



# Managing Metadata of Sound Artefacts with FAIR principles in a HEURIST Database

Sibylle Emerit, Sylvain Perrot and  
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**In the framework of the project**

**RIMAnt**

**a French-Italian database of remains of ancient musical instruments**

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Alexandre Vincent





RIMAnt =

*Repertorium Musicorum Instrumentorum Antiquorum*

A multilingual online database of the archaeological remains of musical instruments from the Egyptian, Greek and Roman civilizations



# Presentation of the RIMAnt database

DATA MODELIZATION



MODELING DATA THROUGH HEURIST



RIMANT DATASET



MANAGING RIMANT WITH HEURIST



CONCLUSION

# Working in digital humanities

The main problems in digital humanities

- Getting fund
- Hosting data (place and security)
- Development of specific tools which cannot be sustained after a research program (in terms of technical means and staff)
- Proprietary *vs* free softwares (open source)

→ Solutions explored by the French Research Infrastructure  
Huma-Num



# DATA SERVICES FOR SOCIAL SCIENCES AND HUMANITIES

## ORGANIZATION

Services to organize collaborative work around data.

- ShareDocs
- GitLab
- Kanboard
- Mattermost

## PROCESSING

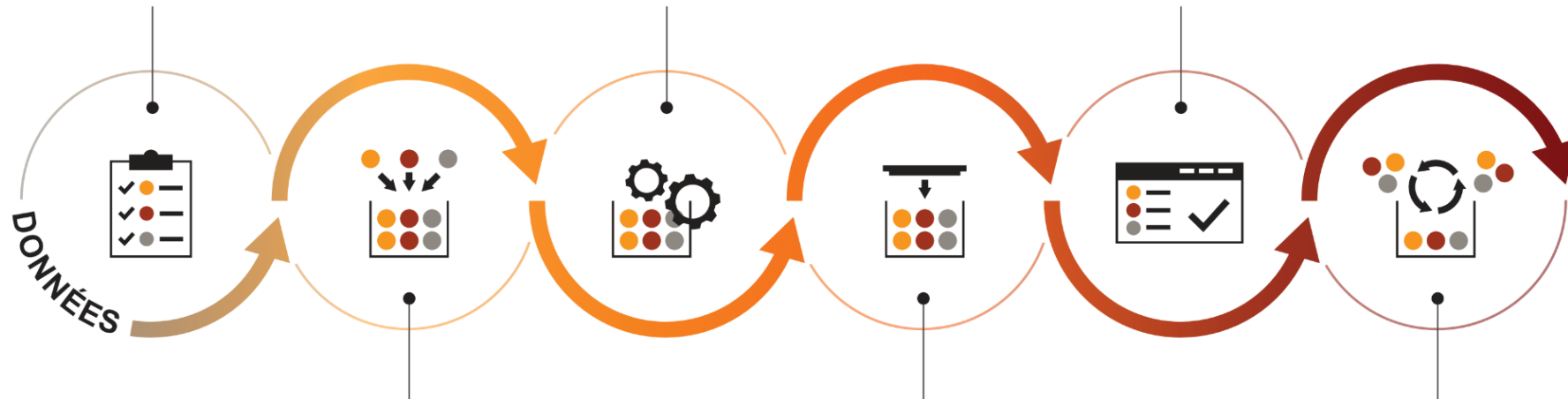
Specific tools and services for data processing and analysis.

- Statistical and R environment
- Polling software
- Character recognition
- Computing power (+ CC-IN2P3)

## PUBLICATION

Your data can be published from Nakala to the web and reported in Isidore, an SSH search engine.

- Web hosting
- Virtual machines
- Nakala
- Isidore



## COLLECTION

Secure storage services for the collection and creation of your data.

- ShareDocs
- Huma-Num Box

## PRESERVATION

Huma-num supports you in the storage and documentation of your data in Nakala, the SSH data warehouse.

- Nakala
- Huma-Num Box
- Long-term preservation (+ CINES)

## REUSE

Your data stored in Nakala and reported in Isidore are reusable.

