

Virtual Cultural Heritage between research and communication

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VISIT LAB
VISUAL INFORMATION
TECHNOLOGY LAB
CINECA

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Talk Outline

- The use of **High Performance Computing** (HPC) in **Cultural Heritage** projects
- The role of **3D modeling**, **Cultural Databases**, and **AI tools** in creating accurate **digital representations** and **metadata** of **cultural heritage assets**
- Examples of **projects** undertaken by Visit lab, such as the **Isabella d'Este Virtual Studiolo**
- An exploration of the potential of the **Digital Twin concept** in the context of Cultural Heritage environments and its ability to aid in the collection, distribution and creation of knowledge



Cineca's Leonardo: 4th Most Powerful Supercomputer in the World

Leonardo-supercomputer.cineca.eu

[Leonardo - The European Pre-exascale Supercomputer](#)

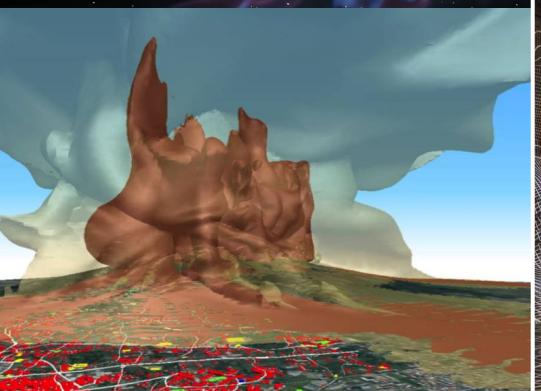


EuroHPC Joint Undertaking	NOVEMBER 2022	TOP 500	GREEN 500
LUMI	#3	#7	
Leonardo	#4	#14	
MELUXINA	#52	#22	
KAROLINA	#85	#20	
DISCOVERER	#123	#247	
VEGA	#140	#288	

Visual Information Technology lab

visitlab.cineca.it [Blog](#)

XR, VR, SciViz, Computer Graphics tools for Research and Communication





Cross-media approach, digital assets **reuse**, **open data** , data preservation ,
data interoperability ,new semantic layers , **AI services** , interoperability
among digital ecosystems , **UX design**. **crowdsourcing and crowdsensing**





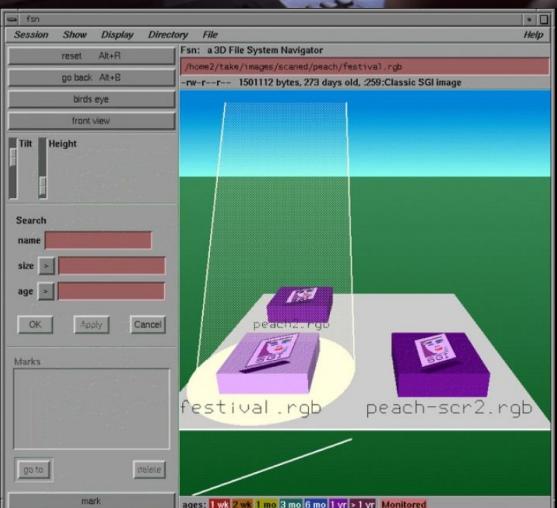
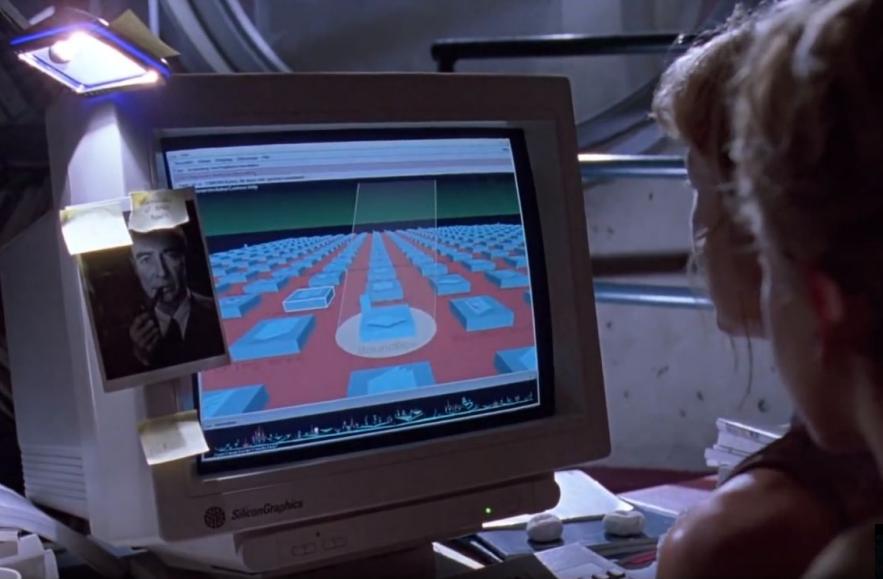
The Sarcophagus Clone by Giugiaro



