided tours of museums and galleries to walks around world famous attractions. More and more tourists travelling on a cultural motivation are choosing alternative destinations as well as alternative means of touring and education. With the rapid technological advance, various research programs have funded the design and development of applications and other technological tools to present a different experience to tourists, while offering the promise of new destinations. The paper aims to highlight a digital dimension of cultural routes, as well as the impact of technologies for urban accessibility and inclusiveness.

▪ **The wine and cultural regions of Vinhos Verdes and Douro: analysis of the website's usability and accessibility (Project Paper)**

*Fatima Matos Silva et al.*

**Abstract:**

Viticulture is historically linked to Portugal, being an integral activity of its culture and heritage, promoting the several demarcated regions. This article discusses this issue, aiming to contribute to a better perception of the levels of accessibility provided by websites related to two important wine regions. In this context, we analysed the websites of the demarcated regions of Vinhos Verdes (Sub-regions of Melgaço and Monção, Lima and Amarante) and Douro (Baixo and Cima Corgo), in the specific case of the websites of the municipalities of these regions, as well as the Portal of Vinhos Verdes and the Instituto dos Vinhos do Douro e Porto. To achieve our goal, we have verified compliance with the World Wide Web Consortium (W3C) Web Content Accessibility Guidelines 2.0 (WCAG). As we analyse it from the point of view of the wine tourist and considering the poor results obtained, we encourage constructive suggestions, highlighting some examples of good practices, using the five senses, to improve the personal experiences of users of this type of cultural heritage.

- **Underwater Cultural Heritage Protection and Sustainable Tourism Management And New Technologies. The Case of Greece. (Project Paper)**

*Ioanna C. Chatzopoulou et al.*

**Abstract:**

Underwater cultural assets have a unique historical importance, as they constitute material testimonies of our common history and memory. Despite its significance the underwater cultural property is largely unknown and underestimated, while it is exposed to various natural and human derived threats, like unauthorized activities, looting, commercial exploitation, coastal development, environmental degradation and pollution, global warming, exploitation of the natural resources and of the sea bed. Key prerequisites for preventing such activities and effectively curating and preserving the underwater cultural property and the natural environment surrounding it, are public education, information, knowledge, interest and awareness of the urgent need to sustainably manage and protect this priceless heritage. This paper examines how innovative and pioneering applications of new technologies can make a decisive contribution to the survey, discovery, excavation, protection and preservation of underwater cultural heritage. It also demonstrates how advanced technology enhances non - intrusive access to in situ underwater cultural heritage and enables the wide public to virtually visit and exploring it for educational and recreational reasons, promoting this way public interest and appreciation of this hidden cultural wealth. Moreover, the article demonstrates how the use of virtual and augmented reality applications contributes to the development of thematic tourism (diving tourism) and to economic growth. It also focuses on the Greek paradigm, as a case study.

- **Sustainable Cultural Tourism Strategy and Promotion: An ICT Management Platform (Project Paper)**

*Kashyap Raiyani et al.*

**Abstract:**

Cultural tourism (CT) is a significant element of today's economy, accounting for around 37% of the total tourist industry and expanding at a pace of over 15% each year. This function and economic impact can benefit some EU and non-EU locations and areas with high cultural, social, and environmental potential. Other synergistic variables such as know-how, Information Communication Technologies (ICTs), gastronomy, identity, local culture, values, intangible legacy, or other characteristics also contribute to this influence. The work presented in this paper is part of the Social Innovation and TEchnologies for Sustainable Growth through Participative Cultural TOURism (TExTOUR) project, which brings together partners from the quintuple social innovation helix (knowledge, business, society, government, and entrepreneurs) to co-design, validate, and scale up policies and strategies that have a positive impact on socio-economic territorial development based on cultural tourism. TExTOUR collaborates with eight Cultural Tourism Pilots in lesser-known destinations to develop collaborative work methodologies for developing CT strategies for local sites, utilizing ICTs and social innovation tools. The Cultural Tourism Labs assist stakeholders in putting CT ad hoc strategies and action plans into action, monitoring them, and validating them. As a result, a technological platform (ICT tool) is presented in this paper, with its components outlined.