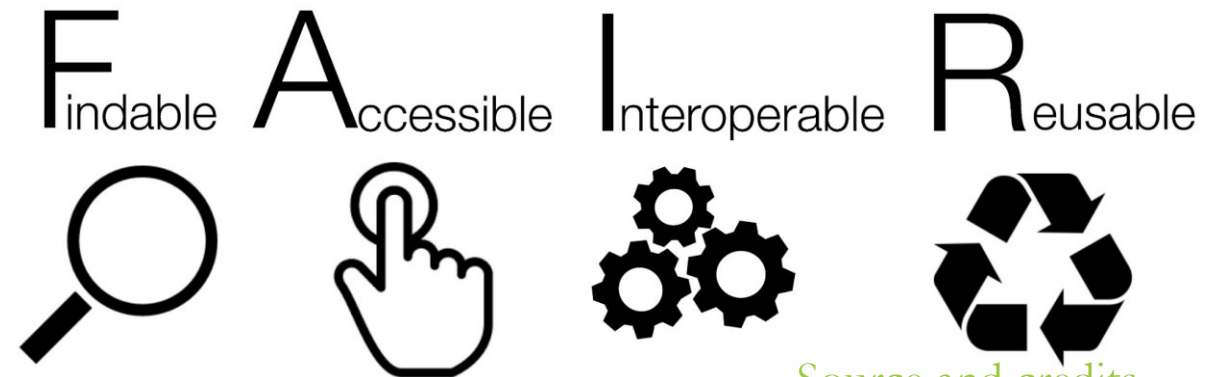
- Web portal
- API
- Triplestore
- OAI-PMH





# Open science: FAIR principles (FAIRNESS)

- ▶ **Findable** (by human beings and machines): a permanent and unique identifier like DOI (Digital Object Identifier), well documented metadata
- ▶ **Accessible**: easy to understand, open science licences, public hosting entity
- ▶ **Interoperable**: websemantics (controlled vocabulary and schemata / data models made of relations [isCreatedBy, isSisterOf]) and websyntax in open source)
- ▶ **Reusable**: common standarts



# Why modeling data?

In order to:

- **query** all your data like you want (through filters/facets)
- **create meaningful relations** between different kinds of data (persons, places, objects, dates, life events...)
- **share** your data with your peers, so that everyone can understand your data
- **connect and compare** easily your dataset with other researchers', either on the same topic or on the same discipline
- **save** it



# What is Heurist?



**HEURIST**



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Software actively developed and sustained by the University of Sydney

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The concepor, Ian Johnson, is a researcher specialised in mapping geographic and historic data

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Tool made for digital humanities and social sciences

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Doesn't require any programming skill

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Came to French Community through the Paris Time Machine Consortium

