# Artframe Connecting two Worlds

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Metadata Coordinator, Columbia University Libraries Nov. 14, 2016, Metropolitan Museum of Art

## **Linked Data for Production (LD4P)**

"The Andrew W. Mellon Foundation has awarded Stanford a \$1.5 million grant to support library initiatives that develop and advance the use of linked open data. Stanford Libraries will coordinate a team representing Columbia, Cornell, Harvard, Library of Congress and Princeton to upgrade the current infrastructure libraries use to create, store, and share bibliographic data."

Source: https://library.stanford.edu/news/2016/04/stanford-libraries-leads-collaborative-grant

## LD4\*

LD4L (2014-2016): Collaborative project of Cornell University Library, Harvard Library Innovation Lab, and Stanford University Libraries.

LD4L-Labs (2016-2018): Cornell-lead collaborative project with Harvard University, Stanford University, and library researchers at the University of Iowa.

LD4P (2016-2018): Stanford-lead collaborative project with Columbia, Cornell, Harvard, Library of Congress, Princeton, and Stanford University to start transitioning traditional technical services workflows to linked open data.

## **LD4P Projects**

- Columbia: Art objects (two & three dimensional)
- Cornell: Non-commercial LPs from the Hip Hop collection & rare materials
- Harvard: Library cartographic resources (printed maps, atlases, digital geospatial datasets, etc)
- Library of Congress: BIBFRAME 2.0 test, audio-visual material, Prints & Photographs, BIBFRAME & RDA
- Princeton: Archive of the philosopher Jacques Derrida (1930-2004);
   annotations
- Stanford: Tracer bullets; Performed music ontology

#### **Artframe -- a BIBFRAME extension**

- Many libraries own art objects
- Art objects have been described in MARC
- Larger institutions often have libraries as well as museums -- lack of communication
- BIBFRAME is supposed to work with "various content models" and accommodate "different needs for resource descriptions"
   (Library of Congress (2012). Bibliographic Framework as a Web of Data.

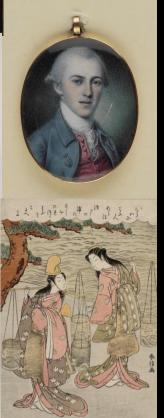
   Page 15)

















John Singleton Copley Portrait of Myles Cooper ca.1768, oil on canvas



Anna Hyatt Huntington Cranes Rising 1934, bronze



Suzuki Harunobu

The Brine Maidens
Japan, Edo period
1769-70, woodblock print



George Romney
Portrait of David Hartley, M.P.
1784



Alice Neel
Portrait of Jack Beeson
1979



Samuel Adoquei

Portrait of Constance Baker Motley
2015



Florine Stettheimer Self-Portrait with Palette (Painter and Faun), ca. 1915



Florine Stettheimer Portrait of Myself, 1923



Arthur Rothstein

Girl at Gee's Bend (Artelia Bendolph)

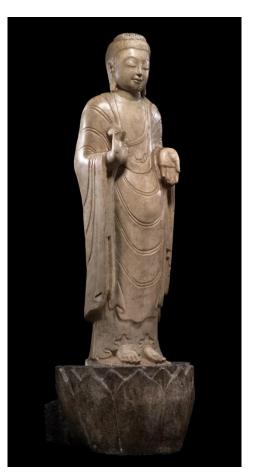
1937, gelatin silver print



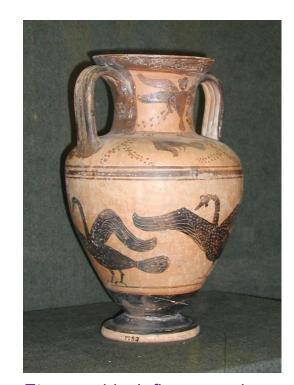
Bruce Davidson *Time of Change*1962, gelatin silver print



Plaque with a hunter and lion Iran, 8th-7th century BCE ivory or bone



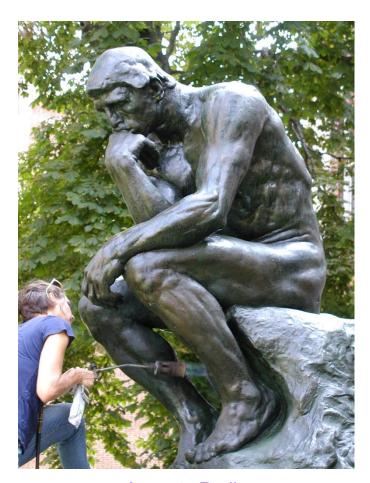
Standing Buddha, China Northern Qi dynasty (550-577) marble with limestone base



