CoVHer

Computer-based Visualization of Architectural Cultural Heritage

Project team and associated Partners

• BET TFILA
• GENERALDIREKTION KULTURELLES ERBE
• HERDER-INSTITUT
• MAINZED
• STADTARCHIV MAINZ

• FOUNDATION FOR THE PRESERVATION OF JEWISH HERITAGE IN POLAND
• MUSEUM OF WARSAW
• NATIONAL INSTITUTE OF CULTURAL HERITAGE
• PICTUREWORKS

• APROGED
• CASA DA ARQUITECTURA
• FUNDAÇÃO INSTITUTO ARQUITECTO JOSÉ MARQUES DA SILVA
• INTERNATIONAL SOCIETY FOR INTERDISCIPLINARY STUDY OF SYMMETRY
• MUNICÍPIO DE FREIXO DE ESPADA À CINTA
• FUNDAÇÃO DE SERRALVES
• SOCIEDADE PORTUGUESA DE ESTUDOS DE HISTÓRIA DE CONSTRUÇÃO

WUT

HS MAINZ

IGSD

UNIBO

U.PORTO

TEMP **UAB**

• AGÈNCIA CATALANA DEL PATRIMONI CULTURAL
• COMPUTER APPLICATIONS IN ARCHAEOLOGY INTERNATIONAL ASSOCIATION
• INSTITUT CATALÀ D`ARQUEOLOGIA CLÀSSICA
• SOCIEDAD ESPAÑOLA DE ARQUEOLOGÍA VIRTUAL
• SOCIEDAD INTERNACIONAL DE HUMANIDADES DIGITALES HISPÁNICAS
• UNIVERSITAT POMPEU FABRA

• COMUNE DI CESENA
• MUSEO LEONARDIANO DI VINCI
• REGIONE EMILIA-ROMAGNA

UNIBO

Alma Mater Studiorum, University of Bologna
Departmet of Architecture

Architectural Drawing and Graphic Analysis (2 year)

In this course the students learn how to analyse, deconstruct, and represent the complexity of architectural models through the use of 3D digital representation methods. They build a hypotetical 3D architectural model starting from documental graphical sources by authors of the past (e.g., C. N. Ledoux, A. Palladio, M. Guidi, G. A. Antolini, etc.). They learn the difference between modelling methods/languages and techniques and they are asked tp apply them according to their needs and the context. They learn how to deal with classical orders, historical units of measurement, architecture modularity, documental inconsistencies and incomplete primary sources.