Paris Time Machine Consortium: <https://paris-timemachine.huma-num.fr/web/>

Heurist website: <https://heuristnetwork.org/>

Heurist in Huma-Num: <http://heurist.huma-num.fr/>

© S. Perrot



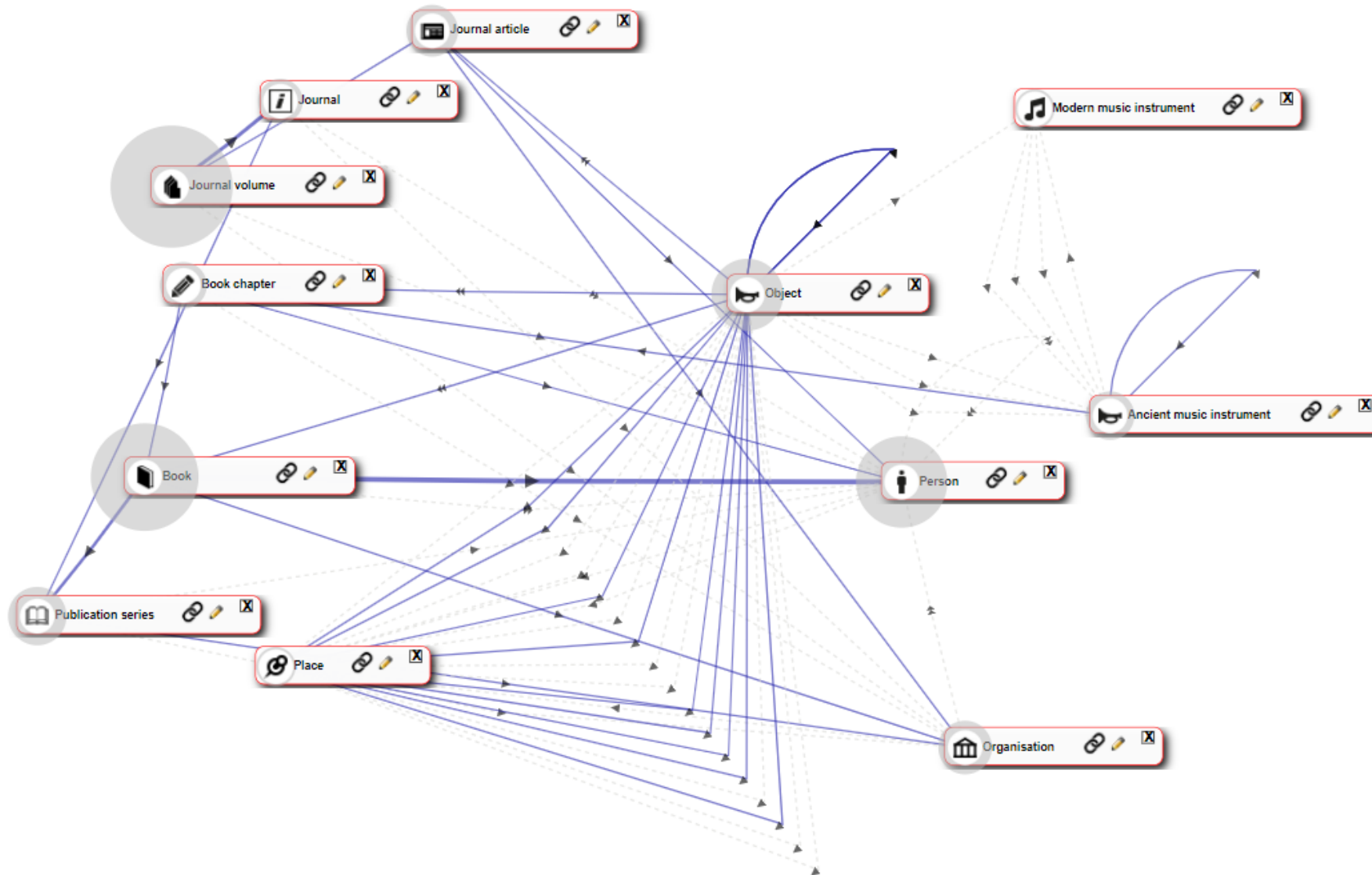
# Heurist features

- ▶ Access your data through a web interface (software off-line: work in progress)
- ▶ Add and modify fields
- ▶ Manage term lists (drop-down menus)
- ▶ Import and structure data through a relational database (record linking: MotherOf, EquivalentTo, FoundIn, ProducedBy, ExcavatedBy, etc.)

# Structure datasets through a relational database



# Structure data through a relational database: the network diagram of RIMAnt (work in progress)



# Heurist features

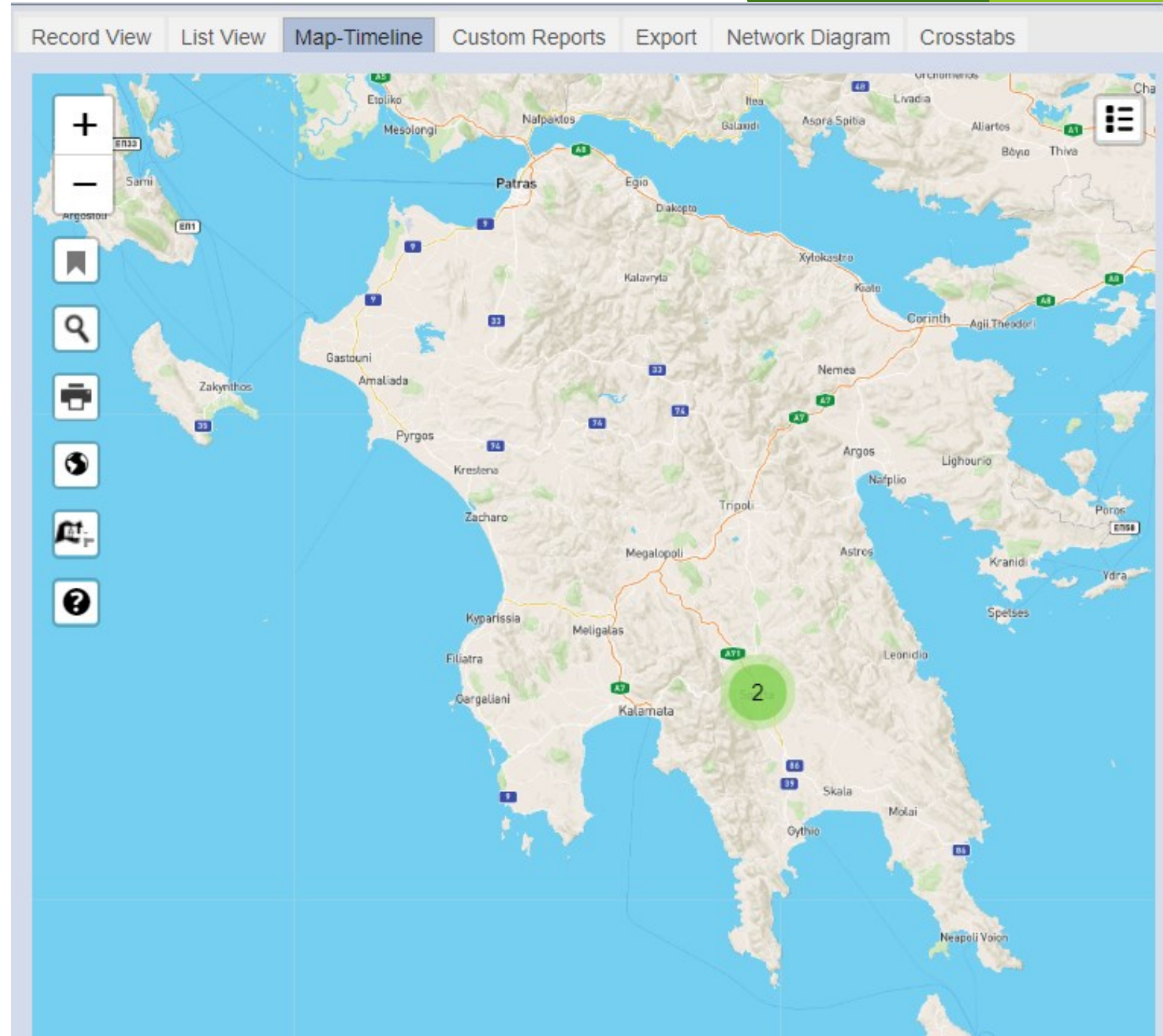
- ▶ Access your data through a web interface (software off-line: work in progress)
- ▶ Add and modify fields
- ▶ Manage term lists
- ▶ Import and structure data through a relational database (record linking: MotherOf, EquivalentTo, FoundIn, ProducedBy, ExcavatedBy, etc.)
- ▶ Work collaboratively on record templates /data and share them
- ▶ Export xml, csv, hml (heurist xml package), kml
- ▶ Archive (xml, sql)
- ▶ Visualize it online (map, graph, facet searches, timeline, crosstabs, network diagrams)