Etruscan black-figure amphora 9th-8th century BCE earthenware



Daniel Chester French *Alma Mater*1903, bronze



Auguste Rodin The Thinker 1930, bronze

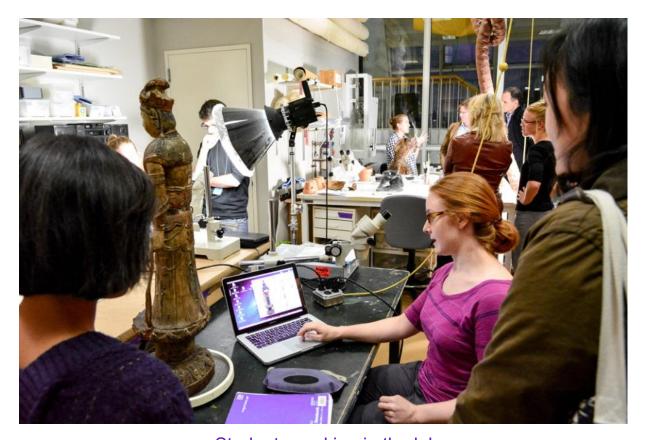








Clement Meadmore, *Curl*, 1967, Cor-Ten steel (conservation completed Fall 2015)



Students working in the lab
NYU Institute of Fine Arts Conservation Center



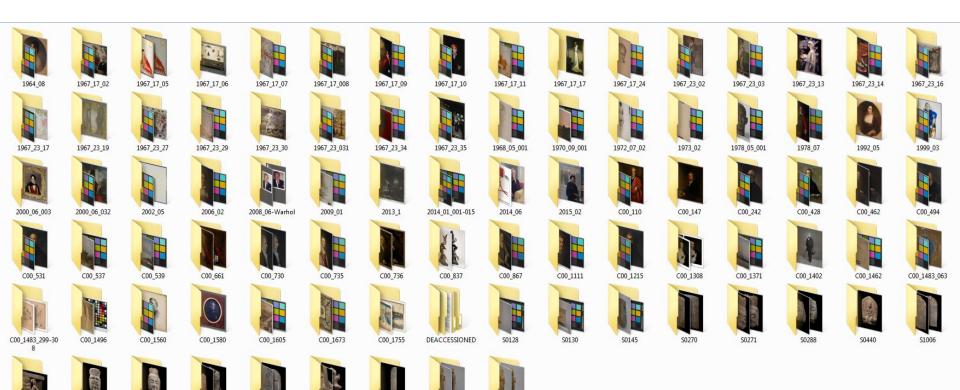


Virgin Mary polychrome wood figurine, Mexico or South America, 18th century, with X-ray







