

# Conference Program

## GEO2019 GEOMATICS & RESTORATION

2<sup>nd</sup> edition

**Cultural Heritage:  
challenges, new perspectives and technology innovation  
Towards informative content models and beyond**

*ISPRS WG II/8, WG III/5, WG IV/II, WG V/I, WG V/II*

Milan, Italy | 8-10 May 2019

Politecnico di Milano, P.za Leonardo da Vinci, 32

*CONFERENCE ROOM SO2 (Building 3) and CASTIGLIANO (Building 5)*



**POLITECNICO  
DI TORINO**



**POLITECNICO  
MILANO 1863**



**UNIVERSITÀ  
DEGLI STUDI  
FIRENZE**



MILANO  
LODI  
MONZA E BRIANZA



MicroGeo



# GEORES2019

# PROGRAMME AT GLANCE

Wednesday, May 8		Thursday, May 9		Friday, May 10	
8:30	Registration	8:30	Registration	8:30	Registration
9:30		9:00		9:00	
9:30	Opening ceremony (CONFERENCE ROOM S02 BUILDING 03)	9:00	SSHRC Internship programme and Value Chain	9:00	20th century heritage
11:00		10:30	Teaching, accessibility and learning	10:00	Landscape
11:00	KEYNOTE SPEAKER: Joan Cobb (The J. Paul Getty Trust - Getty Digital Division) "Using the Getty Vocabularies to Connect Resources in a Linked and Open World: growing potential through contributions"				KEYNOTE SPEAKER: Sabrina Baggioni (Vodafone Italia 5G programme responsible) "5G potentials for Tourism and Education in the Cultural Heritage domain"
11:30	INVITED LECTURE: Mario Santana Quintero (Vice-President ICOMOS and ICOMOS/ISPRS Heritage Documentation CIPA) "Can we apply ethics to digital recording for conserving heritage places"		Coffee break	10:15	KEYNOTE SPEAKER: Daniele Loiacono (Politecnico di Milano) "5G, applications, Virtual Reality and Augmented Reality for Immersive Education"
11:45		10:30		10:45	
11:45	Coffee break	11:00	Geomatic technologies and preservation		INVITED LECTURE: Minja Yang (President Raymond Lemaire International Centre for Conservation, KU Leuven, Member of Board - Association des centres culturels de rencontre, ACCR), "Heritage & Development" Strategy On Historic Urban Landscape (HUL)"
12:00		12:30		10:45	
12:00	HBIM and Informative models 1	12:30	INVITED LECTURE: Marinos Ioannides (UNESCO EU ERA CHAIR ON DCH) "The EU H2020 Virtual Multimodal Museum (ViMM) Manifesto: Road Map and Action Plan for the Horizon-Europe Framework programme"	11:00	Coffee break
13:00	Multi-source data analysis	13:00		11:30	
13:00	Light Lunch & Sponsors Exhibition (GEOMAX srl MicroGeos srl STONEX srl)	13:00	Light Lunch & Sponsors Exhibition	11:30	Heritage documentation in the pre-digital era
14:00		14:00	(GEOMAX srl MicroGeos srl STONEX srl)	13:00	Heritage Urban Landscape
14:00	Structure and Infrastructure Monitoring Challenging Hazard	14:00	Poster	13:00	Light Lunch & Sponsors Exhibition (GEOMAX srl MicroGeos srl STONEX srl)
15:30	HBIM and Informative models 2	15:30		14:00	
15:30		15:30	Discussion TABLE: GEORES teaching education, capacity building, value chain	14:00	Poster
16:00	Coffee break	15:30		15:00	
16:00	Vocabularies and Semantics for Informative Models	16:00	Discussion TABLE: HBIM&VR Informative Modeling Critical Issues	15:00	
17:30	Digitization of Architectural Heritage	16:00		15:00	Best paper/poster award, Closing Ceremony
18:00	ICEBREAKER & VISIT TO THE HISTORICAL LIBRARY OF THE POLITECNICO DI MILANO	16:30	Coffee break	15:30	
18:00	Leonardo da Vinci (The Atlanticus Codex - XIX cen. edition), Galileo Galilei, historical treatises (Vitruvio - XVI cen. edition, Rondelet, De Dartein, Colombo and Formenti).	16:00			
19:30		16:30	KEYNOTE SPEAKER: Christian Greco (Director of the Egyptian Museum of Turin), "The biography of objects"		
		16:30			
		16:30	Content based eXtended REALITY (AR/MR/VR)		
		18:00	Archaeology and digital technologies		
		19:30	Social Dinner (Basilica di Sant'Ambrogio)		
		23:00	P.zza S. Ambrogio 15, Milan		
		19:30	Guided visit to the Basilica di Sant'Ambrogio		
			Welcome by the Abbot of the Basilica di Sant'Ambrogio, Monsignor Carlo Faccendini		
		20:00			
		23:00	Social Dinner (Bramante's Canonica Porch and Sant'Ambrogio Hall)		

**CERIMONY – CONFERENCE ROOM S02**

**KEYNOTES & INVITED LECTURE – S02**

**ORAL SESSION – S02**

**ORAL SESSION – CASTIGLIANO ROOM**

**POSTER – PORCH**

## KEYNOTES

WEDNESDAY 8 MAY 11:00 – 11:30 AULA S.0.2



### JOAN COBB

The J. Paul Getty Trust - Getty Digital Division

*“Using the Getty Vocabularies to Connect Resources in a Linked and Open World: growing potential through contributions”*

Joan Cobb is a Principal IT Project Manager with the Getty Digital division of the J. Paul Getty Trust. Since joining the Getty in 1990, she has, in addition to other projects, played a primary role in the design and development of the custom software needed to support the growth and usage of the Getty Vocabularies as well as leading the project to publish the Art & Architecture Thesaurus® (AAT), the Getty Thesaurus of Geographic Names® TGN), and the Union List of Artist Names® (ULAN), as Linked Open Data. Joan currently is dividing her time between the moving of the Getty Conservation Institute’s AATA Online to the Arches open-source platform and helping internal and external resources link their data with and contribute to the Getty Vocabularies. Joan came to the Getty with a varied background in programming and design experiences ranging from academic and medical research to energy management and hazardous chemical tracking. She began her career in software after more than a decade as a teacher and master teacher with the public school system and government/industry sponsored programs.