i-Media-Cities Platform for accessing historical films and images of cities

Ready to market







Certosa di Bologna

Pelagio
Palagi

Bologna, 1777 - Torino, 1860

Posto sotto la protezione del nobile bolognese Carlo Filippo Aldrovandi che ne aveva in tutta ancora fanciullo le potenzialità artistiche, Palagi si forma a contatto con la ricca biblioteca di arte e le raccolte di dipinti e calchi di statue celebri del suo patrono, frequentando l'accademia che si riuniva nel palazzo degli Aldrovandi. Alla fine del Settecento il giovane Palagi esordisce negli affreschi di palazzo Alfini Sanguineti, oggi Museo della Musica, dove esegue la decorazione per la sala del Teatro Romano, la sala del Teatro Greco di Enea e dello Zodiaco. Tra il 1802 e il 1804 realizza quattro monumenti dipinti per la Certosa di cui solo due sopravvivono (Peppoli e Sampieri De Gregorio). A questo periodo risalgono dipinti e disegni prevalentemente scenografici, dove la tradizionale prospettiva bolognese si fonde con le citazioni dall'antico di pentimento.

Dal 1804 al 1815 risiede a Roma per motivi di studio. A contatto con l'antico e con l'ambiente culturalmente vivace dell'atelier di Canova, fonda un'accademia con sede a palazzo Venezia dalla quale usciranno artisti promettenti, tra cui Francesco Hayez.

Insiste a Roma fino al 1820, quando apre una galleria nel palazzo del banchiere Torlonia in piazza Venetia. In seguito dimostra la sua abilità all'altare della Patria, Palagi crea una sontuosa decorazione ad affresco con scene della vita di

biblioteca :: cataloghi :: ricerca :: bibliografia :: studio :: stampa :: alla leggibilità

◀ 8 di 29 ▶

Approfondimenti

commenti | immagine | opere

Pelagio Palagi | (su disegno dJ), Monumento al Conte Verde, 1853, bronzo.
Torino, Piazza del Municipio.

parole chiave :: personaggi in rilievo

1600 1650 1700 1750 1800 1850 1900 1950 2000



Virtual Museum Certosa di Bologna

[Storia e Memoria Di Bologna](#)



IDEA
ISABELLA D'ESTE
ARCHIVE

Isabella d'Este (1474 - 1539)