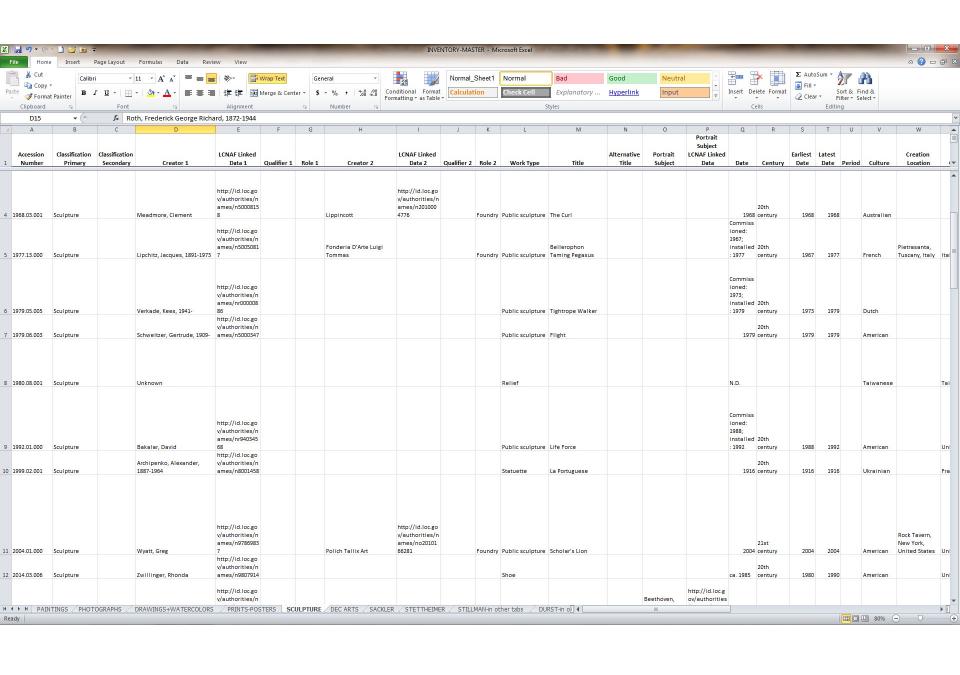


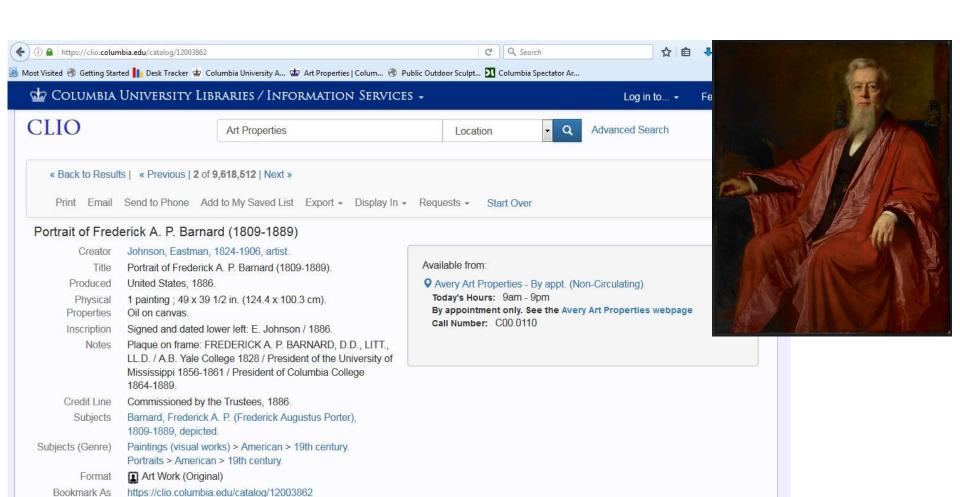
S3512

S3829

S1038

S1094





Virtual Shelf Browse

Show

Hide

Full Screen

## **But Why linked data?**

#### Library cataloging: a guide for a basic course,

Author: Immroth, John Phillip.

**Title:** Library cataloging: a guide for a basic course, by John Phillip Immroth and Jay E. Daily.

Published: Metuchen, N.J., Scarecrow Press, 1971.

**Description:** 202 p. illus. 22 cm.

LC Subjects: Cataloging--Outlines, syllabi, etc.

Also Listed Under: Daily, Jay Elwood, author.