They are taught to document and communicate the hypothetical reconstruction process transparently and objectively, with a particular focus on the visual communication of uncertainties through the use of false colours. Another important aspect of the course is the visualization of the 3D models through the educated choice of the point of view and the projection type. In the end, they learn how to present their work through printed posters by applying all the good practices of traditional technical drawing.
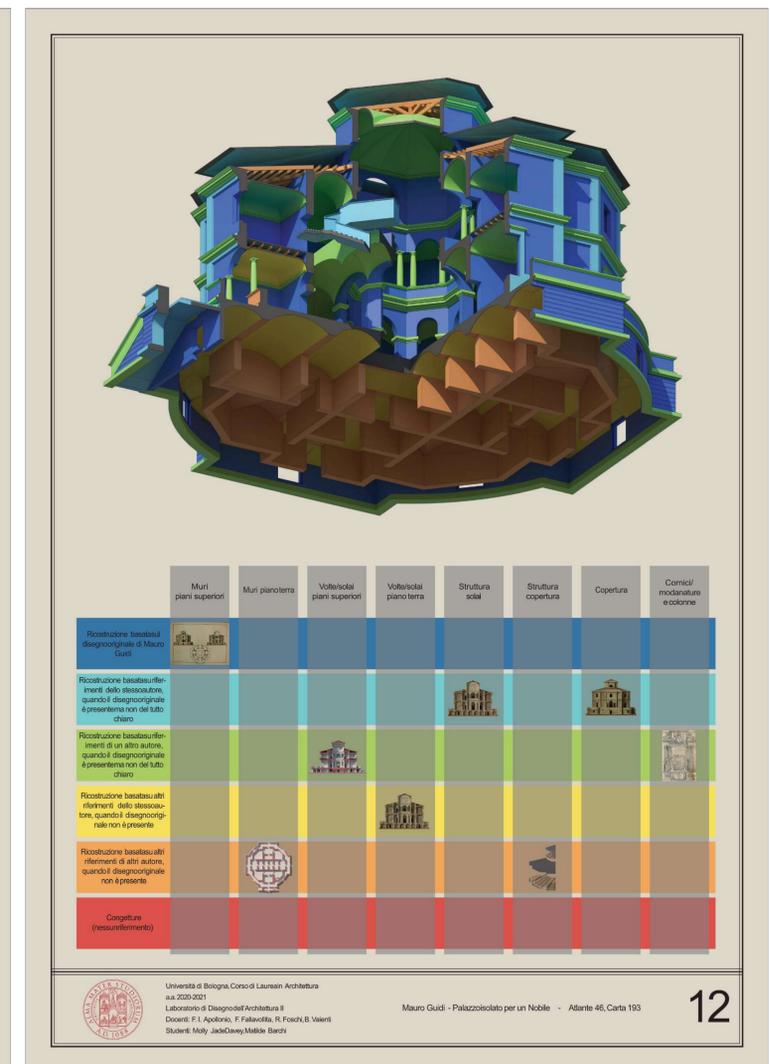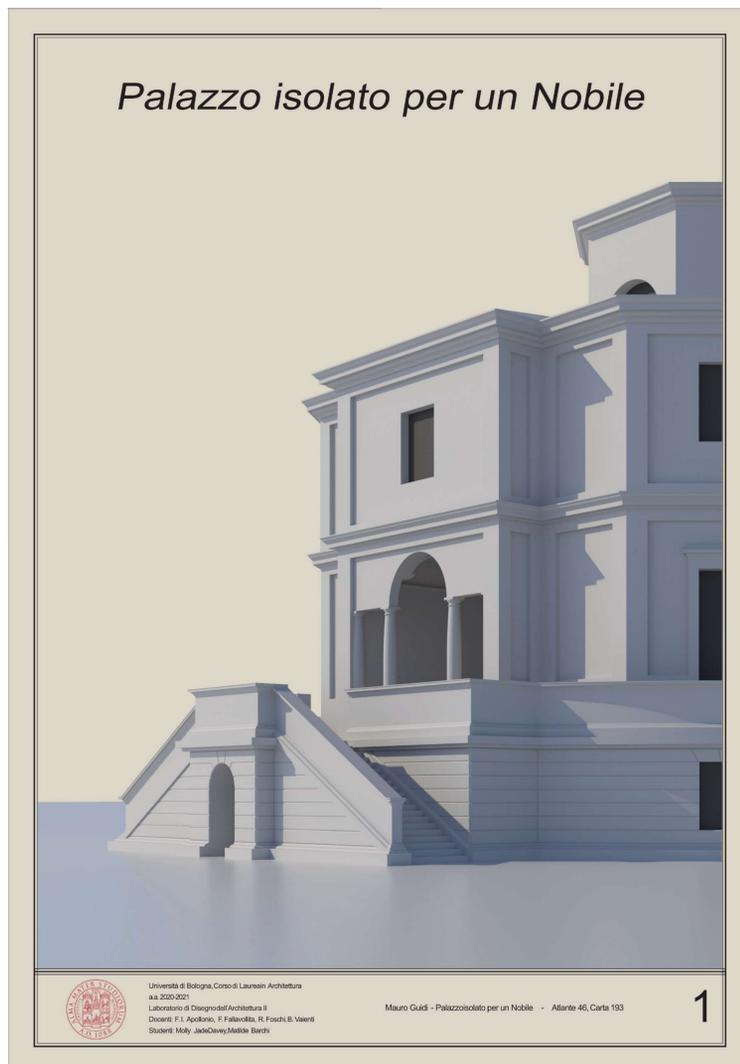
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UNIBO

Fabrizio I. Apollonio   **Federico Fallavollita**   **Riccardo Foschi**

Palazzo isolato per un Nobile

Extract of students examination posters (M. Barchi M. J. Davey), 2020/21.
M. Guidi - Palazzo isolato per un Nobile - Atlante 46, Carta 193.

