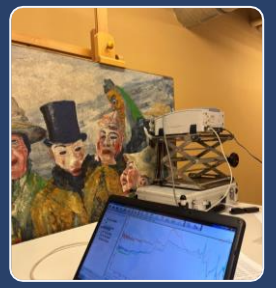
E-RIHS
EUROPEAN RESEARCH INFRASTRUCTURE FOR HERITAGE SCIENCE

ESFRI

ESFRI PL Projects Landmarks ROADMAP 2016




From Heritage Science Data to the Cultural Heritage Data Space and Beyond

Vania VIRGILI
Director General, E-RIHS ERIC

EOSC symposium, Florence, 14-16 Oct | **EOSC and Data Spaces**

E-RIHS ERIC

E-RIHS

Established 28 March 2025 · ESFRI Landmark 2026

Intergovernmental organisation · 13 countries · ICCROM as permanent observer · Statutory seat in Florence

ACCESS
laboratories, data, collections

TRAINING
HS Academy

R&D
driven by co-creation

PROTOCOLS & STANDARDS
open science, FAIR

INTERNATIONAL COOPERATION
beyond Europe

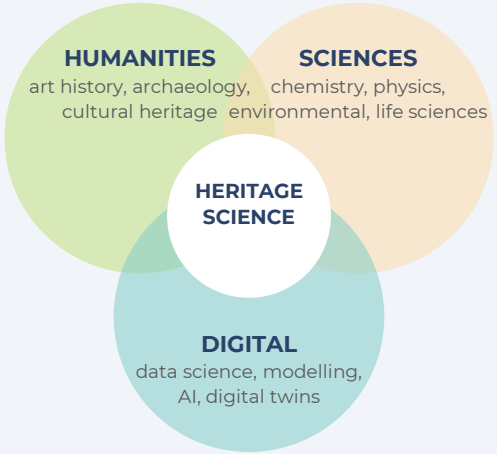
IMPACT
research, innovation, society

HERITAGE SCIENCE IN THE SSH DOMAIN

Interdisciplinary research on **heritage**

E-RIHS is the only research infrastructure in the SSH domain dedicated to the scientific study of material heritage, integrating humanities, sciences and digital research.

Its facilities also include **PSE** and **DIGIT**





13 countries · ICCROM

CENTRAL HUB

Florence · Manifattura Tabacchi



GENERAL ASSEMBLY
13 countries, one vote each

DIRECTOR GENERAL & CENTRAL HUB
executes, coordinates, ensures quality

COMMITTEE OF NATIONAL NODES
service portfolio and scientific coordination

SCIENTIFIC & ETHICS ADVISORY BOARD
independent advice

CATALOGUE OF SERVICES (CoS): ONE UNIQUE ACCESS POINT

E-RIHS

One catalogue. Four access platforms. ARCHLAB, FIXLAB, MOLAB and DIGILAB from a single-entry point.

UNIQUE ACCESS POINT https://catalogue.e-rihs.eu/catalogue

ARCHLAB



11
services

Physical and digital archives, reference collections, datasets and grey literature.

FIXLAB



111
services

Large and medium fixed facilities, e.g., accelerators, neutron sources, X-ray and electron microscopy.

MOLAB



91
services

Mobile, non-invasive in-situ diagnostics, e.g., hyperspectral imaging, XRF, portable Raman.

DIGILAB



26
services

Digital services and tools for documentation, visualisation and data.

86 facilities for **239 services** in total

- **DIGILAB** introduced as a regular component
- **Multi-platform proposals** — services from different platforms in one application

CASE STUDY · THE UNIQUE RI FOR ADVANCING HERITAGE-SCIENCE KNOWLEDGE

E-RIHS

HERITAGE-RESEARCH QUESTION

INTEGRATED, EXPERT-MEDIATED ACCESS

1 ARCHLAB

What is already known about the degrading varnishes?

OPD (IT) · RCE (NL) · CATS-SMK (DK)
Conservation reports and analytical archives

2 MOLAB

What is on the painting, and where is the degradation?

CNR, SMMArt (IT) · C2RMF (FR)
Mobile instruments brought to the museum in Oslo



3 FIXLAB

What are the organic binders and dyes?

University of Ljubljana (SI)
Institute for the Protection of Cultural Heritage (SI)

4 FIXLAB

What are Munch's original paint materials made of?