#### Holdings Information:

Location (guide): Offsite - Place Request for delivery within 2 business days

Call Number: Z693 .145

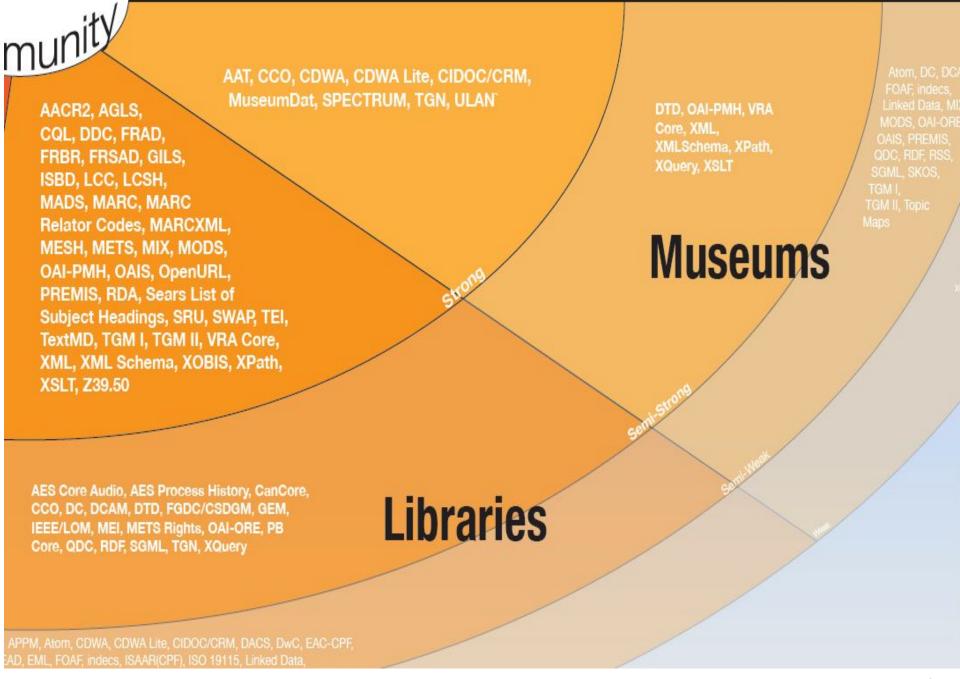
Status: Not checked out

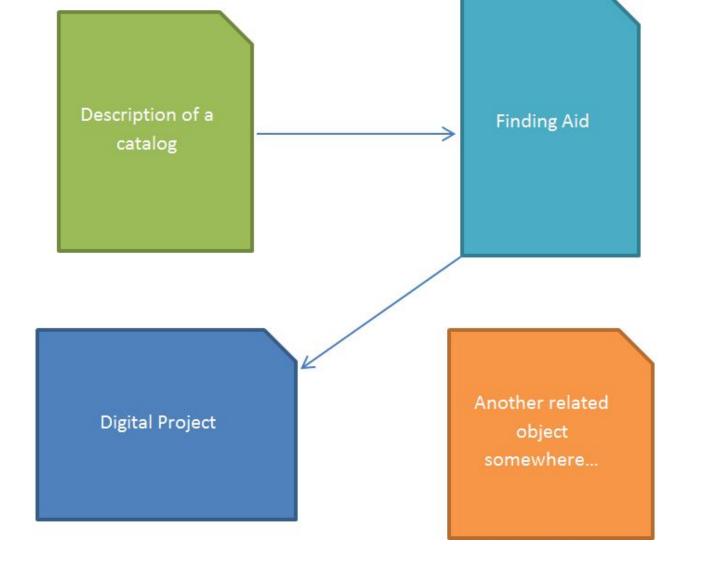
#### COLLECTIONS OF CORRESPONDENCE AND MANUSCRIPT DOCUMENTS

NAME OF	COLLECTION:	FABIAN	ESSAYSCollecti	on	·	<del></del>
SOURCE: Purchase 54799C						
SUBJECT:	Fabian	Essays :	in Socialism			
DATES CO	VERED:	1890	NUMBER	OF	ITEMS:	50

Dramatic Museum Realia







#### **Semantic Web to the Rescue?**

- Linking data (resources) instead of documents (information resources)
- Identifying resources using URIs instead of text strings
- Structured data instead of unstructured data
- Explicit semantics instead of ambiguity (semantics = meaning)
- Goal: machine consumption in addition to human consumption

### What is Linked Data?

Component part of the Semantic Web

#### Building blocks:

- URIs or IRIs (resource identifiers)
- HTTP (hypertext transfer protocol)
- Structured data using controlled vocabulary terms and dataset definitions expressed in Resource Description Framework [RDF] serialization formats such as RDFa, RDF/XML, N3, Turtle, or JSON-LD
- Linked Data Platform

(source: https://en.wikipedia.org/wiki/Linked\_data#Components)

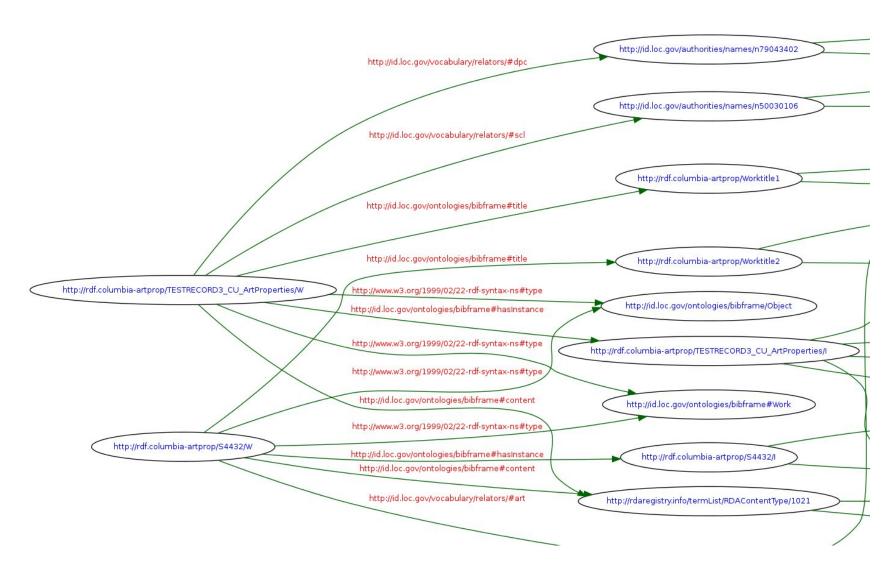
## **RDF--Resource Description Framework**

- Used to express linked data
- Graphs, not records
- RDF statements are called triples
- RDF triples consist of a subject, a predicate, and an object

## RDF Triple

Subject Object **Predicate** Andy Warhol Self-portrait depicts http://viaf.org/vi http://id.loc.gov/vo http://worldcat.org/ cabulary/relators/d entity/work/id/1817 af/56617645 278820 DC

## **RDF Graph**



## Linked Data Vocabularies & Ontologies

- Vocabularies vs. value vocabularies
- Define classes of objects, the relationship of objects, and the properties of resources
- Often expressed in RDFS or OWL
- Examples: FOAF, dcterms, schema.org, BIBFRAME ...