THURSDAY 9 MAY 16:00 – 16:30 AULA S.0.2

### CHRISTIAN GRECO

Director of the Egyptian  
Museum of Turin

*“The biography of objects”*

*Christian Greco has been Director of the Museo Egizio since 2014. He managed a refurbishment of the museum*

*building and a renovation of its galleries, completed on March 31st 2015, whereby the Museo Egizio was transformed from an antiquities museum into an archaeological museum. While at the head of the Museo Egizio, he has set up important international collaborations with museums, universities and research institutes all across the world. Greco is also a dedicated teacher. He taught Greek and Latin at high school in the Netherland for many years. For several years, he was a member of the Epigraphic Survey of the Oriental Institute of the University of Chicago in Luxor. He has also been a keynote speaker at a number of Egyptology and museology international conferences.*





FRIDAY 10 MAY 10:15 – 10:45 AULA S.0.2



## DANIELE LOIACONO

Politecnico di Milano

*“5G, applications, Virtual Reality and Augmented Reality for Immersive Education”*

Daniele Loiacono graduated in 2004 in Computer Engineering and received a Ph.D. in Computer Engineering in 2008 from Politecnico di Milano. Since 2011, he is an assistant professor at the Department of Electronics, Information of Politecnico di Milano. His main research interests include machine learning, computer assisted game design, educational games, and AR/VR technologies.

## SABRINA BAGGIONI

Vodafone Italia 5G programme responsible

*“5G potentials for Tourism and Education in the Cultural Heritage domain”*

Sabrina Baggioni is 5G Program Director of Vodafone Italia since September 2017. She joined Vodafone Italia in 2000 as Head of Business Development and over the years held various roles, always focusing on innovation, from the world of online and digital to that of international roaming. In a few years he became the first responsible of integrated communication services for companies, and then Marketing Director of the Enterprise world (2006-2014), leading to the launch of the first convergent offer in Italy, which is why he was called to England by the Vodafone Group to lead implementation also in other markets. Previously he worked in the consulting world for Monitor Deloitte (from 1992 to 2000) first in London, then in Abu Dhabi and finally Milan, managing projects and clients at an international level, and mainly dealing with strategy, internationalization and product portfolio. Graduated in Management and Business Administration at the ‘Luigi Bocconi’ Commercial University, she specialized in Business Administration and Internationalization at the Wharton School of the University of Pennsylvania. She graduated in piano from the Giuseppe Verdi Conservatory in Ravenna.



## INVITED LECTURES

WEDNESDAY 8 MAY 11:30 – 11:45 AULA S.0.2



### MARIO SANTANA QUINTERO

Vice-President ICOMOS and ICOMOS/ISPRS  
Heritage Documentation CIPA

*“Can we apply ethics to digital recording for conserving heritage places”*

Mario Santana-Quintero, is an associate professor at department of Civil and Environmental Engineering Carleton University. He is also the Director of the NSERC Create program Heritage Engineering based at the Carleton immersive Media Studio Lab (CIMS). He is also a guest professor at the Raymond Lemaire International Centre for Conservation (University of Leuven). Along with his academic activities, he serves as ICOMOS Vice President and he is the past president of the ICOMOS Scientific Committee on Heritage Documentation (CIPA). Furthermore, he has collaborated in several international projects in the field of heritage documentation for UNESCO, The Getty Conservation Institute, ICCROM, World Monuments Fund, UNDP, Welfare Association, and the Abu Dhabi Authority for Culture and **Heritage**.

THURSDAY 9 MAY 12:30 – 13:00 AULA S.0.2

### MARINOS IOANNIDES

UNESCO EU ERA CHAIR ON DCH

*“The EU H2020 Virtual Multimodal Museum (ViMM) Manifesto: Road Map and Action Plan for the Horizon-Europe Framework programme”*

Dr-Ing Faculty of Mechanical Engineering, University of Stuttgart, Germany. Diplom Informatiker (Computer Science) Faculty of Mathematics and Computer Science, University of Stuttgart, Germany.

Chair of the Digital Heritage Research Center at CUT (Cyprus University of Technology) - Department of Electrical Engineering, Computer Engineering and Informatics. Secretary General of CY ICOMOS Committee ([www.icomos.org](http://www.icomos.org)). Member of the Executive Committee of CIPA (<http://cipa.icomos.org/>). Member of the EU Expert Group on Digitalization and Preservation (<https://goo.gl/hbzthW>). Former Editor in Chief of the International Journal on Heritage in the Digital Era ([www.multi-science.co.uk/ijhde.htm](http://www.multi-science.co.uk/ijhde.htm)). Member of the Europeana Network and Cultural Commons (2009-Ongoing). Member of the European Commission Group of Experts on Digital Heritage and Europeana, since 2007. Member of the CEN/TC for standards in Cultural Heritage, since 2018. Director of UNESCO Chair on Digital Cultural Heritage, since 2018. Special CICOP Net 2018 Award. H2020 CSA Virtual Multimodal Museum ([www.vimm.eu](http://www.vimm.eu) 2016-2019). H2020 R&I INCEPTION project ([www.inception-project.eu](http://www.inception-project.eu) 2016-



2019). International Conference EuroMed2010-18 - Chair. UNESCO Chair on Digital Cultural Heritage. EU ERA Chair on Digital Cultural Heritage

**FRIDAY 10 MAY 10:45 – 11:00 AULA S.0.2**



## **MINJA YANG**

**President Raymond Lemaire International Centre for Conservation, KU Leuven, Member of Board - Association des centres culturels de rencontre, ACCR)**

***“Heritage & Development” Strategy On Historic Urban Landscape (HUL)”***

Minja Yang was born in Tokyo, Japan in 1952. Upon completing her high school education in Tokyo, she attended universities in Paris, Washington D.C., Geneva and London and has an undergraduate degree in Development Sociology (Georgetown University, USA) and post-graduate degrees in Southeast Asian Studies and Politics (University of London). Joining the United Nations High Commissioner for Refugees (UNHCR) in 1979, she worked for the protection of refugees and displaced persons from Indochina as well as from the Horn of Africa until 1989 when she transferred to the United Nations Educational, Scientific and Cultural Organization (UNESCO). Having served in the Cabinet of the Director-General of UNESCO, then as Chief of Emergency Unit (1990), as Chief of Unit for the safeguarding of Angkor and concurrently Head of the Intersectoral Task Force on Cambodia (1991), she joined the World Heritage Centre in 1994. She is now concurrently Director for the Asia-Pacific Region and of the Information and Documentation Unit, as well as Coordinator for a Special Programme for the Safeguarding and Development of Asian World Heritage Cities for the 21st Century, at the UNESCO World Heritage Centre.