Visualize data  
through facets, maps  
or diagrams

Example :

Two *aulos* fragments from the  
sanctuary of Orthia at Sparta



# The RIMAnt dataset

- A set of music / sound instruments to start with
- Different information about the artefacts themselves (type, materials, datation, description, etc.), the context (places, archaeological context), museology (inventory, conservation, purchase) or bibliography
- Lots of different kinds of metadata organized through 9 tables (→ **headings** in Heurist) and around 60 columns (→ **fields** in Heurist) in an Excel file
  - File
  - Typology
  - Description
  - Museum data
  - Provenience
  - Date
  - Technical data
  - Bibliography
  - Pictures / Media



# The RIMAnt database

**HEURIST** v6.2.7.1 misha\_RIMAnt Help Sylvain Perrot

**Admin** **Explore** **Design** **Populate** **Explore** **Publish** **New** **Navigate**

**Filters**  
Recent | All  
Entities  
Saved filters

**Build**  
Filter builder  
Facets builder  
Save filter

**Advanced**  
Rules  
Set as subset

**Filtered Result** filter saved filters FILTER

**Record View** List View Map-Timeline Custom Reports Export Network Diagram Crosstabs

**0002** ID:1373 Type 98: Object

**Object ID: 1373 0002** Attributes Edit title mask Template Bug report

**Informations sur la fiche**  
Informazione sulla scheda

**Numéro de fiche** 0002  
Numero della scheda / Number of file

**Date de création** 2021-05-25  
Data di creazione / Creation date

**Premier auteur** Sylvain Perrot  
Primo autore / First author

**Dernière saisie** 2021-05-25  
Ultimo inserimento / Last input

**Historique des modifications** Création le 25/05/2021 [html](#)  
Storico delle modifiche / History of modifications

**Remarques / Questions** [html](#)  
Note / domande Notes / questions

**Vérification sur place** Non +  
Sopralluogo Checking in situ

**Etat** En cours +  
Stato / State

**Référence MEDDEA**  
Riferimento a MEDDEA / Reference to MEDDEA

Step through filtered subset **1/1127** Save then Dupe New Save Save + Close Close Drop Changes

Scheda in relazione 0001  
General description Fragment of an aulos, inscribed, with three holes (one for thumb)  
Inscription(s) TAI FOPΘA ("To Orthia")  
Similar record 0001