### **Linked Data in Libraries**

- ID.LOC.GOV
- Bibliographic Ontologies (e.g. schema.org + bib. Extension; BIBFRAME)
- Linked Data projects

#### LC Linked Data Service Authorities and Vocabularies





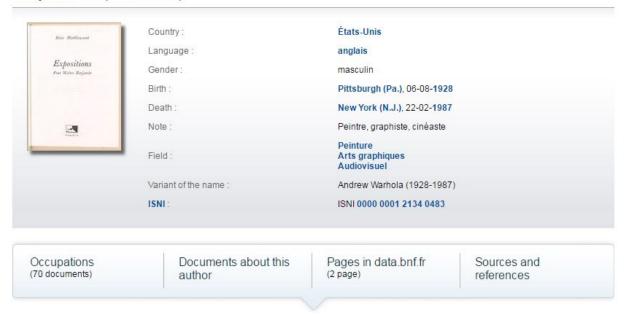
#### Available Datasets

The Linked Data Service provides access to commonly found standards and vocabularies promulgated by the Library of Congress. This includes data values and the controlled vocabularies that house them. The following are currently offered as part of this service:

> LC Subject Headings > MARC Relators Schemes and smaller codelists > LC Name Authority File > MARC Countries Identifiers > MARC Geographic Areas > LC Classification > Carriers > LC Children's Subject Headings MARC Languages > Content Types > LC Genre/Form Terms > ISO639-1 Languages > Media Types > LC Medium of Performance Thesaurus > ISO639-2 Languages > Resource Types for Music > ISO639-5 Languages > Description Convention LC Demographic Group Terms > Extended Date/Time Format

http://id.loc.gov/

#### Andy Warhol (1928-1987)



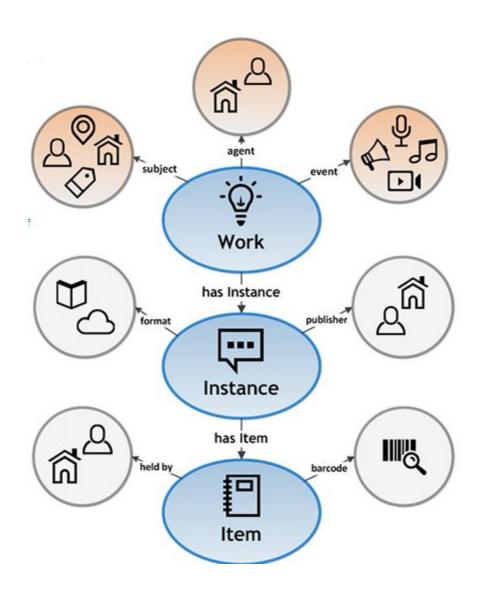
#### Occupations



# Bibliographic Framework Initiative (BIBFRAME)

- Develop a new format that accommodates different content rules and data models
- Determine aspects of MARC that should be retained and translate to a LD model
- Based on Semantic Web and Linked Data technologies
- Foster reuse of existing rich metadata
- Plan for migrating existing metadata into a new structure
- Integrate bibliographic metadata with other rich metadata on the Web

(slide courtesy of Rebecca Guenther)



## **Linked Data in Art**

- Getty vocabularies
- Art ontologies
- Linked Data Projects

## **Art Vocabularies**

- The Art & Architecture Thesaurus (AAT)
- The Getty Thesaurus of Geographic Names (TGN)
- The Union List of Artists Names (ULAN)
- Thesaurus for Graphic Materials (on id.loc.gov)

## **Art & Architecture Thesaurus (AAT)**



# acrylic paintings (visual works)

Source:http://vocab.getty.edu/aat/300181918

All	Object	Predicate	Subject (87)
-----	--------	-----------	--------------

Predicate	Object
rdf:type	gvp:Concept
rdfs:seeAlso	http://www.getty.edu/vow/AATFullDisplay?find=&logic
dcterms:created	1990-06-06T00:00:00
dcterms:modified	1998-06-15T00:00:00, 2001-07-26T22:04:07, 2007 2010-04-23T04:26:37, 2011-01-07T17:22:20, 2011-