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HS Mainz

Mainz University of Applied Science, Institute of Architecture

3D-CITY MODELS (GEO-INFORMATICS & SURVEYING)

The course confronts the students with the topic of digital 3D reconstruction and interactive access to lost urban spaces. Digital tools in the field of visualization and documentation are applied in a practical way. It consists of learning 3D modeling based on the digital reconstruction of Mainz before 1945. For this purpose, a georeferenced digital 3D city model of Mainz around 1940 is created based on source material from the city archives.

The students are working object-oriented and are learning how to deal with historical source material. The focus is on the communication and elaboration of re-usable research data, which is to be enriched with metadata and documented within a virtual research environment. The 2D/3D datasets are georeferenced in the standard CityGML and evaluated in Virtual Reality.

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HS Mainz

Piotr Kuroczynski   Jan Lutteroth   Igor Bajena

Compilation of student 3D-models in a virtual environment (Arkio), 2020, The area of the "Brand" before 1945

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WUT

**Warsaw University of Technology
Faculty of Architecture**

Digital source-based 3D reconstruction of wooden synagogues

In the course, students learn the critical examination of historical sources, as well as 3D modelling based on 2D representation. The topic of the seminar is the architecture of wooden synagogues in the former Republic of Poland, destroyed during the Second World War. The computer-aided research aims to convey the method of digital 3D reconstruction as a research tool.

A public and media-effective mediation of the lost cultural heritage is to be implemented in the end in an augmented reality (AR) application or in a 3D print. In this way, new transfer formats in cultural heritage are to find their way into teaching.

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WUT

Krzysztof Koszewski   **Jakub Franczuk**   **Karol Argasinski**

Wydzial Architektury, Politechnika Warszawska, Synagoge in Wolpa, Katarzyna Porkopiuk

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UAB

Universitat Autònoma de Barcelona.
**Department de Prehistòria. Quantitative Archaeology lab
UAB-OpenLab. Digital Lab.**

Digital Humanities and Digital Heritage (Oficial master degree). In collaboration with Universitat Pompeu Fabra

This master's degree provides graduate students from any branch of Humanities, heritage and cultural studies with theoretical and practical training in the development of new technologies for digitizing cultural heritage materials.

This 600 hours course makes emphasis on:

- Programing Heritage Information Systems
- Computer Visualization –including photogrammetry and 3D scanning)
- Human-Computer Interaction

All those computational methods are applied to the reconstruction of historical, artistic and cultural materials and to the design of Virtual Museums and other forms of advanced digital dissemination of cultural knowledge.
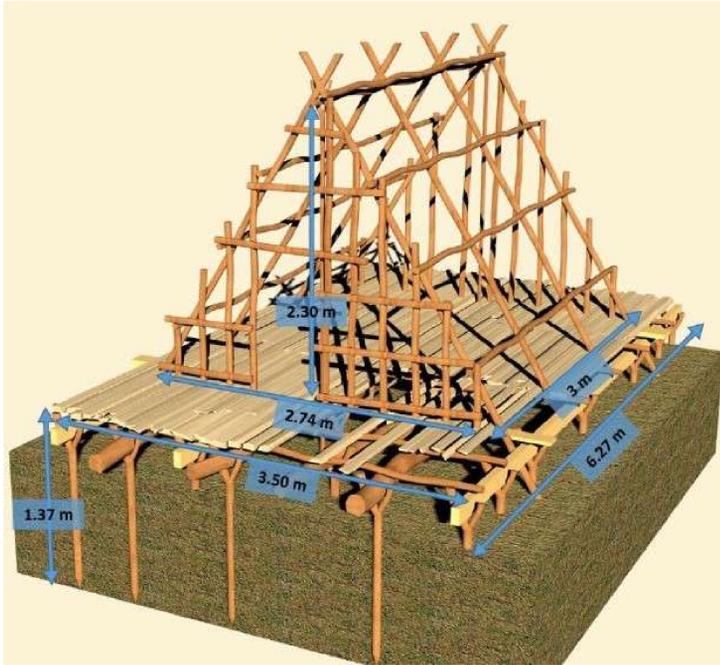
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UAB

Juan A. Barceló   Ivan Campana   Evdoxia Tzerpou   Jan Salazar

2.30 m
2.74 m
3 m
3.50 m
6.27 m
1.37 m

Reconstructing a prehistoric hut at La Draga archaeological site (Banyoles, Catalonia, Spain) 6000 years ago

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U.PORTO

University of Porto, Faculty of Architecture
Center for Studies in Architecture and Urbanism

Integrated Master's in Architecture, Advanced Course in Architectural Heritage, Doctoral Program in Architecture

Representation tools, such as sketching, hand drawing, physical models, and virtual models, are crucial elements in the teaching and learning process in the Faculty of Architecture (FAUP) and are typically used in combination or alone.