▪ **Assessment of tourist's acceptance of a VR multisensory system (Short Paper)**

*Razvan Gabriel Boboc et al.*

**Abstract:**

This study focused on assessing the tourist's acceptance of a VR multisensory system which was integrated in a public weapons exhibition. Museums have a key role in preserving the history, heritage and culture of a society that may be long gone. The recent advances in Virtual Reality (VR) technologies can be successfully integrated in custom made equipment that can offer tourists an unforgettable immersive, interactive and rich experience. The developed VR application offered users the opportunity to shoot targets using a haptic bow in a virtual medieval world. Sixty tourists have agreed to participate in the study and have completed an adapted questionnaire which evaluated four constructs: immersion, engagement, intention to use, and social interaction. The statistical analysis revealed significant correlations between the factors, which confirmed the proposed re-search model. The engagement factor was found to have a greater influence over the intention to use than immersion, therefore implying that users are more motivated to visit a museum if they can have a VR multisensory experience. The level of immersion, although significant, does not properly justify the variance in the user's decision to use the system.

▪ **Beyond the Ionian Film Office metaverse: design and development of a tourism location guide for Ionian Islands in Greece (Short Paper)**

*Iakovos Panagopoulos et al.*

**Abstract:**

In this work, we present one of the first attempts to extend to the Metaverse, the Ionian Film Office, a public service inaugurated and supported by the prefecture of Ionian islands in Greece. Today, the wide availability of metaverse platforms, combined with the introduction of new types of interaction devices, the increase in connectivity speeds and the wide acceptance of those methods by the public are all factors that allow advanced levels of mixed virtual/physical collaboration to be realized. Within this real-life case study, we explore various developmental aspects that should be considered from different perspectives. Those include: adaptation of the intended interactivity scenario and use of the virtual space for other complementary purposes beyond its original intended use; various issues that commonly arise during collaboration as officials have to be present and interact in both the actual and virtual spaces with producers; designing for potential tourists or tourism office representatives who explore the available information gathered from a visiting-touristic perspective; the incorporation of various uses that include providing a shared visiting space for virtual exhibitions within touristic expos; the ethical and legal implications that arise.

▪ **From symbol to place: A tourist review study of informal intangible cultural heritage in Guangzhou (China) and Kraków (Poland) (Short Paper)**

*Qihang Qiu et al.*

**Abstract:**

Symbols of intangible cultural heritage (ICH), which are usually recognized by tourists, play an important role in place branding. Intend to explore how ICH symbols and places show in cities, this study conducted a Content Analysis based on 12,211 reviews from Guangzhou (China) and 68,582 reviews from Kraków (Poland) on Tripadvisor. The findings present that: 1). ICH symbols can be summarized into six categories and sixteen subcategories, and most of them evolve from

social practices, rituals and festive events. The difference is tourists recognize more symbols of traditional music in Poland, while knowledge and practices concerning nature and the universe are more appreciated in Guangzhou. 2). The semantic networks of ICH symbols and networks of ICH-related places both present clear structures of core and periphery 3). The most important ICH symbols shown in cities can be concluded as culinary, folklore, and religion. 4). Although Chinese ICH symbols distribute in various types of places, Polish ones are mainly gathered in religious sites. Comparing two cities from China and Europe, the results preliminary reveal two ICH-related destination images based on symbols, and how ICH-related places interact with each other.

- **ECHOES: An Interdisciplinary Approach in Digital Reviving of Archaeo-anthropological Material (Short Paper)**

*Georgia Georgiou et al.*

**Abstract:**

Drawing from the past the human remains of ancient civilizations and reviving them with the assistance of current technology is a way to shed light on history and develop communication channels between the modern world and its past. Within the framework of construction of various works of infrastructure in Greece, the archaeologists are given the unique chance to excavate in the current urban environment and unveil the archaeological relics that stand buried and silent for centuries under the modern concrete buildings and roads. Among the various archaeological findings, the ancient cemeteries are a valuable source of information about the populations that once inhabited the Greek cities. The construction of Thessaloniki's subway uncovered thousands of tombs, dated from the Hellenistic (4th c. BC) to the Ottoman period (19th c. AD). This archaeo-anthropological material becomes the research objective of a collaboration of research institutions and creative and cultural companies, with the aim to reconstruct the health of the ancient population, revive the citizens of the ancient city using the Virtual and Augmented Reality, and Serious Games technologies, and narrate their story through the design of experiential tours. This contribution outlines the multidisciplinary approach applied in the ECHOES project for the innovative presentation of the biographies of the ancient inhabitants of Thessaloniki to the current city's wide population.