# Full programme GEORES 2019

## WEDNESDAY 8 MAY

<b>9:30 – 11:00</b>	<b>OPENING CERIMONY</b>	<b>AULA S.0.2</b>
	<b>Conference Chairs Introduction and Welcome</b> <i>R. Brumana, V. Pracchi, A. Grimoldi, F. Rinaudo, M. Scaioni</i>	
	<b>Outcomes of the first edition of GEORES</b> <i>G. Tucci</i>	
	<b>Vice Rector of the Politecnico di Milano</b> <i>E. Faroldi</i>	
	<b>Welcome of the Head of Department ABC – Politecnico di Milano</b> <i>S. Della Torre</i>	
	<b>Welcome of the “Deputy commander of the Istituto Geografico Militare – IGM”</b> <i>Gen. G. Poccia</i>	
<b>11:00 – 11:30</b>	<b>KEYNOTE</b>	<b>AULA S.0.2</b>
	<b>Joan Cobb</b> The J. Paul Getty Trust - Getty Digital Division  <i>“Using the Getty Vocabularies to Connect Resources in a Linked and Open World: growing potential through contributions”</i>	
<b>11:30 – 11:45</b>	<b>INVITED LECTURE</b>	<b>AULA S.0.2</b>
	<b>Mario Santana Quintero</b> Vice-President ICOMOS and ICOMOS/ISPRS Heritage Documentation CIPA  <i>“Can we apply ethics to digital recording for conserving heritage places”</i>	
<b>11:45 – 12:00</b>	<b>COFFEE BREAK</b>	<b>SOUTH PAVILION COURTYARD</b>
<b>12:00 – 13:00</b>	<b>SESSION A1</b>	<b>AULA S.0.2</b>
	<b>HBIM AND INFORMATIVE MODELS 1</b> <i>Chairs: S. Della Torre, G. Tucci</i>	
	<ul style="list-style-type: none"><li>■ <b>Innovative tools for managing historical buildings: the use of geographic information system and ontologies for historical centers</b> <i>Acierno, M.; Fiorani, D.</i></li></ul>	

- **Geometric survey data and historical sources interpretation for HBIM process: the case of mantua cathedral façade**  
*Adami, A.; Fregonese, L.; Rosignoli, O.; Scala, B.; Taffurelli, L.; Treccani, D.*
- **Advanced 3D technology in support of the BIM processes in the cultural heritage: in-depth analysis of the case study of the roman fluvial port of Aquileia (Italy)**  
*Pratali Maffei, S.; Canevese, E. P.; De Gottardo, T.; Pizzol, L.*

12:00 – 13:00

SESSION B1

AULA CASTIGLIANO

### MULTI-SOURCE DATA ANALYSIS

*Chairs: L. Díaz-Vilariño, D. Del Curto*

- **Combination of terrestrial laserscanning, UAV and close-range photogrammetry for 3D reconstruction of complex churches in Georgia**  
*Luhmann, T.; Chizhova, M.; Gorkovchuk, D.; Hastedt, H.; Chachava, N.; Lekveishvili, N.*
- **The GAMHER research project for metric documentation of cultural heritage: current developments**  
*Bitelli, G.; Balletti, C.; Brumana, R.; Barazzetti, L.; D'Urso, M. G.; Rinaudo, F. Tucci, G.*
- **Laser and multi-image reverse engineering systems for accurate 3D modelling of complex cultural artefacts**  
*Ioannidis, C.; Piniotis, G.; Soile, S.; Bourexis, F.; Chliverou, R.; Tsakiri, M.*
- **Point cloud segmentation using image processing techniques for structural analysis**  
*Barrile, V.; Candela, G.; Fotia, A.*

13:00 – 14:00

LIGHT LUNCH

SOUTH PAVILION COURTYARD

14:00 – 15:30

SESSION A2

AULA S.0.2

### STRUCTURE AND INFRASTRUCTURE MONITORING CHALLENGING HAZARD

*Chairs: T. Luhmann, L. Cantini*

- **Lifecycle management, monitoring and assessment for safe large-scale infrastructures: challenges and needs**  
*Limongelli, M. P. Previtali, M.; Cantini, L.; Carosio, S.; Matos, José C.; Isoird Aurrekoetxea, J. M.; Wenzel, H.; Pellegrino, C.*
- **History, geometry, structure: interdisciplinary analysis of a historical bridge**  
*Bruno, N.; Coïsson, E.; Diotri, F.; Ferrari, L.; Mikolajewska, S.; Morra di Cella, U.; Roncella, R.; Zerbi, A.*
- **Remote sensing technologies for linear infrastructure monitoring**  
*D'Aranno, P.; Di Benedetto, A.; Fiani, M.; Marsella, M.*



- **Cultural heritage monitoring by low-cost GNSS receivers: a feasibility study for San Saudenzio's cupola, Novara**  
*Barzaghi, R.; Reguzzoni, M.; De Gaetani, C. I.; Caldera, S.; Rossi, L.*
- **MAGO: a new approach for orthophotos production based on adaptive mesh reconstruction**  
*Gagliolo, S.; Federici, B.; Ferrando, I.; Sguerso, D.*
- **Informative content models for infrastructure load testing management: the Azzone Visconti bridge in Lecco**  
*Previtali, M.; Barazzetti, L.; Banfi, F. Roncoroni, F.*