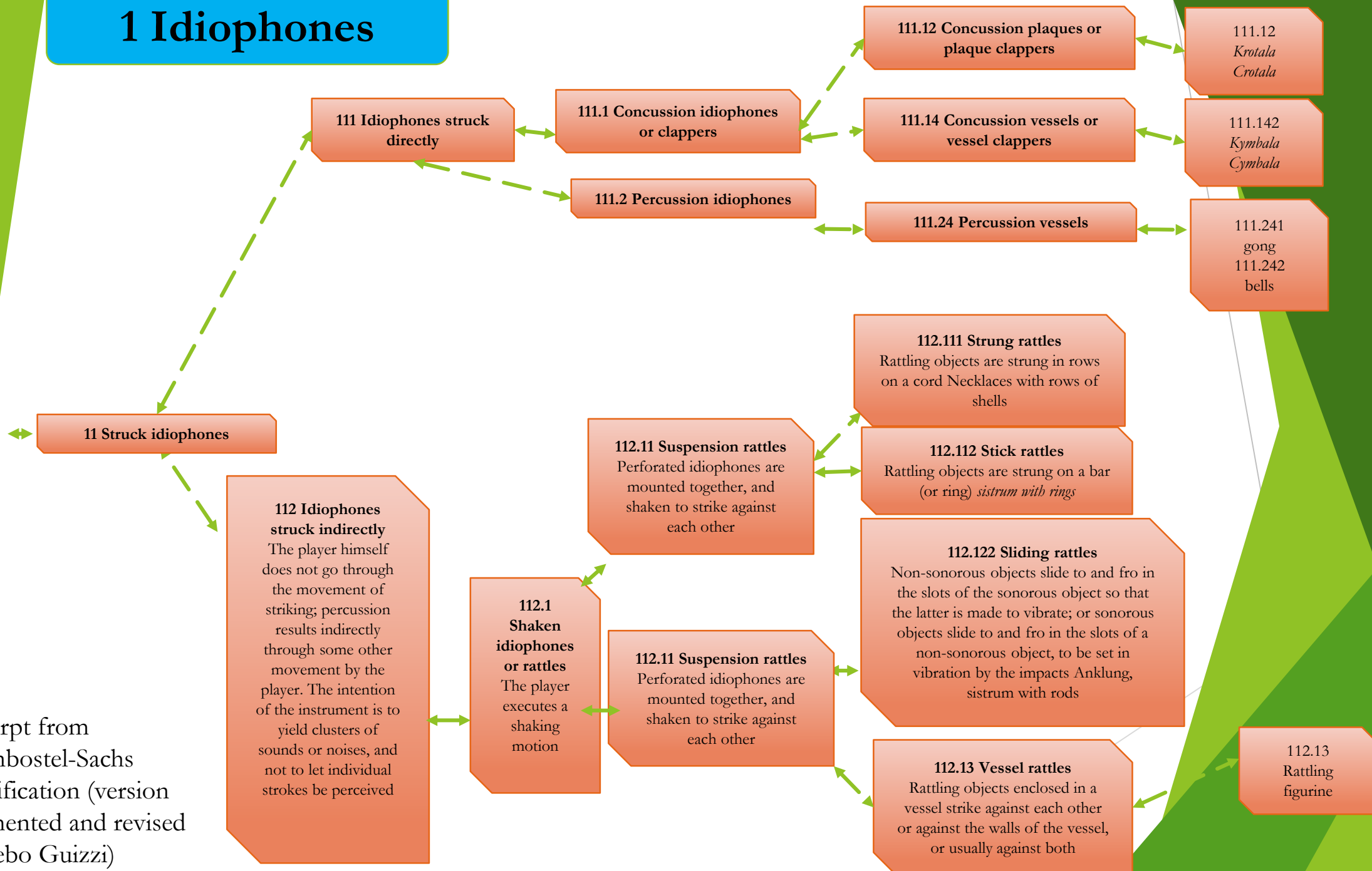
Cymbala...\_2001  
Rattle...\_2001  
Fistula...\_2001

# Create controlled vocabularies: a trilingual classification of sound artefacts based on the Hornbostel-Sachs classification

The screenshot displays the HEURIST v6.2.7.1 interface. The top navigation bar includes the HEURIST logo, version information, and a user profile dropdown for 'misha\_RIMAnt'. The main interface is divided into several panels:

- Admin Panel:** Contains sections for Design, Populate, Explore, and Publish.
- Design Panel:** Includes options for Modify (Record Types, Vocabularies, Base Fields, Browse templates, Visualise) and Setup (My Preferences, Properties, Register, Shortcuts bar).
- Vocabularies editor Panel:** Shows a list of groups including 'User-defined', 'People, events, biogra...', 'Place', 'Bibliographic, copyright', 'Spatial', 'Spatial and mapping', 'Semantic web', 'Internal', and 'RELATIONSHIPS'. A blue arrow points to the 'User-defined' group.
- User-defined Panel:** Lists various vocabularies such as 'Inscription Scripts', 'Inscription types', 'Land Use Types', 'Manufacture technique', 'Materiale', 'Matériaux', 'Museum Object Types', 'Object Materials', 'Oui/Non', 'Ownership Records', 'Periodi', 'Person role vocab', 'Production type', 'Provinces', 'Roles', 'Site Type', 'States', 'Subjects', 'Survey Landforms', 'test', 'Thesaurus RIMAnt (en)', 'Thesaurus RIMAnt (fr)', 'Thesaurus RIMAnt (it)', 'Treatments', 'Units', and 'Vegetation types'. A blue arrow points to 'Thesaurus RIMAnt (en)'.
- Thesaurus RIMAnt (en) Panel:** Displays a hierarchical tree of terms. A blue arrow points to the term 'Trumpet with curved tube with mouthpiece' under the 'Trumpet' category.