SOLEIL synchrotron — IPANEMA (FR)
Samples travelled to Paris; the painting stayed in Oslo

Edvard Munch, **Canal in Warnemünde** (1908) · Munch Museum, Oslo (NO) · access delivered under IPERION HS

5

countries provided the services — Italy, France, the Netherlands, Denmark and Slovenia — for one painting in Norway.

THE INFRASTRUCTURE TRAVELS

MOLAB brought mobile instruments to the museum in Oslo. For the synchrotron, samples travelled to Paris. The painting itself never had to move.

NOT AN EXCEPTION

Two in three E-RIHS proposals request more than one service, averaging **3.7 services** each.

FOUR E-RIHS ACCESS STRANDS ORGANISED AROUND ONE OBJECT

Each contributed complementary expertise, addressing distinct research questions and maximising scientific value

CASE STUDY · RESEARCH AND DEVELOPMENT

E-RIHS

Most heritage is not flat. Now the instrument moves around it.

X-ray fluorescence and infrared imaging work well on paintings. Sculptures, masks and vessels defeat them. A collaborative robot carries the spectrometer around the object — about a centimetre away, never touching it — and returns elemental maps on the three-dimensional surface.

WHAT IS NEW

- **Multimodal —** XRF and infrared (SWIR–MIR) in a single instrument
- **Robotic —** a collaborative arm reaches complex 3D surfaces
- **Non-invasive and mobile —** in situ, no contact, about 1 cm standoff
- **AI-controlled —** acquisition and real-time analysis
- **Large surfaces —** up to 3 m in one measurement session



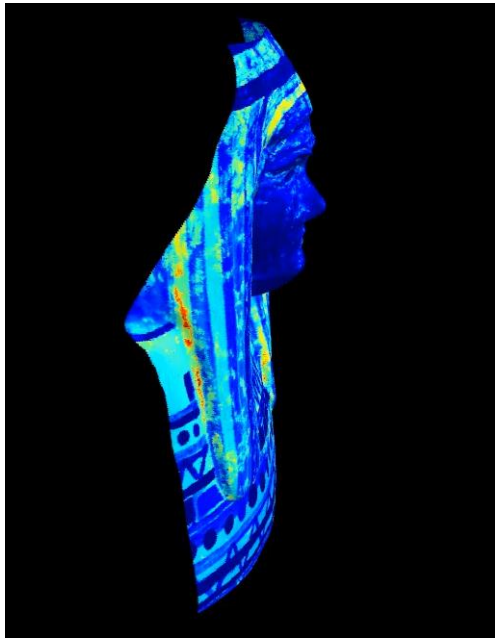
THE TEST OBJECT

A cartonnage mask: 3D, painted, fragile.



THE SCAN · VIDEO

The robot moves around it, without contact.



THE RESULT

Elemental distribution on the 3D surface.

3D model laser profilometry ▶ **Trajectory planning** surface normals, anticollision ▶ **XRF acquisition** along the optimised path ▶ **Mapping** projected back onto the mesh

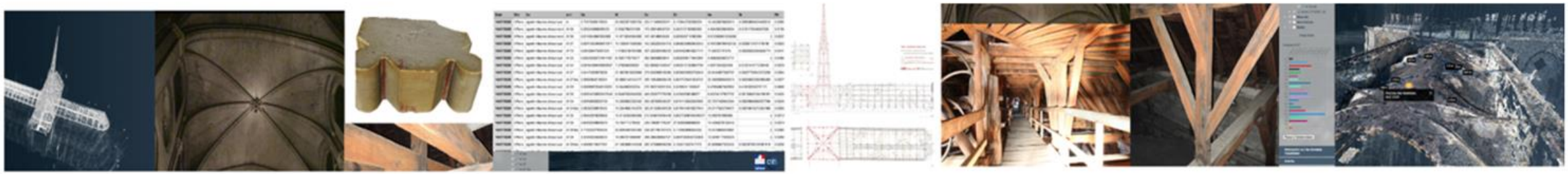
F.P. Romano et al. · CNR-ISPC, CNR-SCITEC, SMAArt – University of Perugia · E-RIHS.it

THE SCIENTIFIC CHALLENGE OF DIGILAB

One object, many kinds of data. Connecting them is the challenge.