14:00 – 15:30

SESSION B2

AULA CASTIGLIANO

## HBIM AND INFORMATIVE MODELS 2

*Chairs: R. Brumana, D. Fiorani*

- **The facade's dome of the St. Anthony's basilica in Padua**  
*Diaz, M.; Holzer, S. M.*
- **Technology 4.0 for buildings management: from building site to the interactive building book**  
*Laurini, E.; Rotilio, M.; Lucarelli, M.; De Berardinis, P.*
- **From the elaboration process of point cloud to information systems both for planning and design management of cultural heritage**  
*Ruffino, P. A.; Bocconcino, M. M.; Del Giudice, M.; Osello, A.*
- **Advanced 3D modeling versus building information modeling: the case study of palazzo Ettoreo in Sacile (Italy)**  
*Visintini, D.; Marcon, E.; Pantò, G.; Canevese, E. P.; De Gottardo, T.; Bertani, I.*
- **An informative content 3D model for the hall holding the resurrection of Christ by Piero Della Francesca mural painting at Sansepolcro, Italy**  
*Coli, M.; Ciuffreda, A. L.; Micheloni, M.*

15:30 – 16:00

COFFEE BREAK

SOUTH PAVILION COURTYARD

16:00 – 17:30

SESSION A3

AULA S.0.2

## VOCABULARIES AND SEMANTICS FOR INFORMATIVE MODELS

*Chairs: A. Spanò, N. Lombardini*

- **Towards building a semantic formalization of (small) historical centres**  
*Kokla, M.; Mostafavi, M.-A.; Noardo, F.; Spanò, A.*
- **Towards a semantic based hub platform of vaulted systems: HBIM meets a GEODB**  
*Brumana, R.; Condoleo, P.; Grimoldi, A.; Previtali, M.*
- **HBIM in a semantic 3D GIS database**  
*Matrone, F.; Colucci, E.; De Ruvo, V.; Lingua, A.; Spanò, A.*
- **Modelling in HBIM to document materials decay by a thematic mapping to manage the cultural heritage: the case of "Chiesa della Pietà" in Fermo**  
*Malinverni, E. S.; Mariano, F.; Di Stefano, F.; Petetta, L.; Onori, F.*

- **Evaluation of an integrative approach between HBIM and architecture history**

*Beltramo, S.; Diara, F.; Rinaudo, F.*

**16:00 – 17:30**

**SESSION B3**

**AULA CASTIGLIANO**

### **DIGITIZATION OF ARCHITECTURAL HERITAGE**

*Chairs: M.A. Marsella, E. Rosina*

- **The cathedral of S. Lorenzo in Perugia and the hypogeal spaces. Geomatic techniques for spatial investigations aimed at the knowledge and interpretation of the origin of the transept**  
*Matracchi, P.; Radicioni, F.; Stoppini, A.; Tosi, G:*
- **The digital documentation of historical cities between transformations and conservation: the case study of Valbona gate in Urbino Italy**  
*Baratin, L.; Cattaneo, A.; Gasparetto, F.; Moretti, E.; Lonati, S.*
- **Photogrammetric wireframe and dense point cloud 3D modelling of historical structures: the study of Sultan Selim mosque and Yusuf Aga library in Konya, Turkey**  
*Altuntas, C.; Mert, S.; Yaman, G.; Cengiz, Y.; Sonmez, M.*
- **Data optimization for 3D modeling and analysis of a fortress architecture**  
*Marino, B. G.; Masiero, A.; Chiabrando, F.; Lingua, A.; Fissore, F.; Blaszcak-Bak, W.;Vettore, A.*
- **Scan planning optimization for outdoor archaeological sites**  
*Díaz-Vilariño, L.; Frías, E.; Previtali, M.; Scaioni, M.; Balado, J.*

## THURSDAY 9 MAY

9:00 – 10:30

SESSION A4

AULA S.0.2

### SSHRC INTERNISHIP AND VALUE CHAIN

*Chairs: S. Fai, R. Brumana*

- **Digital documentation and monitoring hub in climate-sensitive territories: the Albenga case study (San Clemente site)**  
*Molnar, T.; Brumana, R.; Conventi, M.; Previtali, M.*
- **New tools for cultural heritage tourism: accessible virtual reality for Milan's basilica Sant'Ambrogio**  
*Pybus, C.*
- **The evolution of modelling practices on Canada's parliament hill: an analysis of three significant heritage building information models (HBIM)**  
*Chow, L.; Graham, K.; Grunt, T.; Gallant, M.; Rafeiro, J.; Fai, S.*
- **A workflow for geometric colour photography of painted surfaces**  
*Dhanda, A.; Scarpa, G.; Fai, S.; Santana Quintero, M.*
- **Merging photogrammetry and augmented reality: the canadian library of parliament**  
*Carrión-Ruiz, B.; Blanco-Pons, S.; Weigert, A.; Fai, S.; Lerma, J. L.*
- **Generative modeling, virtual reality and HBIM interaction: immersive environment for built heritage: case study of Shaikh Isa Bin Ali house, Bahrain**  
*Banfi, F.; Brumana, R.; Aljishi, A.; Sayeh, N.AL.; Santana, M.; Cuca, B.; Oreni, D.; Midali, C.*

9:00 – 10:30

SESSION B4

AULA CASTIGLIANO

### TEACHING, ACCESSIBILITY AND LEARNING

*Chairs: J.E. Lerma, A. Grimoldi*

- **Impact of virtual reality experience on accessibility of cultural heritage**  
*Paladini, A.; Dhanda, A.; Reina Ortiz, M.; Weigert, A.; Nofal, E.; Min, A.; Gyi, M.; Su, S.; Van Balen, K.; Santana Quintero, M.*
- **On the relationship between geomatics and conservation: lessons learned from integrated restoration laboratories**  
*Pracchi, V.; Barazzetti, L.*
- **Revealing the everyday landscape: innovative systems for heritage education in schools. The SCAR (school activates resources) project**  
*Bonfantini, B.; Casonato, C.; Villa, D.; Di Blas, N.; Pracchi, V.; Vedoà, M.*
- **Geometric primitives assessing italian-czech vault construction techniques in baroque period**  
*Stanga, C.; Hasnikova, H.; Brumana, R.; Grimoldi, A.; Banfi, F.*
- **Educational and training experiences in geomatics: tailored approaches for different audience**  
*Tucci, G.; Parisi, E. I.; Conti, A.; Corongiu, M.; Fiorini, L.; Panighini, F.*