# 1 Idiophones



Excerpt from  
Hornbostel-Sachs  
classification (version  
augmented and revised  
by Febo Guizzi)

# Insert clean geodata

In order to get clean and consistent data, trying to retrieve if possible information on places through [GeoNames](#).

GeoNames



# Insert clean geodata



Example : Locating *aulos* fragments from the sanctuary of Orthia at Sparta

The screenshot displays the GeoNames interface. At the top, the search bar contains "Paris, Mount Everest, New York". The main map area shows a satellite view of Sparta, Greece, with a popup for the "Sanctuary of Artemis Orthia" (ID: 12238026). The popup includes the name in Greek and English, coordinates (37.08285, 22.43516), and a list of download options like .kml and .rdf. A blue arrow points from the text "Example : Locating *aulos* fragments from the sanctuary of Orthia at Sparta" to the popup. Below the map, a data entry form for "Sanctuary of Artemis Orthia -- Archaeological site" is visible. The form has a "GeoNames ID" field containing "12238026", which is highlighted by a green arrow pointing from the popup. Other fields include "Primary place name", "Locality name", "Place type" (set to "Archaeological site"), and "Location (mappable)".

GeoNames About Browse Download API Help Paris, Mount Everest, New York rimant

Plan Satellite Layers

Sanctuary of Artemis Orthia ca. 228 m  
archaeological/prehistoric site  
Greece GR » Peloponnese ΕΣΥΕ25 » Laconia 42 » Sparta 0252  
37.08285, 22.43516 N 37°04'58" E 22°26'07"

Place ID: 1280 Sanctuary of Artemis Orthia -- Archaeological site

Modify structure Show help Optional fields Attributes Edit title mask Template Bug report

PRIMARY INFORMATION

**Primary place name** Sanctuary of Artemis Orthia  
Commonly used name of the place. Do not abbreviate or use hierarchichal naming (put that under country, state etc.)

Locality name  
A specific locality name, such as a school or camp (optional)

**Place type** Archaeological site  
The type or category of place

**Location (mappable)** Point 22.43516, 37.08285  
Geospatial location(s) to which this record relates. Use for simple mapping where locations are identified by coordinates rather than names.

**GeoNames ID** 12238026  
The ID of the place in GeoNames. Info is then available at <http://www.geonames.org/>

**Short description**  
Short summary, typically used in annotated listings, information popups and so forth. Aim for 100 - 200 words.

Step through filtered subset 6/7 Save then Dupe New Save Save + Close Close

# Applying FAIR practices in structuring data

Use of **controlled vocabularies** and, if possible, reuse what has already been done on this topic

For periods: [OpenTheso](#) (Pactols)  
or [Perio.do](#)

**Perio.do**

A gazetteer of period definitions for linking and visualizing data.

→ Identifying digital objects: ARK  
(Archival Resource Key) or  
Handle



Terme préféré		Deuxième période intermédiaire égyptienne (fr)
Collection		Chronologie
Concept générique	↑	époque pharaonique
Concept spécifique	↓	XIIIe dynastie égyptienne , XIVe dynastie égyptienne , XVe dynastie égyptienne , XVIe dynastie égyptienne , XVIIe dynastie égyptienne
Concept associé	↕	.....
Synonyme	=	2e ép intermédiaire , 2e période intermédiaire
Total de la branche	📄	
Définition		Caractérisée par une phase d'instabilité dans l'histoire de l'Égypte antique, cette période se situe entre le Moyen Empire et le Nouvel Empire de 1650 à 1550 av. J.-C. (Wikipédia)
Traduction		2do período intermedio (es) 2. Zwischenzeit (de) II periodo intermedio (it) Second Intermediate Period (en) Tweede Tussenperiode (nl) العصر الاثناوية الثانية (ar)
Corpus lié		🔗 Catalogue Frantiq (130 notices)
Identifiant / Lien permanent		
Id interne		🔗 2947
Uri		🔗 <a href="https://ark.frantiq.fr/ark:/26678/pctrWdtTtgEFgD">https://ark.frantiq.fr/ark:/26678/pctrWdtTtgEFgD</a>
IdArk		26678/pctrWdtTtgEFgD
IdHandle		20.500.11859/26678.pctrWdtTtgEFgD

# Bibliographic data

HEURIST v6.2.7.1 misha\_RIMAnt Help Sylvain Perrot

Admin Design Populate Explore Publish New Navigate

Filters Rec Ent Sav Build Filte Fac Sav Advan Rule Set

Object ID: 1373 0002

Attributes Edit title mask Template Bug report

Modify structure Show help Optional fields

Unit of weight g (grams) Unité de poids

Weight Poids

Other dimensions Diameter of the holes: 7-8 mm html

Autres dimensions

Number of elements 1 Nombre d'éléments

Bibliographie Bibliografia

Sources/Références

Publié dans : The Sanctuary of Artemis Orthia at Sparta. Dawkins, Richard McGillivray, 1929

Exposé dans : Musiques! Échos de l'Antiquité, catalogue d'exposition, musée du Louvre-Lens, Lens, 17 septembre 2017-15 janvier 2018., 2017

Sites internet

Media

Images

Representative image or thumbnail

Additional Images: select : Digital media (image, video, PDF etc.)