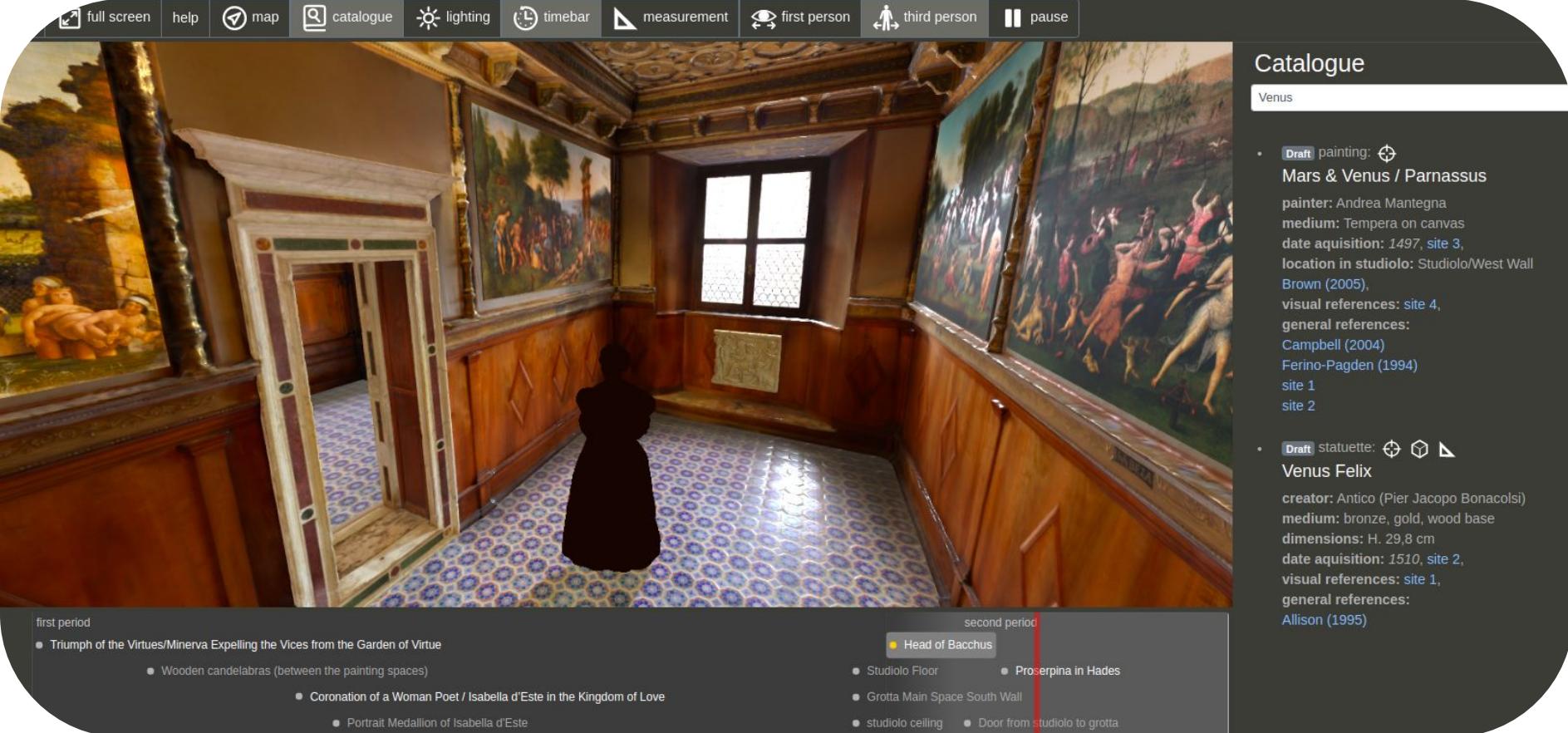
IDEA Isabella d'Este Archive

IDEA project

Deanna Shemek

University of California, Irvine

Isabella d'Este Virtual Studiolo project a case study



full screen help map catalogue lighting timebar measurement first person third person pause

Catalogue

Venus

- Draft painting: Mars & Venus / Parnassus
painter: Andrea Mantegna
medium: Tempera on canvas
date acquisition: 1497, site 3,
location in studiolo: Studiolo/West Wall Brown (2005),
visual references: site 4,
general references:
Campbell (2004)
Ferino-Pagden (1994)
site 1
site 2
- Draft statuette: Venus Felix
creator: Antico (Pier Jacopo Bonacolsi)
medium: bronze, gold, wood base
dimensions: H. 29.8 cm
date acquisition: 1510, site 2,
visual references: site 1,
general references:
Allison (1995)