- **The HBIM analysis of the geometry to understand the constructive technique: the use of the trompe volume in a brick vault**  
*Attico, D.; Turrina, A.; Banfi, F.; Grimoldi, A.; Landi, A. G.; Condoleo, P.; Brumana, R.*

10:30 – 11:00

COFFEE BREAK

SOUTH PAVILION COURTYARD

11:00 – 12:30

SESSION A5

AULA S.0.2

## GEOMATIC TECHNOLOGIES AND PRESERVATION

*Chairs: L. Barazzetti, V. Pracchi*

- **Monitoring and preservation of the Kyiv Pechersk Lavra caves**  
*Shults, R.; Bilous, M.; Kovtun, V.*
- **The use of new technologies in the restoration and conservation of built cultural heritage/ the case of the statue of Fouara, Setif. Algeria**  
*Ali Khodja, N.; Zeglache, H.; Benali, F.; Guani, O.*
- **Specificity of historical buildings and BIM methodologies. A first experimentation for the Federico II headquarters in Naples.**  
*Picone, R.; Veronese, L.*
- **Comparison of UAVS performance for a roman amphitheatre survey: the case of Avella (Italy)**  
*Barba, S.; Barbarella, M.; Di Benedetto, A.; Fiani, M.; Limongiello, M.*
- **Geomatics and archaeometric investigations for the sustainable reuse of ruins. The Santa Chiara convent ruin in Cagliari (Sardinia)**  
*Fiorino, D. R.; Grillo, S. M.; Pilia, E.; Vacca, G.*
- **Multi-source approaches for complex architecture documentation: the “Palazzo Ducale” in Gubbio (Perugia, Italy)**  
*Patrucco, G.; Rinaudo, F.; Spreafico, A.*

11:00 – 12:30

SESSION B5

AULA CASTIGLIANO

## VIRTUAL RECONSTRUCTION TECHNOLOGIES

*Chairs: L. Wong, L. Chow*

- **Integrated survey techniques: preliminary studies for the conservation of villa Galvagnina**  
*Nannei, V. M.; Farina, P. M.; Mirabella Roberti, G.; Sansonetti, A.*
- **The castle of Assoro: the integrated survey for the knowledge and conservation of ruin**  
*Versaci, A.; Cardaci, A.; Fauzia, L.; Russo, M.*
- **Lesson learned on monitoring cultural heritage at risk under climate changes: strategy, techniques and results**  
*Rosina, E.; Romoli, E.; Pili, A.; Suma, M.*
- **Evaluating smartphones color fidelity and metric accuracy for the 3D documentation of small artifacts**  
*Gaiani, M.; Apollonio, F. Ivan; Fantini, F.*

- **Best before? Advanced geomatics for preservation and preservation of advanced geomatics**  
*Celli, S.; Del Curto, D.*
- **Research on non-destructive testing technology in renovating projects of Mukden palace**  
*Li, C.; Yang, J.; Zhang, X.; Fu, M.*

**12:30 – 13:00**

**INVITED LECTURE**

**AULA S.0.2**

**Marinos Ioannides**

UNESCO EU ERA CHAIR ON DCH

*“The EU H2020 Virtual Multimodal Museum (ViMM) Manifesto: Road Map and Action Plan for the Horizon-Europe Framework programme”*

**13:00 – 14:00**

**LIGHT LUNCH**

**SOUTH PAVILION COURTYARD**

**14:00 – 15:30**

**POSTER SESSION**

**SOUTH PAVILION COURTYARD**

**POSTER SESSION 1**

*Chairs: E.I. Parisi, C. Altuntas*

- **Prospective upon multi-source urban scale data for 3D documentation and monitoring of urban legacies**  
*Abbate, Sammartano, Spanò*
- **UAV photogrammetry for resilience management in reconstruction plan of urban historical centres after seismic events. A case study**  
*Alicandro, Rotilio*
- **Geomatic techniques for the colonnade structural analysis of the historical “chiamonte steri” building**  
*Orlando*
- **Inventory project for the cultural assets of Istanbul: a model for digitization of cultural heritage**  
*Kudde, Erdogan, Ilze*
- **HBIM for the surveying, analysis and restoration of the Saint John the theologian cathedral in Nicosia (Cyprus)**  
*Santagati, Laurini, Sanfilippo, Bakirtzis, Papacharalambous, Hermon*
- **A geodatabase for multisource data management applied to cultural heritage: the case study of villa Buonaccorsi’s historical garden**  
*Malinverni, Chiappini, Pierdicca*
- **Terrestrial laser scanning and digital photogrammetry for heritage conservation: case study of the historical walls of Lagos, Portugal**  
*Cotrim Mateus, García Fernández, Mota Ferreira, Franco Oliveira, Aguiar, Sousa Gago, Pacheco, Nuno Pernão*
- **Preserving the venetian fortress of Bergamo: quick photogrammetric survey for conservation planning**  
*Mirabella Roberti, Nannei, Azzola, Cardaci*
- **Examining the origin of flowerpot motifs in the buildings of Qajar era**  
*Benisi, Zarezadeh*
- **Rapid 3D digitalization of the cultural heritage: a case study on Istanbul Suleymaniye social complex (Kulliye)**  
*Kan, Büyüksalih, Enç Özkan, Başkaraca*
- **Digital storage and the data collection for the seismic prevention: a comparison from the Italian recent experiences.**  
*Brusa*