## Thursday 10th of November

### Keynote Speakers

Thursday 10th of November	
9:00 - 9:30	<b>Keynote Prof. Irini Stamatoudi, University of Nicosia,CY</b>
9:30 - 10:00	<b>Keynote Mr.Dimi Dimitrov, Wikipedia</b>

TIME	SESSION
<b>10:20 - 10:30</b>	<ul style="list-style-type: none"> <li>The PITCHER Project: education &amp; awareness about illicit trafficking of cultural heritage.</li> </ul>

- **The PITCHER Project: education & awareness about illicit trafficking of cultural heritage. (Short Paper)**

*Maud Ntonga et al.*

#### Abstract:

“PITCHER - Preventing Illicit Trafficking of Cultural Heritage: Educational Resources (2021-2024)” is an Erasmus+ Project which addresses teachers from secondary schools and educators by providing resources for raising youth awareness and enhancing their professional development. PITCHER builds on the final recommendations of the previous NETCHER (H2020 - 2019-2021) project, coordinated by the CNRS, which implemented a strong trans-sectoral network, as well as issued recommendations to fight against looting and trafficking of cultural goods. The objective consists of developing and testing a set of open educational resources, to be made available online. The focus is on improving the capacity of teachers to prepare new learning experiences (workshops, gamification, AR) to raise awareness of youngsters and support the fight against this criminal phenomenon. This paper will explore the methodological approach of the PITCHER project. The results of the project will be achieved firstly by identifying the training needs that will drive the creation of the learning package. PITCHER is using a STEAM approach (combination of science, technology, engineering, arts, and mathematics) as access points to guide young people's research, dialogue, and critical thinking. This paper will also highlight the research work done so far by project partners in terms of mapping the existing initiatives and pedagogical resources and identifying the needs of the teachers. PITCHER has collected training needs from many teachers and mediators covering 5 countries in Europe and beyond. Finally, this paper will demonstrate how PITCHER is developing scenarios that apply the concept of "open schooling" to the fight against the trafficking of cultural goods, involving young people, museum institutions and other organisations active in education on a European scale. Themes addressed in the materials and tools include intercultural reflection, EU values and identity, as well as critical thinking.

Friday 11th of November - <b>ONLY with invitation and Physical presence</b>		
	<b>SPECIAL DAY DEDICATED TO THE HOLISTIC DOCUMENTATION OF MONUMENTS: THE CASE OF INTERREG DIGIARC PROJECT</b>	
9:00 - 9:30	Opening Ceremony	MIN 90
9:30 - 10:00	Ministry of Cultural and Sports, Greece	
10:00 - 10:30	Prof. Gunnar Liestøl	
11:00 - 12:00	UNIVERSITY OF AEGEAN	MIN 120
12:00 - 13:00	CYPRUS UNIVERSITY OF TECHNOLOGY	
14:00 - 14:30	DEPARTMENT OF ANTIQUITIES, CYPRUS	MIN 90
14:30 - 15:00	Prof. Petros Patias	
15:00 - 15:30	Prof. Stavros Katsios	
16:00 - 16:30	Ephorate of Antiquities of the Dodecanese, Greece	MIN 150
16:30 - 17:00	Mr. Thomas Kline	
17:00 - 17:30	Mrs. Catharine DASS, UK Parliament	
17:30 - 18:00	DISCUSSION	
18:00	END OF FINAL CEREMONY	
Friday 11th of November		

## THE HOLISTIC DOCUMENTATION OF MONUMENTS: THE CASE OF INTERREG DIGIARC PROJECT.

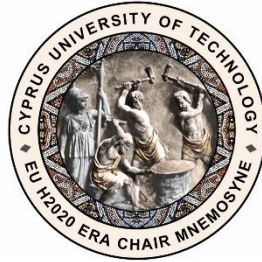
Key and unique results of the Interreg DigiArc Project. <https://www.digiarc.eu/>

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