first period

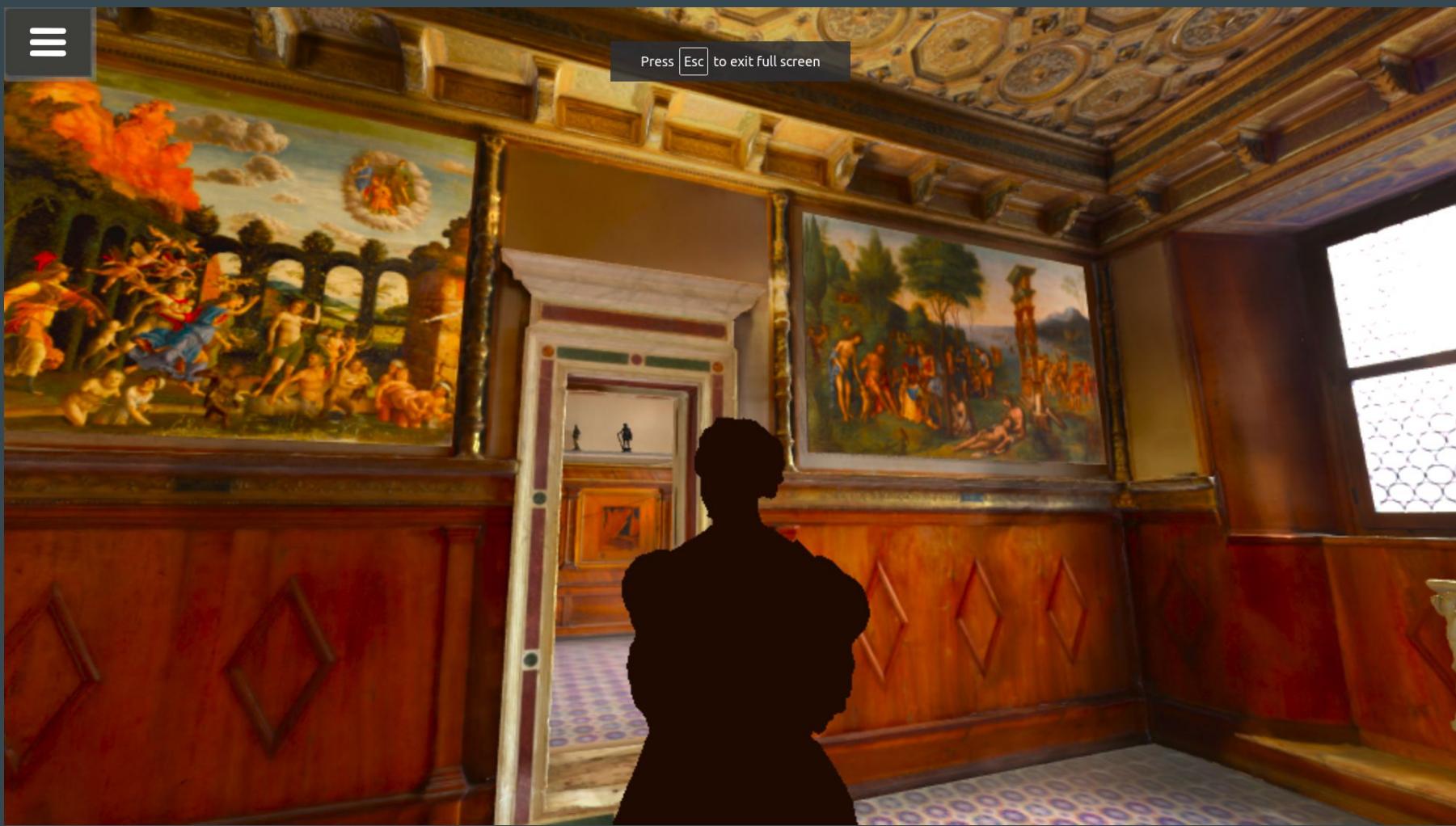
- Triumph of the Virtues/Minerva Expelling the Vices from the Garden of Virtue
 - Wooden candelabras (between the painting spaces)
 - Coronation of a Woman Poet / Isabella d'Este in the Kingdom of Love
 - Portrait Medallion of Isabella d'Este