- **Detection of building roofs and facades from aerial laser scanning data using deep learning**  
Pirotti, Zanchetta, Previtali, Della Torre
- **Ground based 3D modeling (photogrammetry and TLS) - survey, documentation and structural assessment of XX century cultural heritage in India – a case study of the masonry vaults in Dehradun**  
Tucci, Rihal, Betti, Conti, Fiorini, Cerisano Kovacevic, Bartoli
- **Building assessment using shadow analysis for the architectural documentation**  
Kadhim, Kadhim
- **Managing cultural heritage with integrated services platform**  
Apollonio, Gaiani, Bertacchi
- **Integrated approach combining direct survey and observations in damage analysis of historic buildings in the case of soil settlements**  
Giangregorio, Cortinovis, Cardani, Coronelli
- **Integration of 3D model from UAV survey in BIM environment**  
Barrile, Fotia, Candela, Bernardo
- **Representation and digitalization of stone theaters in eastern Sicily: the Palazzolo Acreide theater**  
Di Gregorio
- **A GIS tool for the management of seismic emergencies in historical centers: how to choose the optimal routes for civil protection interventions**  
Artese, Achilli
- **An optimised workflow for the interactive experience with cultural heritage through reality-based 3D models: cases study in archaeological and urban complexes**  
Cipriani, Bertacchi, Bertacchi
- **Experiencing heritage dynamic through visualization**  
Lecci, Prodi, Trovatelli, Vezzi
- **Analysis of Jiayuguan [嘉峪关] pavilions' deformation and its influence factors with the application of comprehensive technology**  
Zhang, Dong, Zhou, Ba
- **GIS analysis of the seismic damage on historical masonry spires**  
Zanazzi, Coisson, Ferretti
- **Benchmark of metric quality assessment in photogrammetric reconstruction for historical film footage**  
Condorelli, Rinaudo
- **Forgotten architecture: smart tools for cultural tourism in the cloister of the prior (Santa Maria delle Grazie, Milan)**  
Bolognesi, Aiello
- **TLS for detecting small damages on a building facade**  
Masiero, Costantino
- **A geo-referenced database to manage the landscape areas under preservation in Lombardy region**  
Cazzani, Aresi, Coloru, Giannoccaro
- **Built environment: modelling the urban space**  
Guzzetti, Ngozi Anyabolu, D'Ambrosio, Marchetti
- **Advanced geomatics and conservation management plan. Tools and methods for the conservation of 20th century architectural heritage**  
Allegretti, Del Curto, Mazza
- **Digital modelling and analysis of masonry vaults**  
Angjeliu, Cardani, Coronelli
- **BEP & mapping process for the restoration building site**  
Lucarelli, Laurini, Rotilio, De Berardinis
- **Documentation of historical architectures through the combined use of digital surveying techniques**  
Valente, Oreni, Barazzetti, Roncoroni, Previtali
- **Three-dimensional survey of Cave Guattari with traditional and mobile phone cameras**  
Alessandri, Baiocchi, Del Pizzo, Di Ciaccio, Onori, Rolfo, Troisi
- **Point cloud dataset and FEM for a complex geometry: the San Luzi bell tower case study**  
Selvaggi, Bitelli, Serantoni, Wieser
- **Photogrammetry: methods of survey and applications on restoration works**  
Monteiro Genin

- **Geomatics techniques for the enhancement and preservation of cultural heritage**  
Balletti, Bertellini, Gottardi, Guerra
- **Georeferencing and reprojection error investigation on image based 3D digitization and mapping of historical Buildings**  
Altuntas

<b>14:00 – 15:30</b>	<b>DISCUSSION TABLE</b>	<b>AULA S.0.2</b>
	<b>GEORES TEACHING EDUCATION, CAPACITY BUILDING, VALUE CHAIN</b> <i>Chairs: S. Della Torre, G. Tucci</i>	
<b>14:00 – 15:30</b>	<b>DISCUSSION TABLE</b>	<b>AULA CASTIGLIANO</b>
	<b>HBIM&amp;VR INFORMATIVE MODELING CRITICAL ISSUES</b> <i>Chairs: R. Picone, R. Brumana</i>	
<b>15:30 – 16:00</b>	<b>COFFEE BREAK</b>	<b>SOUTH PAVILION COURTYARD</b>
<b>16:00 – 16:30</b>	<b>KEYNOTE</b>	<b>AULA S.0.2</b>
	<b>Christian Greco</b> Director of the Egyptian Museum of Turin  <i>“The biography of objects”</i>	
<b>16:30 – 18:00</b>	<b>SESSION A6</b>	<b>AULA S.0.2</b>
	<b>CONTENT BASED EXTENDED REALITY (AR/MR/VR)</b> <i>Chairs: A. Paladini, F. Maiwald</i>	
	<ul style="list-style-type: none"> <li>■ <b>Aristotle’s mirror: combining digital and material culture</b> <i>Rossi, C.</i></li> <li>■ <b>Realistic natural interaction with virtual statues in X-reality environments</b> <i>Margetis, G.; Papagiannakis, G.; Stephanidis, C.</i></li> <li>■ <b>3D documentation and virtual archaeological restoration of macedonian tombs</b> <i>Stambouloglou, M; Toska, O.; Tapinaki, S.; Kontogianni, G.; Skamantzari, M.; Georgopoulos, A.</i></li> <li>■ <b>Comparing innovative XR systems in cultural heritage. A case study</b> <i>Carrozzino, M.; Voinea, G.-D.; Duguleană, M.; Boboc, R G.; Bergamasco, M.</i></li> <li>■ <b>A content-based immersive experience of basilica of Sant'Ambrogio in Milan: from 3D survey to virtual reality</b> <i>Banfi, F.; Brumana, R.; Stanga, C.</i></li> <li>■ <b>BIM for museums: an integrated approach from the building to the collections</b> <i>Tucci, G.; Betti, M.; Conti, A.; Corongiu, M.; Fiorini, L.; Matta, C.; Cerisano Kovacevic, V.; Borri, C.; Hollberg, C.</i></li> </ul>	