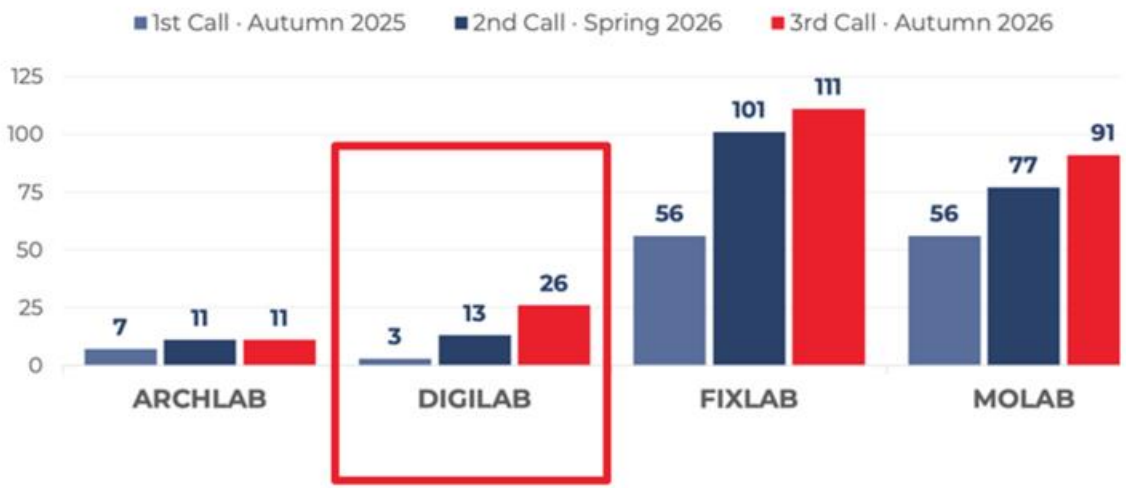
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Heterogeneous data require contextualisation, semantic connections and scientific interpretation.



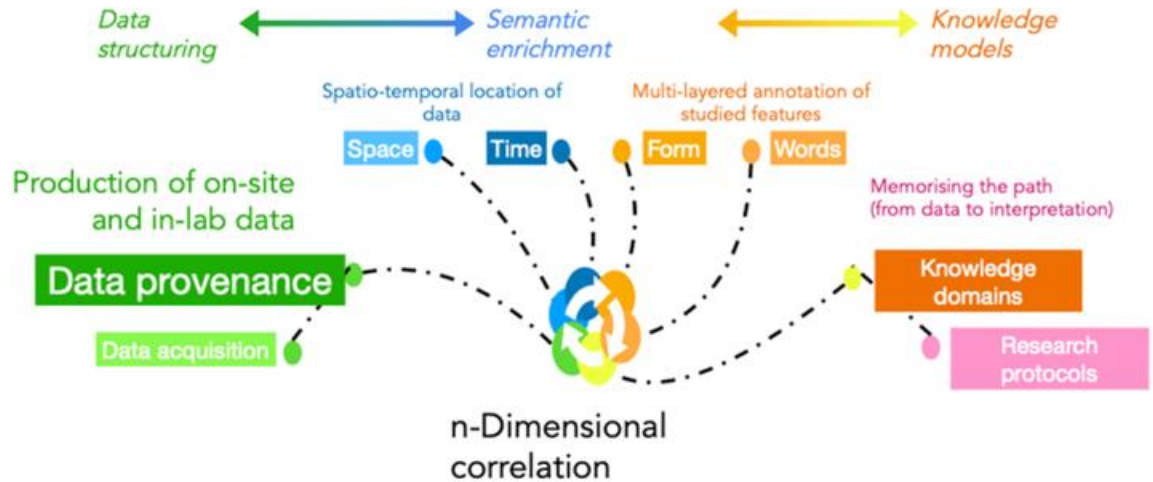
One monument, documented many times over: point clouds, photographs, material samples, analytical tables, structural models, site records.

SERVICES IN THE CATALOGUE



DIGILAB has grown from 3 to 26 services across three calls — the fastest growth of the four platforms.

FROM DATA TO KNOWLEDGE



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DIGILAB: DIGital LABoratory of E-RIHS

E-RIHS

What is it?

A portfolio of **digital services** providing researchers with access to digital tools, data resources, and expertise that support **heritage science research**.