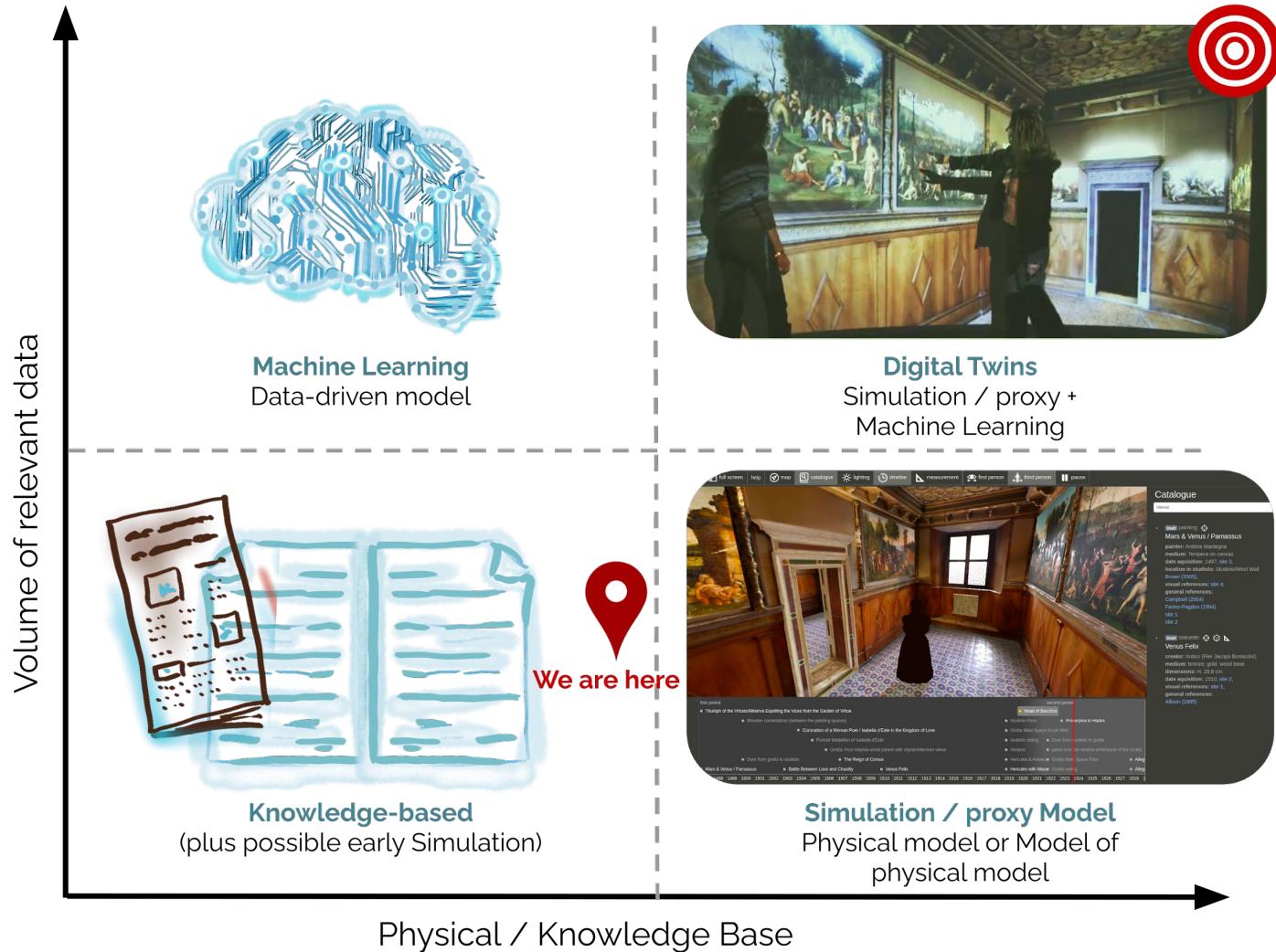
second period

- Head of Bacchus
 - Studiolo Floor
 - Grotta Main Space South Wall
 - studiolo ceiling
- Proserpina in Hades
 - Door from studiolo to grotta



Press Esc to exit full screen





Workflow: Photogrammetry

Studiolo

574 photos aligned

110,945,015 point in the dense cloud

11 million **vertices** model

8 * 4096*4096 pixel **textures**;