**ARCHAEOLOGY AND DIGITAL TECHNOLOGIES**

*Chairs: R. Picone, M. Santana Quintero*

- **Challenging the invisibility of mobile cultures remote sensing, environment and archaeology in the Near East**  
*Silver, M.; Törmä, M.; Silver, K.; Nuñez, M.; Okkonen, J.*
- **3D integrated surveys and stratigraphic methods for a deeper understanding of historical buildings. A case -study of the Franciscan monastery and the Immacolata Church in Troina, Sicily**  
*Campisi, M. T.; Liuzzo, M.; Giuliano, S.*
- **Interpretation of the function of the obelisk of Augustus in Rome from antique texts to present time virtual reconstruction**  
*Hiermanseder, M.*
- **Lidar data analyses for assessing the conservation status of the so-called baths-church in Hierapolis of Phrygia (TR)**  
*Marson, C.; Sammartano, G.; Spanò, A.; Valluzzi, M. R.*
- **Alba Fucens archaeological site: multiscale and multidisciplinary approach for risk assessment and conservation**  
*Alicandro, M.; Candigliota, E.; Dominici, D.; Immordino, F.; Quaresima, R.; Zollini, S.*
- **Survey and virtual reconstruction of ancient roman floors in an archeological context**  
*Fazio, L.; Lo Brutto, M.; Dardanelli, G.*

## FRIDAY 10 MAY

9:00 – 10:00

SESSION A7

AULA S.0.2

### 20TH CENTURY HERITAGE

*Chairs: V. C. Heras Barros, E.S. Malinverni*

- **Discovering and communicating the rationalist architecture of Forlì. An integrated process**  
*Favaretto, G.; Pretelli, M.; Zampini, A.*
- **Le Corbusier's apartment-studio : 3D model data of preliminary research for the restoration**  
*Bruez, M.; Gandini, B.; Groux, D.*
- **Discovering and preserving the military landscape. ICT for the German bunkers of the Galla Placidia Line.**  
*Mariotti, C.; Ugolini, A.; Zampini, A.*
- **Residential buildings by Giuseppe Terragni in Como: proposals for integration between research, communication and valorisation of heritage**  
*Greppi, A.; Casanova, M.*
- **Building survey and energy modeling: an innovative restoration project for Casa del Fascio in Como**  
*Buda, A.; Mauri, S.*

9:00 – 10:00

SESSION B7

AULA CASTIGLIANO

### LANDSCAPE

*Chairs: A. Cazzani, G. Bitelli*

- **A photogrammetric workflow for rapid site documentation at Stobi, Republic of North Macedonia**  
*Jones, K.; Bevan, G.*
- **Ancient mining landscapes and habitative sceneries in the urban area of Centocelle: geomatic applications for their identification, measurement, documentation and monitoring**  
*Celauro, A.; Marsella, M. A.; D'Aranno, P.; Maas, A.; Palenzuela Baena, J. A.; Guerrero Tello, F.; Moriero, I.*
- **Mapping evolving historical landscape systems**  
*Branduini, P.; Laviscio, R.; L'Erario, A.; Toso, F. C.*
- **Extraction and visualization of 3D building models in urban areas for flood simulation**  
*Kilsedar, C. E.; Fissore, F.; Pirotti, F.; Brovelli, M. A.*

10:15 – 10:45

KEYNOTE

AULA S.0.2

**Sabrina Baggioni**

Vodafone Italia 5G programme responsible

*“5G potentials for Tourism and Education in the Cultural Heritage domain”*

**Daniele Loiacono**

Politecnico di Milano

*“5G, applications, Virtual Reality and Augmented Reality for Immersive Education”*

10:45 – 11:00

INVITED LECTURE

AULA S.0.2

**Minja Yang**

President Raymond Lemaire International Centre for Conservation, KU Leuven, Member of Board - Association des centres culturels de rencontre, ACCR

*“Heritage & Development” Strategy On Historic Urban Landscape (HUL)”*

11:00 – 11:30

COFFEE BREAK

SOUTH PAVILION COURTYARD

11:30 – 13:00

SESSION A8

AULA S.0.2

**HERITAGE DOCUMENTATION IN THE PRE-DIGITAL ERA**

*Chairs: A. G. Landi, M. Scaioni*

- **3D object reconstruction in a pre-digital era: case study in the history of restoration**  
*Lobovikov-Katz, A.*
- **3D digital and physical reconstruction of a collapsed dome using SFM techniques from historical images**  
*Beltrami, C.; Cavezzali, D.; Chiabrando, F.; Iaccarino Idelson, A.; Patrucco, G.; Rinaudo, F.*
- **The “cara valle” abbey and its refectory**  
*Guarisco, G.; Oreni, D.*
- **Reconstruction of historical geodetic systems for their implementation in reprojection algorithms**  
*Baiocchi, V.; Deligios, M.; Giannone, F.; Timar, G.*
- **Tutankhamen’s two tombs: replica creation and the preservation of our cultural heritage in the digital age**  
*Wong, L.; Santana Quintero, M.; Agnew, N.*
- **Geo-information technologies for a multimodal access on historical photographs and maps for research and communication in urban history**  
*Maiwald, F.; Henze, F.; Brusckke, J.; Niebling, F.*



11:30 – 13:00

SESSION B8

AULA CASTIGLIANO

## HERITAGE URBAN LANDSCAPE

*Chairs: C. Rossi, M. Previtali*

- **Urban heritage monitoring, using image processing techniques and data collection with terrestrial laser scanner (TLS), case study Cuenca – Ecuador**  
*Heras Barros, V. C.; Sinchi, E.; Briones, J.; Lupercio, L.*
- **The mensiochronology analysis supported by new advanced survey techniques: field tests in milanese area**  
*Cantini, L.; Previtali, M.; Moioli, R.; Della Torre, S.*
- **Inclusive cultural heritage sites: ICT as a tool to support the design process and share knowledge**  
*Marconcini, S.; Pracchi, V.*
- **From the extraordinary nature of THE GREAT POMPEII PROJECT to planned conservation**  
*Mauro, A.*
- **Discussion on restoration design of landscape site based on 3D-terrestrial laser scanning : a case study of Qiwang hall in summer palace, Beijing, China**  
*Zhang, L.; Wang, A.*
- **The geo-referenced XIC century cartography: an analysis tool and a project reference for the preservation and management of built and landscape heritage.**  
*Cazzani, A.; Brumana, R.; Zerbi, C. M.*