- Researchers
- Heritage professionals
- Students
- Service providers
- National Nodes

DIGILAB complements ARCHLAB/FIXLAB/MOLAB services:

- **ARCHLAB** → archival sources & collections
- **FIXLAB** → laboratory analyses
- **MOLAB** → in situ measurements

DIGILAB:

- Data management
- Catalogues & registries
- Semantic resources
- 2D/3D documentation
- Analysis & decision support
- Collaborative research

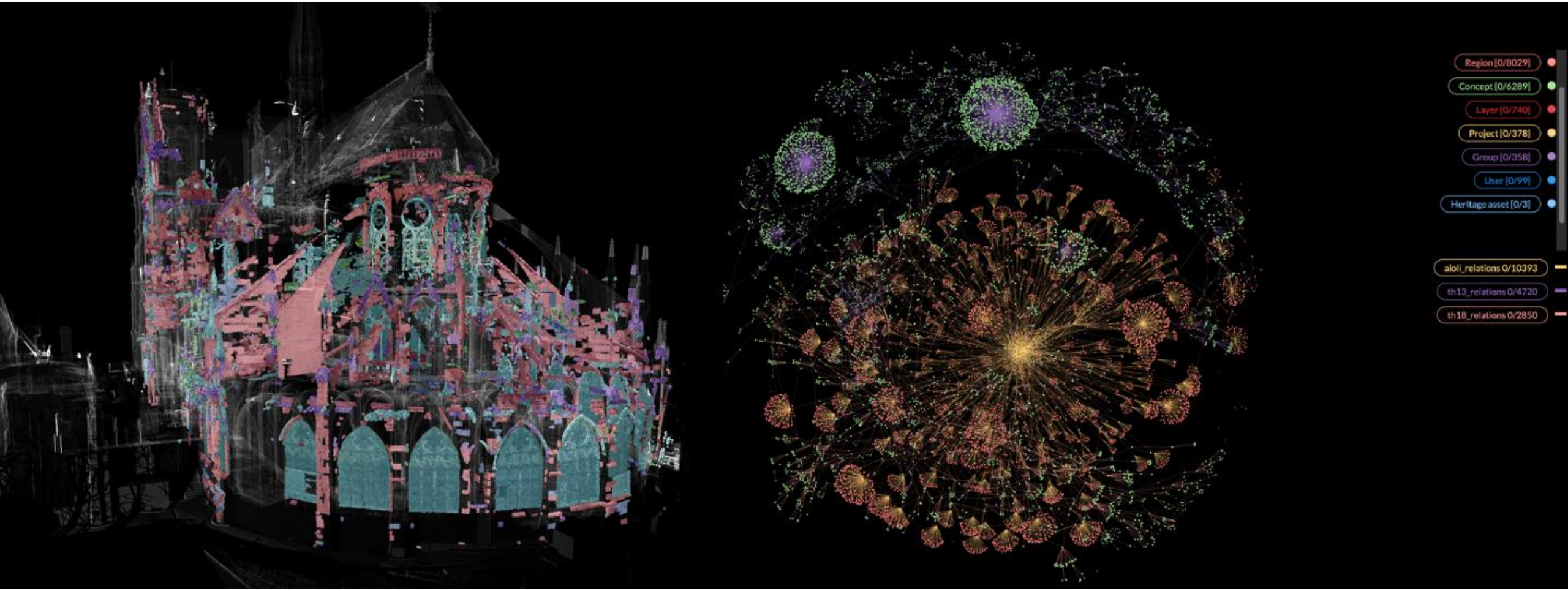
Where? Services access via the Catalogue of Services, E-RIHS

When? User access call (2 calls per year)

Advance your research with DIGILAB services: discover digital services, apply for access, and collaborate with experts across the E-RIHS community.

Research Question → Discover Services → Apply for Access → Conduct Research → Share Results

Same dataset, different (re)presentations



@ Abergel V., CNRS, 2022

Notre Dame de Paris

WHERE WE COORDINATE

E-RIHS

Complementary by design: distinct remits, interoperable data

E-RIHS analyses the material heritage object;
EHRI, DARIAH and RESILIENCE work with texts, documents and archives.

SSHOC
social sciences & humanities open cloud

Where the SSH research infrastructures coordinate. E-RIHS holds the Vice-Chair in 2026 and the Chair in 2027.

echoes

Towards the European Collaborative Cloud for Cultural Heritage

Together with ARIADNE, CLARIN, DARIAH and EGI.