Step through filtered subset 1/1127 Save then Dupe New Save Save + Close Close Drop Changes

Zotero

Champs & Marqueurs

Titre

- Ancient Egyptian musical instruments Manniche
- Catalogue des instruments de musique... Ziegler
- Catalogue of Egyptian antiquities i... Anderson
- Die Musikinstrumente des alten Ägypt... Sachs
- Eine ägyptische Winkelharfe in der Ber... Sachs
- Fragments of woodwork in the Egypti... Eaton-Krauss et S...
- Instruments de musique. Catalogue g... Hickmann
- L'offrande du collier-ment dans les te... Châtelet
- L'offrande du collier-ment: un symbo... Châtelet
- Magisches Glöckchen Doetsch-Amberger
- Miscellanea musicologica I: note sur u... Hickmann
- Miscellanea musicologica IX fragmen... Hickmann
- Miscellanea musicologica V: note sur ... Hickmann
- Musical instruments from the tomb o... Manniche
- Musiques! Échos de l'Antiquité, catalo... Emerit et al.
- Une harpe angulaire égyptienne antiq... Closson
- Une tête "amarnienne" en bois (Mus... Boreux

Sylvain Perrot Sibylle Emerit

Alexandre Vincent Aereophone

Amama-Kunst bell

Berlin, Staatliche Hochschule für Musik

Type de document Livre

Titre Musiques! Échos de l'Antiquité, catalogue d'exposition, musée du Louvre-Lens, Lens, 17 septembre 2017-15 janvier 2018

Éditeur Emerit, Sibylle

Éditeur Guichard, Hélène

Éditeur Jeammet, Violaine

Éditeur Perrot, Sylvain

Éditeur Thomas, Ariane

3 autres...

(...) Résumé Exhibition catalogue: Musiques! Éc...

Collection

N° ds la coll.