Grotta

620 photos, 492 aligned

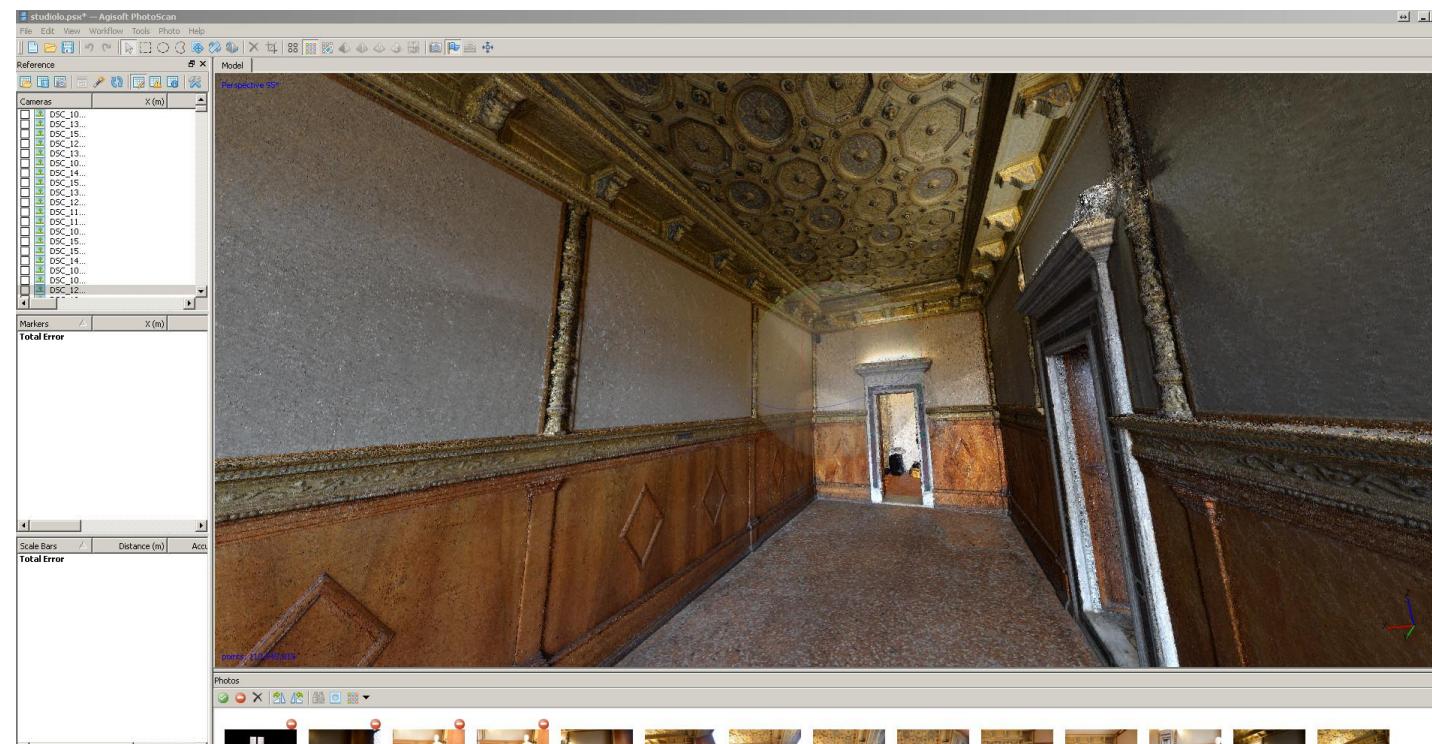
122,408,100 point in the dense cloud

12 million **vertices** model

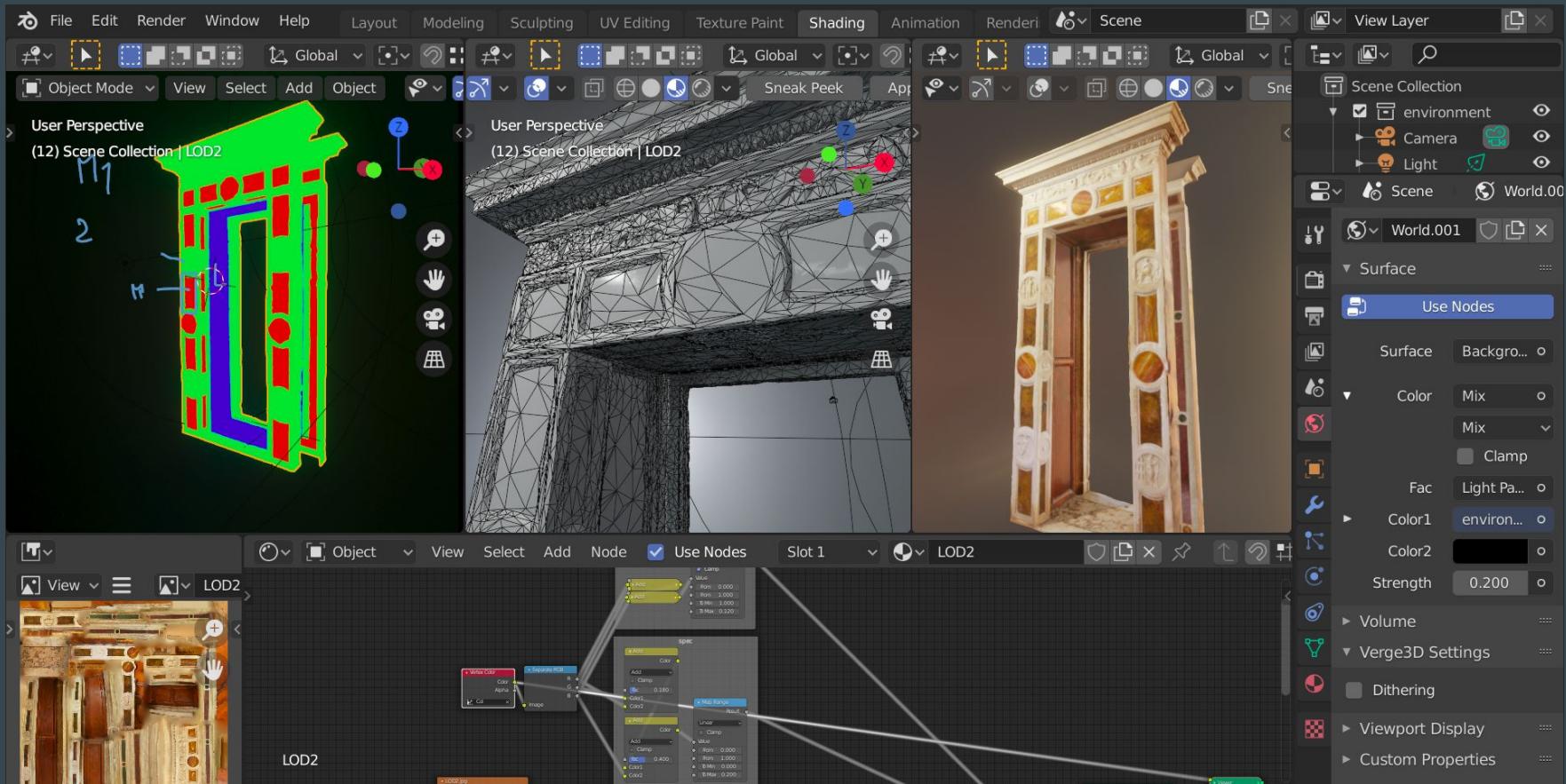
4 * 4096*4096 pixel **textures**;

Blender Optimization

Mesh Decimation



Workflow: Modeling



Workflow: Interface design

Studiolo ceiling

Info Move Isolate Zoom

[Object is now selected]

Search

Category (6) Location (18)

Scholar 3D model

• furniture: door from grotta to studiolo creator: Gian Cristoforo Romano date acquisition: ● location in studiolo: ● visual references: ● medium: wood, marble general references: Ventura (2001), Brown (2005), 3D models: grotta_vp_parete_O_porta, [edit](#)

• architecture: studiolo ceiling creator: Maestro Sebastiano date acquisition: ● location in studiolo: ● visual references: ● medium: wood, gold and blue paint general references: Brown (2005), Ventura (2001), 3D models: studiolo_soffitto_vano_finestra, [edit](#)

• architecture: grotta ceiling creator: Maestro Sebastiano date acquisition: ● location in studiolo: ● visual references: ● medium: wood, gold and blue paint general references: Brown (2005), Ventura (2001), 3D models: grotta_vp_soffitto, [edit](#)

• furniture: 4 grotta intarsia wood panels with architectural views creator: Paolo and Antonio Mola date acquisition: ● location in studiolo: ● visual references: ● medium: wood general references: Ventura (2001), Brown (2005), 3D models: grotta_vp_parete_E_intarsio2, grotta_vp_parete_E_intarsio4, grotta_vp_parete_E_intarsio1, grotta_vp_parete_E_intarsio3, [edit](#)

• furniture: Candelabras (between the painting spaces) creator: Paolo and Antonio Mola date acquisition: ● location in studiolo: ● visual references: ● medium: wood general references: Ventura (2001), Brown (2005), 3D models: studiolo_parete_S_colonnine_angolo, studiolo_parete_O_colonnine_a_parete, studiolo_parete_N_colonnine_angolo, studiolo_parete_E_colonnine_parete, [edit](#)