COMMON EUROPEAN DATA SPACE FOR CULTURAL HERITAGE

The common European data space for cultural heritage

europeana

Built on Europeana for cultural institutions, since 2022. Where heritage science data meets collections data.

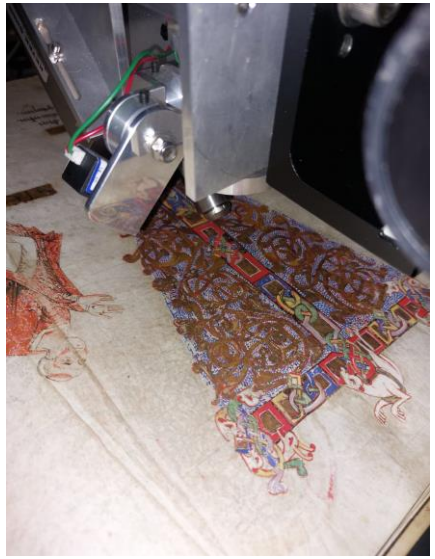
eosc

The European Open Science Cloud

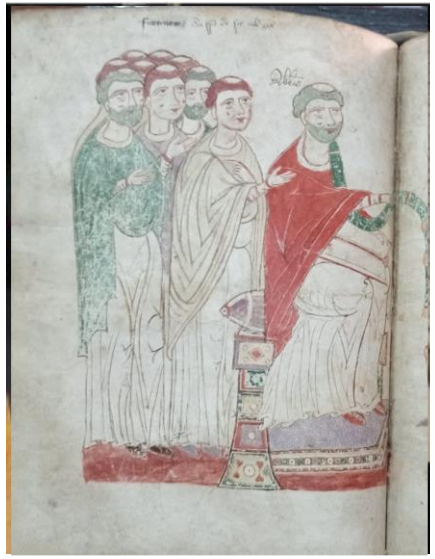
E-RIHS is a member of the EOSC Association, connecting heritage science data to the wider federation.

THE SAME HERITAGE OBJECT ENRICHED BY EACH INFRASTRUCTURE

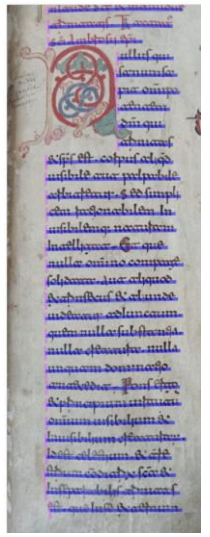
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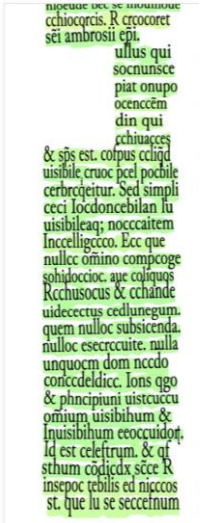


DARIAH · RESILIENCE



CLARIN





@H2IOSC

MATERIALITY
inks, pigments and supports

ICONOGRAPHY
the illuminations and their meaning

SCRIPT
Beneventan palaeography

The shared goal: heritage science data findable and reusable alongside humanities data.

WHERE WE COMPLEMENT — not interchangeable layers

E-RIHS

Research infrastructures, the Cultural Heritage Cloud, the Cultural Heritage Data Space and EOSC each do something the others do not.

1 RESEARCH INFRASTRUCTURES

Data producers and enablers of data use — expertise, mediation, standards and scientific context.

2 echoes

Creates a **collaborative environment** for data, tools, services and new **workflows** across heritage communities.

3 COMMON EUROPEAN DATA SPACE FOR CULTURAL HERITAGE

Connects heritage data and supports discovery, sharing and reuse.

4 eosc

Enables wider research **collaboration across domains**.