### CIDOC-CRM

- CIDOC = International Committee for Documentation of ICOM (International Council of Museums)
- CRM = Conceptual Reference Model
- Official ISO standard since 2006
- Currently in version 5.0.4

## Yale Center for British Art (CIDOC-CRM)

#### Search Details

Creator Francis Hayman, 1707/8-1776, British

Title The Good Samaritan

Date between 1751 and 1752

Medium Oil on canvas

Dimensions 78 1/2 × 48 1/2 inches (199.4 × 123.2 cm)

Credit Line Yale Center for British Art, Paul Mellon Fund

Accession B19

Number

B1979.20

Collection Paintings and Sculpture

Link to This

http://collections.britishart.yale.edu/vufind/Record/1669220

Record

Subject Bible | bishop (prelate) | blood | blood (animal material) |
Terms bottle | costume | donkey | injuries | levite | men | mule |

New Testament | nude | pity | pouring | priest | reading | religious and mythological subject | scroll (information artifact) | the good Samaritan (Luke 10:30-37) | traveler

Place Cusworth | Cusworth Hall | England | United Kingdom |



opped to recto,



image, recto, unframed unframed framed, recto framed, verso

Request additional photography

## Machine-readable form in CIDOC-CRM

#### YALE CENTER FOR BRITISH ART Linked Open Data

URI: http://collection.britishar	.yale.edu/id/object/499	View Collections Online Record
Property	Value	
?:P102_has_title	<a href="http://collection.britishart.yale.edu/id/object/499/title/1">http://collection.britishart.yale.edu/id/object/499/title/1&gt;</a>	
?:P104_is_subject_to	<a href="http://collection.britishart.yale.edu/id/object/499/objectRi">http://collection.britishart.yale.edu/id/object/499/objectRi</a>	ght>
?:P12i_was_present_at	<a href="http://collection.britishart.yale.edu/id/exhibition/389">http://collection.britishart.yale.edu/id/exhibition/757</a>	
?:P138i_has_representation	<ul> <li>http://deliver.odai.yale.edu/content/id/26b6447o-f2cc-494</li> <li>http://deliver.odai.yale.edu/content/id/26b6447o-f2cc-494</li> <li>http://deliver.odai.yale.edu/content/id/26b6447o-f2cc-494</li> <li>http://deliver.odai.yale.edu/content/id/2ddbdeb2-bae2-423</li> <li>http://deliver.odai.yale.edu/content/id/2ddbdeb2-bae2-423</li> <li>http://deliver.odai.yale.edu/content/id/2ddbdeb2-bae2-423</li> <li>http://deliver.odai.yale.edu/content/id/eof8caf2-852f-4b49</li> <li>http://deliver.odai.yale.edu/content/id/eof8caf2-852f-4b49</li> <li>http://deliver.odai.yale.edu/content/id/eof8caf2-852f-4b49</li> <li>http://deliver.odai.yale.edu/content/id/ea66759c-d381-4be</li> <li>http://deliver.odai.yale.edu/content/id/ea66759c-d381-4be</li> <li>http://deliver.odai.yale.edu/content/id/ea66759c-d381-4be</li> <li>http://scale.ydc2.yale.edu/iiif/26b6447o-f2cc-4946-b756-9</li> <li>http://scale.ydc2.yale.edu/iiif/eof8caf2-852f-4b49-860o-2e</li> <li>http://scale.ydc2.yale.edu/iiif/ea66759c-d381-4bee-8a6b-8</li> <li>http://scale.ydc2.yale.edu/iiif/ea66759c-d381-4bee-8a6b-8</li> </ul>	46-b756-92022049b8a9/format/3> 46-b756-92022049b8a9/format/6> 30-9855-c4449b09967d/format/1> 30-9855-c4449b09967d/format/3> 30-9855-c4449b09967d/format/6> 80-9855-c4449b09967d/format/1> 80-9855-c4449b09967d/format/1> 80-9855-c4449b09967d/format/1> 80-8600-2e31750857b5/format/3> 80-8600-2e31750857b5/format/6> 80-8a6b-8333c8506086/format/1> 80-8a6b-8333c8506086/format/3> 80-8a6b-8333c8506086/format/6> 80-8a6b-8333c8506086/format/6> 80-2022049b8a9> 84449b09967d> 81750857b5>
?:P1_is_identified_by	<pre>- <a href="http://collection.britishart.yale.edu/id/object/499/TMS"> - <a href="http://collection.britishart.yale.edu/id/object/499/ccd">http://collection.britishart.yale.edu/id/object/499/inventor</a> - <a href="http://collection.britishart.yale.edu/id/object/499/lidoRecI">http://collection.britishart.yale.edu/id/object/499/lidoRecI</a></a></pre>	
?:P24i_changed_ownership_throug	th= <http: 499="" acquisiti<="" collection.britishart.yale.edu="" id="" object="" td=""><td></td></http:>	
?:P2_has_type	- <a href="http://collection.britishart.yale.edu/id/thesauri/300033618">http://collection.britishart.yale.edu/id/thesauri/300033618</a> - <a href="http://vocab.getty.edu/aat/300033618">http://vocab.getty.edu/aat/300033618</a>	3>
?:P3oi_custody_transferred_throu	gl <a 499="" collection.britishart.yale.edu="" href="mailto:khttp://collection.britishart.yale.edu/id/object/499/acquisiti&lt;/td&gt;&lt;td&gt;ion&gt;&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;?:P39i_was_measured_by&lt;/td&gt;&lt;td&gt;&lt;a href=" http:="" id="" measure"="" object="">http://collection.britishart.yale.edu/id/object/499/measure</a>	ement/1>
?:P43_has_dimension	<pre>- <a href="http://collection.britishart.yale.edu/id/object/499/height&gt;"> <a href="http://collection.britishart.yale.edu/id/object/499/measure">http://collection.britishart.yale.edu/id/object/499/measure</a> <a href="http://collection.britishart.yale.edu/id/object/499/width&gt;">http://collection.britishart.yale.edu/id/object/499/width&gt;</a></a></pre>	ement/1/height> ement/1/width>
?:P45_consists_of	<pre>- <a href="http://vocab.getty.edu/aat/300014078">http://vocab.getty.edu/aat/300014078</a></pre>	