Workflow

Audiences

- students
- educators
- scholars
- general audience

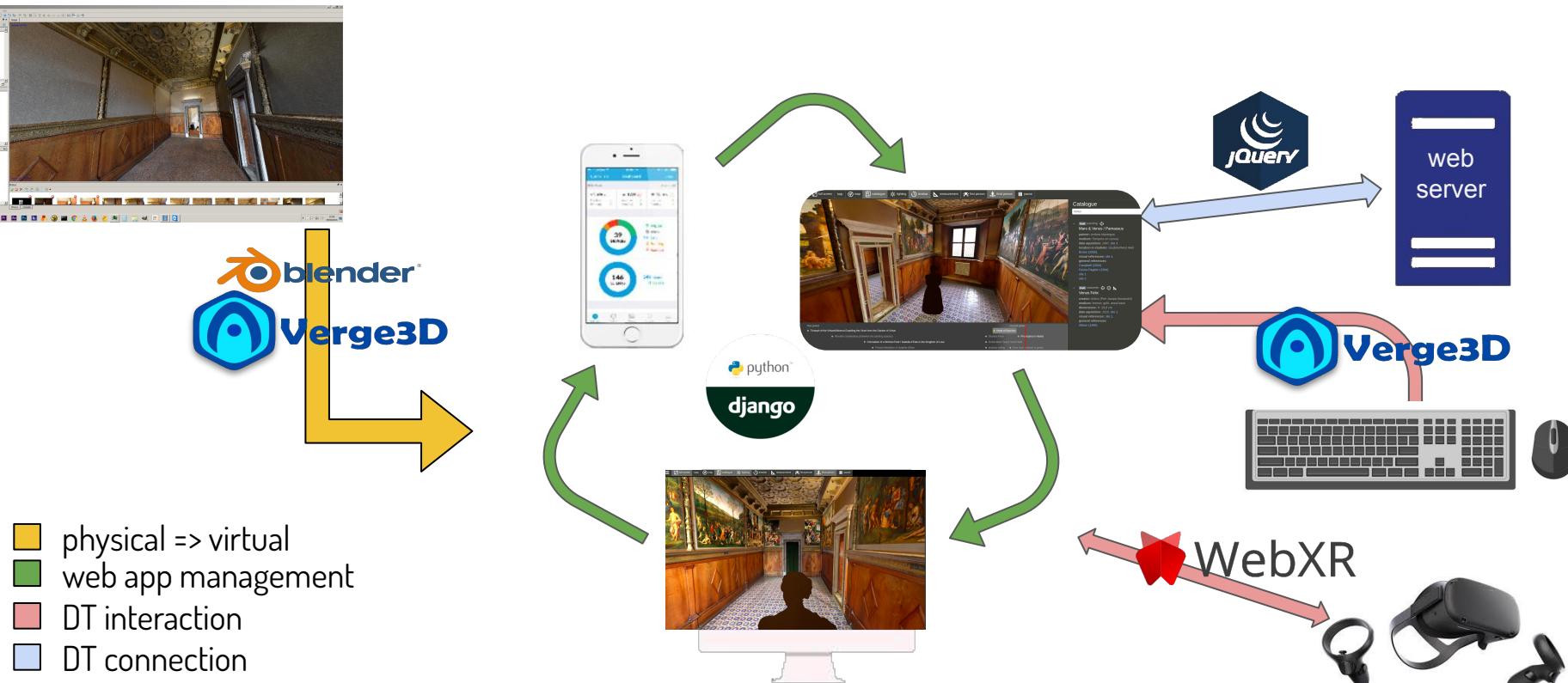
Virtual studiolo 3D

Cross-media approach

- 3D web
 - VR environment HMD
 - Cave (con puntatore/ controller)
 - Void (Hyper - Reality)
- Multisensory environment
- Smell and haptic perception



Digital Twin workflow connections and interactions





Daniele De Luca -
CG artist e factotum



Maria Chiara Liguori -
Umanista e opinionista



Giovanni Bellavia -
Filosofo ed artista



Simona Caraceni -
Dams e Museologa



Il VisitLab Cineca 2022

visitlab.cineca.it

Federica Farroni -
Ingegnere e 3D modeller



Silvano Imboden -
Informatico e guru



Paolo Zuzolo -
simpatico matematico



Beatrice Chiavarini -
Architetto e virtual creator



Francesca Delli Ponti -
Ingegnere edile e
scientific designer