WHAT FAIR DELIVERS

Findable and accessible

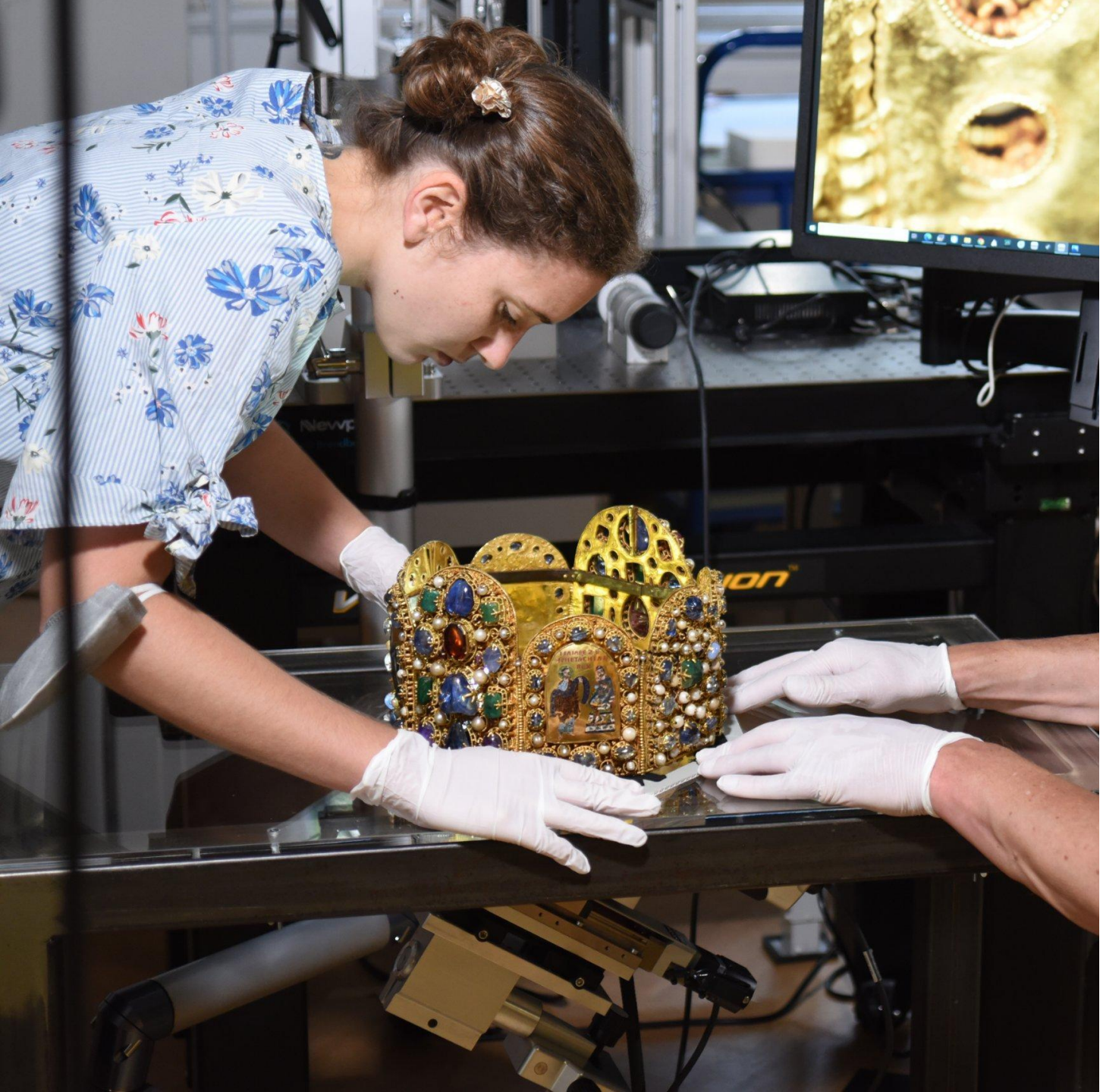
Persistent identifiers, rich metadata and defined protocols: the dataset can be located and retrieved.

VALUE OF CONNECTING CAPABILITIES

Researchable

It does not simply make heritage data accessible: it makes them researchable — understood, trusted, and open to new questions.

Each community has its own questions, data types, vocabularies and methods. Scientific context and community practices are what turn FAIR data into knowledge.



E-RIHS
EUROPEAN RESEARCH INFRASTRUCTURE
FOR HERITAGE SCIENCE

connecting
Heritage to
Science

THANK YOU

www.e-rihs.eu

Positioning the circlet of the Imperial Crown in the context of taking photographs with the HIROX 3D-digital microscope during the CROWN research project
©: KHM-Museumsverband, Kunsthistorisches Museum, Austria