#### VRA Ontology

Vocabulary for representing entities in the VRA data model.

The Ontology was developed by Jeff Mixter, Rebecca Guenther, Trish Rose-Sandler, Michael Dulock and Esme Cowles

#### **Table of Contents**

#### Classes

Administrative Area | Agent | City | Civic Structure | Collection | Continent | Culture | Data Set | Duration | Event | Image | Inscription | Intangible | Material | Organization | Person | Place | Quantitative Value | Quantity | State | Structured Value | Style Period | Technique | Work |

#### Object Properties

area | author | base | based on | builder | cartoon for | circumference | collector | commissioner | component of | composer | contractor | copy of | count | counter proof for | creative activity | creator | cultural context | dealer | decorator | depicted in | depicts | depth | derived from | designed for | designer | developer | diameter | director | distance between | donator | drafter | drawer | duration | editor | engineer | exhibited at | facsimile of | financier | formerly larger context for | formerly part of | former owner | former repository | former site | has cartoon | has component | has context | has copy | counter proof is | has culture | has facsimile | has image | has impression | has inscription | has model | has plan | has printing plate | has prototype | has replica | has study | has style period | technique | has version | height | image of | inventory level | is related to | larger context for | length | location of | manufacturer | mate of | material | model for | owner | painter | partner in set with | part of | pendant of | performer | photographer | place of creation | place of discovery | place of exhibition | place of installation | place of intention | place of ownership | place of performance | place of publication | place of repository | place of site | plan for | preparatory for | printer | printing plate for | producer | programmer | prototype for | relief for | replica of | restorer | running time | source for | study for | venue for | version of | was alteration | was broadcast | was commission | was created | was designed | was destroyed | was discovered | was performed | was presented | was produced | was published | was restored | weight | width | writer |

43

### The Intersection: Libraries AND Art

#### **FRBRoo**

"The FRBRoo is a formal ontology intended to capture and represent the underlying semantics of bibliographic information and to facilitate the integration, mediation, and interchange of bibliographic and museum information."

A working group formed in 2003 aimed to develop a formal ontology " a) Expressing the IFLA FRBR model with the concepts, tools, mechanisms, and notation conventions provided by the CIDOC CRM, and: b) Aligning (possibly even merging) the two object-oriented models with the aim to contribute to the solution of the problem of semantic interoperability between the documentation structures used for library and museum information, …"

# The Artframe Project

#### **Objectives:**

Evaluate the suitability of the BIBFRAME model and vocabulary for describing art objects, both two-dimensional (e.g. paintings, photographs) and three-dimensional (e.g. sculptures, ceramics).

Identify and document any descriptive needs of art objects that are currently not covered by BIBFRAME.

Evaluate other linked data ontologies and initiatives in the art domain.

Develop a profile for the description of art objects.

Convert a selection of art resources cataloged according to the Art Properties collection's local schema to the profile.