Although there is not a course or curricular unit on 3D virtual reconstruction at FAUP, in several of the curricular units (CU), in master dissertations, in advanced courses, in doctoral theses, and also in research projects that include students and alumni in teams, 3D scanning, 3D modelling, and 3D virtual reconstruction have been used with a significant increase over time.

It can be mentioned as an example the work done in Construction CU, where 3D modelling is used to understand and communicate execution modes of certain buildings, in the History of Portuguese Architecture CU, where physical and virtual models are used to reconstitute a building in a certain period, and some research projects with student participation, where the models are used either for didactics, structural analysis, and communication to the general public.

U.PORTO

João Pedro Xavier   **Clara Pimenta do Vale**   **Hugo Pires**

3d modelling of the church and urban surrounding of Torre de Moncorvo, Portugal. SIAP Project - Artificial Intelligence

System for Risk Detection and Alerts on Cultural Heritage. (Point cloud: Hugo Pires; 3d Modelling: Humberto Madruga; post production: Diego Aristofanes).

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IGSD

Interessengemeinschaft für semantische Datenverarbeitung e.V.

Goals
The aim of the association is to expand and promote semantic data networking, primarily in the field of digital humanities. Of central interest is the use of semantic technologies, linked data, open source and open access. For this purpose, the association sees itself as a community and contact partner.

Research & Science
The association promotes science and research by establishing and expanding sustainable and interoperable knowledge structures in the field of cultural heritage and related areas. It collects information on this subject area and makes it publicly available.

Furthermore, the association promotes education and training as well as research and teaching in the field of semantic technologies at universities, research institutions and museums.

Application & Infrastructure
Furthermore, it ensures the preservation and further development of the applications, products and services developed in the DFG project WissKI - Scientific Communication Infrastructure.

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Mark Fichtner
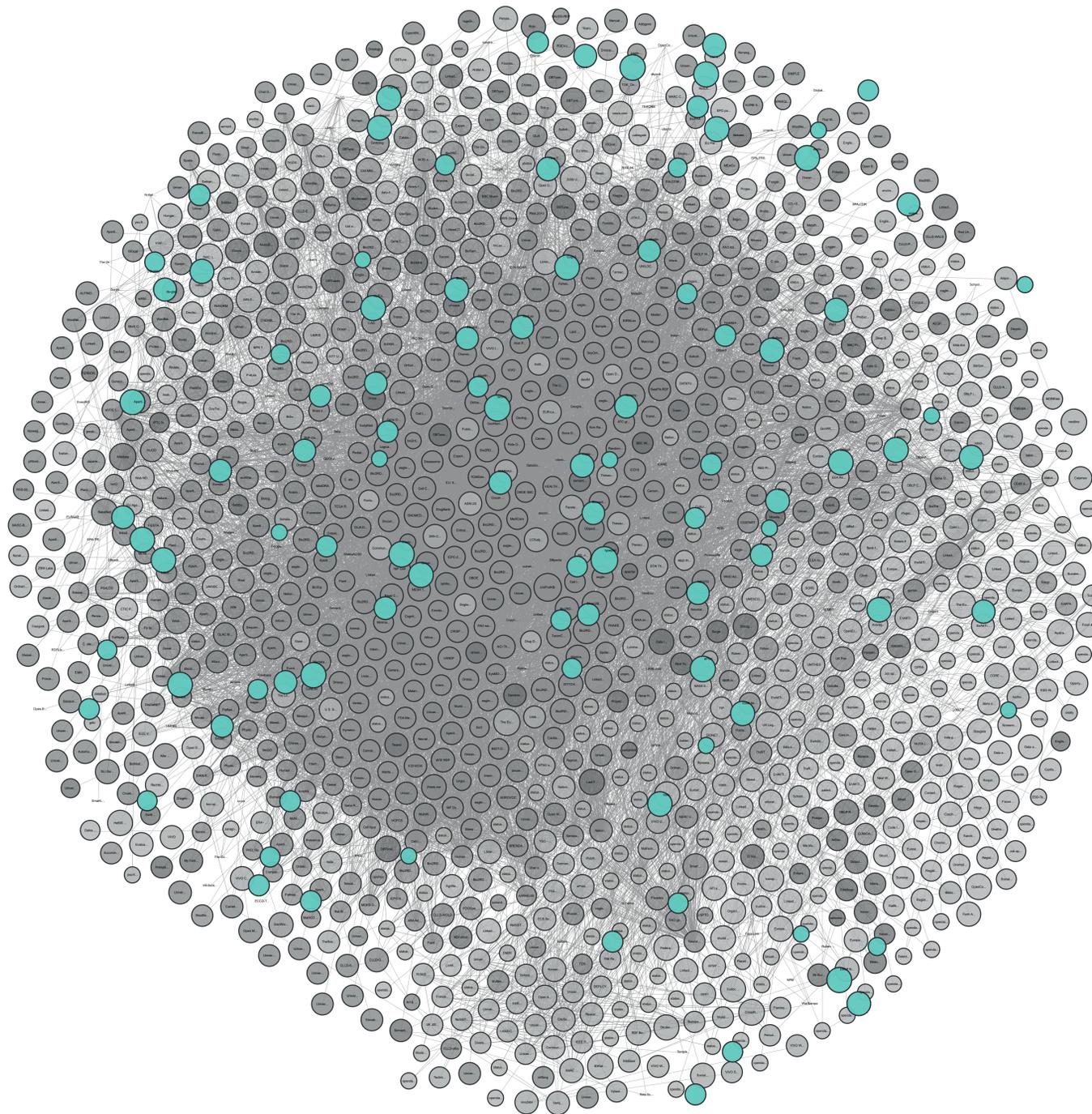
Visualization of the Linked Open Data Cloud (lod-cloud.net)