Volume

Nb de volumes

Édition

Lieu Lens, Gand

Maison d'édition Musée du Louvre-Lens, Snoeck

Date 2017

Nb de pages

Langue

ISBN 978-2-36838-046-8

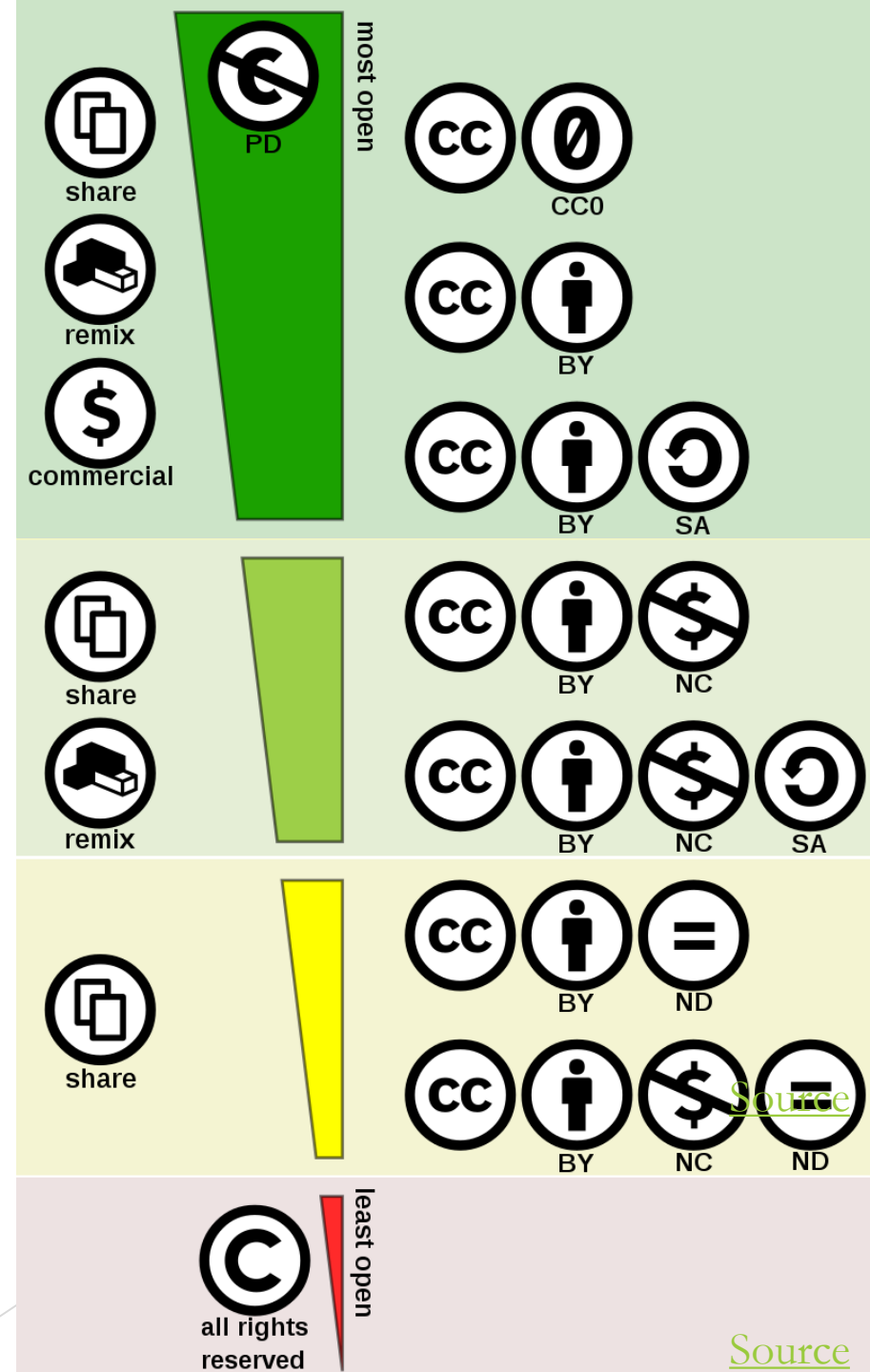


# Hosting and sustainability of pictures

Nakala (Huma-Nur)

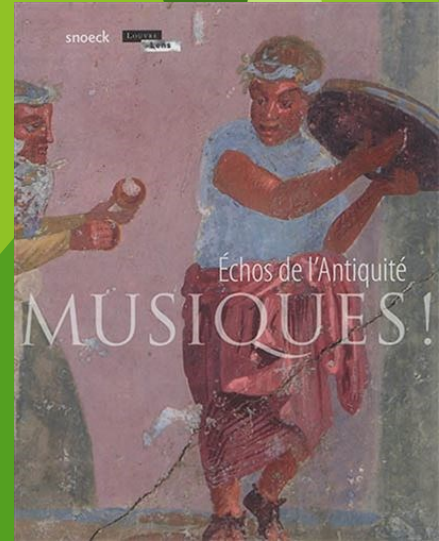


Open licences (Creative commons or Etalab)



# Encountered problems

- Different spelling for a same object according to the classification in use (*aulos*, *tibia*, flute, oboe, pipe, reedpipe, aerophone...)
- Periodical data: 323-31 (Hellenistic, Republican, Ptolemaic/Lagid, etc.)
- Geographic data with both GPS references in a DMS (Degree, Minute, Second) format and also lot of informations regarding administrative names (district, village, site, sub-district), noted in a non consistent way (including transcription of non-Latin alphabets)
- Different spelling or syntax for bibliographic references
- Managing trilingual content (and more, including ancient languages)
- Hosting and publishing pictures (licenses)



# Managing RIMAnt with Heurist

- ▶ **Host data:** Heurist via Huma-Num

- ▶ **Structure and clean data**

Term lists (controlled vocabularies: thesaurus of musical instruments, OpenTheso), relations, dates, single line, etc.

- ▶ **Import existing data**

GeoNames / Zotero

- ▶ **Increment new data**

- ▶ **Link to Nakala for pictures**

- ▶ **Publish it on a website (work in progress)**

Further on this topic:

*Repertorium Instrumentum  
Musicorum Antiquorum :*  
Enjeux et perspectives d'un  
inventaire du patrimoine sonore  
antique

Lyon, Maison de l'Orient et de la  
Méditerranée

January 21<sup>st</sup> 2022



Journée d'étude organisée par Sibylle Emerit (CNRS, laboratoire HiSoMA)  
et Daniela Castaldo (Université du Salento, Collegium de Lyon)  
En lien avec le séminaire de l'Axe B « Cultures et Temporalités » du laboratoire HiSoMA

Questions d'objets  
Repertorium Instrumentorum Musicorum Antiquorum  
Enjeux et perspectives d'un inventaire du patrimoine sonore antique

**VENDREDI 21 JANVIER 2022**

Salle Caillemer - Université Lyon 3  
5 quai Claude Bernard - Lyon 7<sup>e</sup>

Harpe arquée  
Date de création/fabrication : Nouvel Empire  
(?) (attribution d'après style) (-1550 - -1069)  
© Collection du musée du Louvre

Thank you for listening!