13:00 – 14:00

LIGHT LUNCH

SOUTH PAVILION COURTYARD

14:00 – 15:00

POSTER SESSION

SOUTH PAVILION COURTYARD

## POSTER SESSION 2

*Chairs: F. Banfi, C. Boniotti*

- **Management of 0th century hydroelectric plants as industrial heritage**  
Kuban, Talih Güven, Pretelli
- **A combined study of art works preserved in the archaeological museums: 3D survey, spectroscopic approach and augmented reality**  
Barrile, Fotia, Celeste Ponterio, Mollica Nardo, Giuffrida, Mastelloni
- **Virtual restitution of the parietal decoration in the sala del mosaico de Los Amores. Castulo archaeological site (Linares, Spain)**  
López-Martínez, Calvo-Bartolomé, García-Bueno
- **Network through centuries: from the byzantine era to present days.**  
Fioretto
- **High resolution 3D acquisition and modelling in cultural heritage knowledge and restoration projects: the survey of the fountain of neptune in bologna**  
Girelli, Tini, Dellapasqua, Bitelli
- **UAV survey for the archaeological map of Lilybaeum (Marsala, Italy)**  
Ebolese, Lo Brutto, Dardanelli
- **HBIM level of detail-geometry-accuracy and survey analysis for architectural preservation. A critical review of some case studies**  
Brumana, Banfi, Previtali, Cantini, Della Torre

- **“HERITAGE & DEVELOPMENT” strategy on historic urban landscape (HUL): the added value of multi-temporal hub application.**  
Yang, Brumana, Previtali
- **HBIM and the domains of data investigations of heritage buildings - current state of the art**  
Khalil, Stravoravdis
- **Environmental microclimate management and risk in the UNESCO world heritage site of Villa Barbaro Maser (Italy)**  
Bonora, Fabbri, Pretelli
- ***The development of an add-in to guide users in Autodesk Revit: the integration of a scan-to-HBIM process in BIM application***  
Banfi
- **Sustainable land use evaluation based on preservative approach**  
Khademi, Norouzi, Hashemi
- **How to extract useful information about the decay of bass relieves in archaeological area**  
Malinverni, Pierdicca, Di Stefano, Sturari, Paolanti, Frontoni, Orazi, Colosi
- **Integrated survey for tensional analysis of the vault of the church of San Nicola in Montedoro**  
Costantino, Carrieri, Restuccia Garofalo, Angelini, Baiocchi, Bogdan
- **Integrated knowledge on a three-dimensional basis: the foundation of the conservation project and possible implications in the BIM area. The case of the portrait room of Palazzo Borea d'Olmo in Sanremo**  
Campanella, Alauria, Amatori
- **Capability of Matterport 3D camera for industrial archaeology sites inventory**  
Shults, Levin, Habibi, Shenoy, Honcheruk, Hart, An
- **Diagnosis processes for desert rose domes of the Souf region in Algeria**  
Azil, Djebri, Rovero
- **Aerial platforms (UAV) surveys in the VIS and TIR range. Applications on archaeology and agriculture**  
Parisi, Suma, Güleç Korumaz, Rosina, Tucci
- **Geomatics in bridge structural health monitoring, integrating terrestrial laser scanning techniques and geotechnical inspections on a high value cultural heritage**  
Mugnai, Lombardi, Tucci, Nocentini, Gigli, Fanti
- **The Giardino delle Camelie in the Boboli monumental garden: integrated survey, structural reinforcement and restoration project of the architecture, the decorations and the hydraulic system**  
Tucci, Ruggieri, Mazzoleni, Conti, Fiorini, Panighini
- **Initial evaluation of the potential of smartphone stereo-vision in museum visits**  
Masiero, Tucci, Conti, Fiorini, Vettore
- **BIM process, ontologies and interchange platform for cultural architectural heritage management: state of art and development perspectives**  
Pili
- **Using geomatics to understand and valorize heritage, three different contexts of study: Syria, Italy, and France.**  
Kas Hanna, Paonessa
- **The beneficial role of surveys in the investment analysis for public built cultural heritage concessions**  
Boniotti
- **A monitoring method of color decaying for colored patterns in architectural heritage**  
Zhang, Xie, Qin, Liu, Liu
- **Structural rehabilitation and real time monitoring of “Ponte delle Grazie” bridge in Faenza, Italy**  
Corsi, Frediani, La Monica, Lapi, Miccinesi, Micheloni, Pieraccini
- **Integrated study of the Beata Vergine Assunta dome with structure from motion and diagnostic approaches**  
Grillo, Pilia, Vacca
- **Cultural projects and geomatic surveys for the resilience of school heritage**  
Palestini, Basso
- **“Green architecture as an effective strategy to preserve cultural heritage” special mention” Vancouver city- Canada”**  
Mohamed Rehan

- **The use of terrestrial laser scanning techniques to evaluate industrial masonry chimney verticality**  
Barazzetti, Roncoroni, Previtali
- **LIDAR, territory and archaeological areas: new results and perspectives for the knowledge, analysis and preservation of complex contexts**  
Garzulino
- **3D high-quality modeling of small and complex archaeological inscribed objects: relevant issues and proposed methodology**  
Lastilla, Ravanelli, Ferrara
- **Distance-training for image-based 3D modelling of archeological sites in remote regions**  
Yordanov, Mostafavi, Scaioni
- **Research on HBIM and level of information for the life cycle of traditional Chinese built heritage in Taiwan**  
Ya-Ning Yen, Yi-Chou Lu
- **HBIM methodologies for the architectural restoration. The case of the ex-church of San Quirico all'Olivo in Lucca, Yuscany**  
Bacci, Bertolini, Bevilacqua, Caroti, Martínez-Espejo Zaragoza, Martino, Piemonte
- **An initial Design framework for virtual historic Dublin**  
Murphy, Pavia, Cahill, Leinhan, Corns
- **Virtual past. Interactive presentation of late roman towers (Archaeological museum, Milan Italy)**  
Morandi, Tremari
- **Evaluation of the preservation state of historical peninsula in Istanbul based on geospatial data**  
Can, Tura, Kudde

**15:00 – 15:30**

**BEST PAPER/POSTER AWARD,  
CLOSING CERIMONY**

**AULA S.0.2**