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TEMP

La Tempesta
City, culture & technology

Presentation
La Tempesta is a full-service digital services studio. We create, design and develop digital mediation and new media tools for cultural heritage, knowledge and content-based organisations and its communities. We are a multidisciplinary team (developers, designers, documentalists, humanists, social scientists...) working in social and cultural heritage based research projects all over Europe, with offices in Barcelona downtown.

Mission
• We are passionate about integrating the city, culture and technology into a singular unique and meaningful vision.
• We are driven by our desire to foster culture and create new tools to reclaim the value of our social, historical and cultural heritage, for the present and the future.
• We embrace innovation and technology, to serve our collective well-being, social cohesion and organisational improvement.

Expertise in 3D
La Tempesta's particular expertise in 3D lies in digitization and computer visualization to create meaningful digital experiences. In this field we've worked in several 3D based projects including a 3D virtual tour of an archaeological site, the 3D laser scan of La Modelo prision, the design of a metaverse for 3D digital art exhibition or the 3D photogrammetry of a daguerreotype collection.
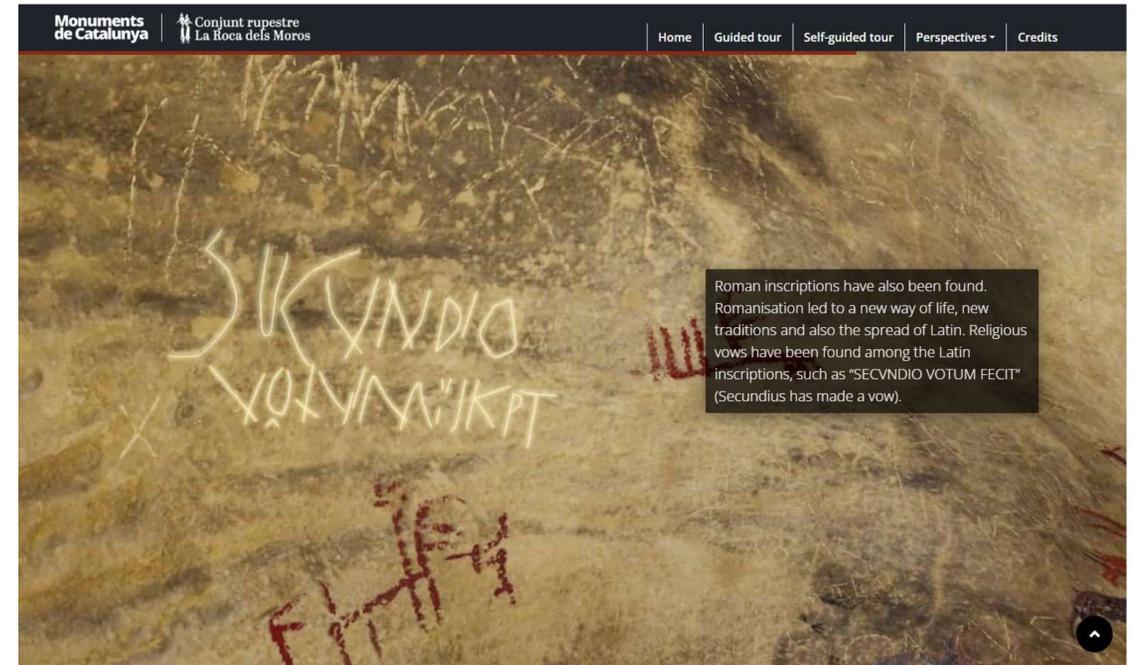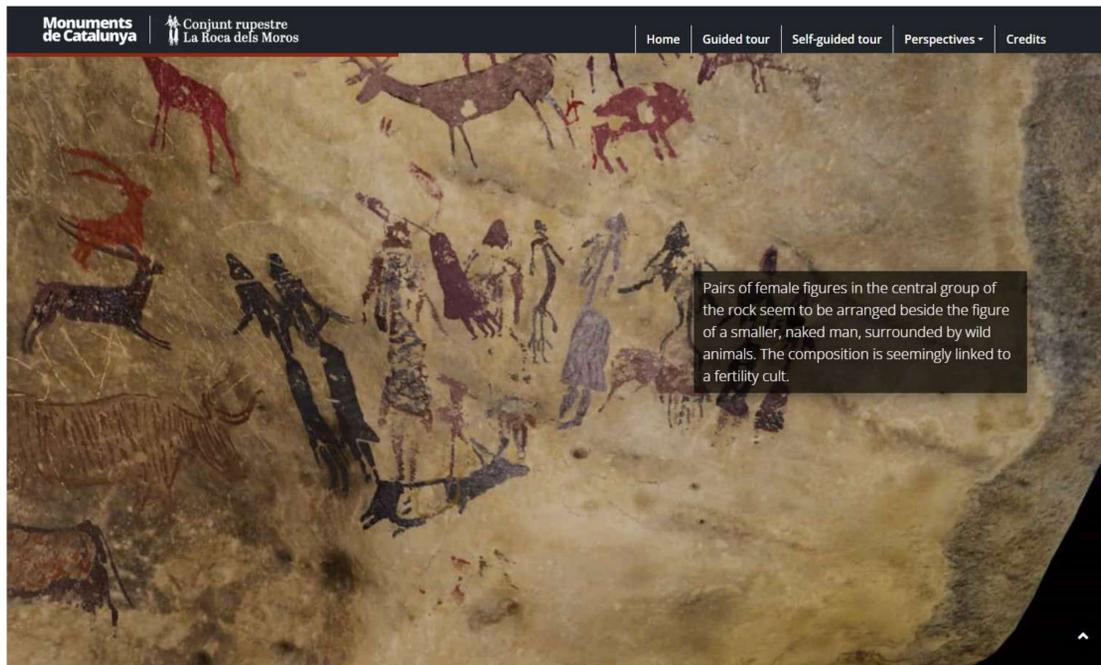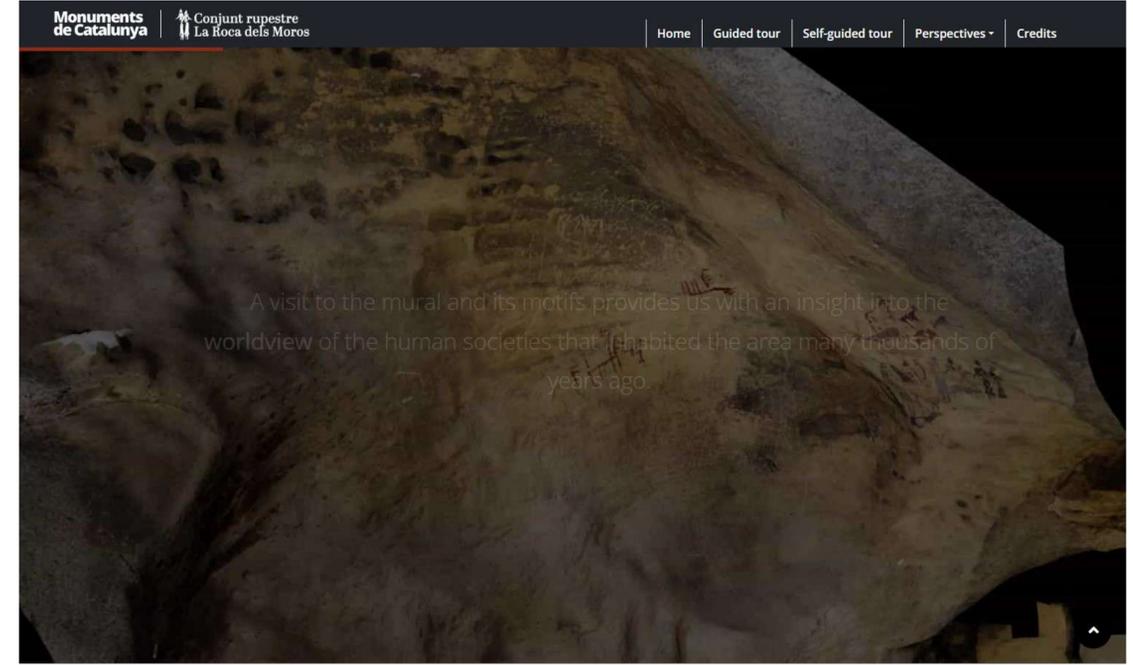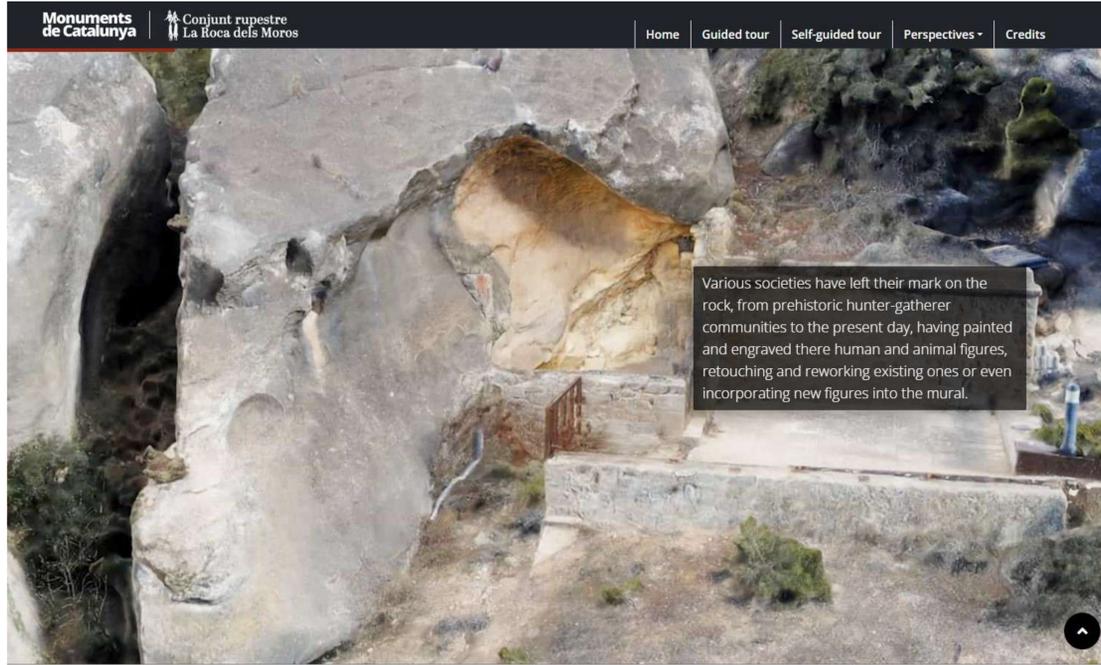
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TEMP

Marc Hernández   **Pol Guiu**

The Virtual Tour of La Roca dels Moros is an innovative virtual experience that brought storytelling narrative using the 3D model of the ancient cave paintings.

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