Engage with related projects in the museum/art library domain, including the Library of Congress Prints and Photographs Division.

Participate in data exchange with other partners.

Develop workflow to connect public facing linked data to MARC circulation and other inventory data in spreadsheets or other sources.

Evaluate the project and share recommendations.

# The Columbia Project Team

#### Project team consisting of librarians and domain specialists

Amber Billey (Metadata Librarian)

Roberto C. Ferrari (Curator of Art Properties)

Kate Harcourt (Director, Original and Special Materials Cataloging)

Erin Petrella (Metadata Assistant; until August 2016y)

Margaret Smithglass (Registrar and Digital Content Librarian, Avery Library)

Project Coordinator: Melanie Wacker (Metadata Coordinator)

Project wiki: <a href="https://wiki.duraspace.org/display/LD4P/Columbia">https://wiki.duraspace.org/display/LD4P/Columbia</a>

# **Pre-project Activities**

- Create test dataset in spreadsheet form representing a variety of art formats
- Reconcile spreadsheet data to external controlled vocabularies
- Characterize objects in the Art Properties collection based on sample data
- Survey existing linked data developments in the art domain
- Map Art Properties data to Bibframe 1.0
- Document issues and omissions in BIBFRAME 1.0 relating to art descriptions
- Map Art Properties data to <u>VRA RDF</u>

# Characterization of Sample Data

Sample data describing art objects in the Art Properties collection. Subset of the overall collection, so should not be seen to represent the entire collection

Formats Events

Physical Description Creators

Location Titles

Acquisitions Type Information "Ofness" vs. "Aboutness"

### **Literature Review**

- Contemporary literature on art and linked data
- Information-seeking behavior for art and visual resources
- Non-MARC metadata schema development and modeling for art and visual resources
- Mapping descriptions for art and visual resources into MARC

# **Artframe Extension Group**

- Columbia Project Team
- Penny Baker (Clark Art Institute)
- LC's Prints & Photographs Division
- Paul Frank
- Arden Alexander
- ARLIS/NA Cataloging Advisory Committee:
- ☐ Chair: Marie-Chantal L'Écuyer-Coelho
- Board Liaison: Jamie Lausch Vander Broek
- □ ALA Committee on Cataloging: Description & Access (CC:DA) Liaison: Karen Stafford
- ☐ ALA MARC Advisory Committee Liaison: John A. Maier
- □ ALA Subject Analysis Committee (SAC) Liaison: Sherman Clarke
- Members: Bronwen Bitetti, Tamara Fultz, Maria Oldal

## **Use Cases**

Title (Goal)	2.5 Part:Whole relationships	
Mode of use	Collection management, cataloging/inventory, curatorial, exhibition	
Primary Stakeholders (who uses it)	Collection managers, curators	
Scope	Discoverability	
Priority	Medium	
Story	A gift of 10 engravings from an 18th-century portfolio of prints has been received, but the original portfolio was published with 15 engravings. The collection manager wants to identity other institutions who may have the entire portfolio to determine how best to catalog and inventory this gift.  A museum owns a collection of various porcelain Sèvres dishes custom-made for a member of a French aristocratic family, and they are want to identify other institutions that own related pieces from this set for an upcoming exhibition.	
Submitted/updated by:	Roberto Ferrari 9/8/16	

# **Use Case Categories**

- Names
- 2. Related Works
- 3. Genre; Facets; Types; WorkType; Classification; Styles
- 4. Physical Characteristics; Properties
- 5. Condition
- 6. Object History
- 7. Related Images of a Work
- 8. Subject/Aboutness
- 9. Annotations
- 10. Titles
- 11. Administrative metadata
- 12. User contributed data

# **Ontology Extension Development**

1.2 Reconcile name changes seamlessly in discovery systems	Agent	hasAuthority	
1.3 Reconcile different name forms seamlessly in discovery systems	Agent	hasAuthority	
1.4 Find all artists who received a given award	Agent	Awards	
1.5 Relating Agents to Works	Agent	Role	Works
2.0a The work is relared to another work	Works	related	
2.0b Discover works held by the same institution	Works	Agent	heldby
2.1 Discover the works held other institutions	Works	Agent	heldby

# Mapping to BF 2.0

(fictional mapping to visualize the process)

Local Element	BIBFRAME	Other
Title	bf:title	
Dimensions	bf:dimensions	
Portrait subject		relator:dpc
Culture		vra:culturalContext

# Inscriptions/Signatures

```
bf:note [ a bf:Note ;
bf:noteType "Inscriptions/ Signatures" ;
Or
vra:hasInscription ?
```

Or something else?

## **Tools**

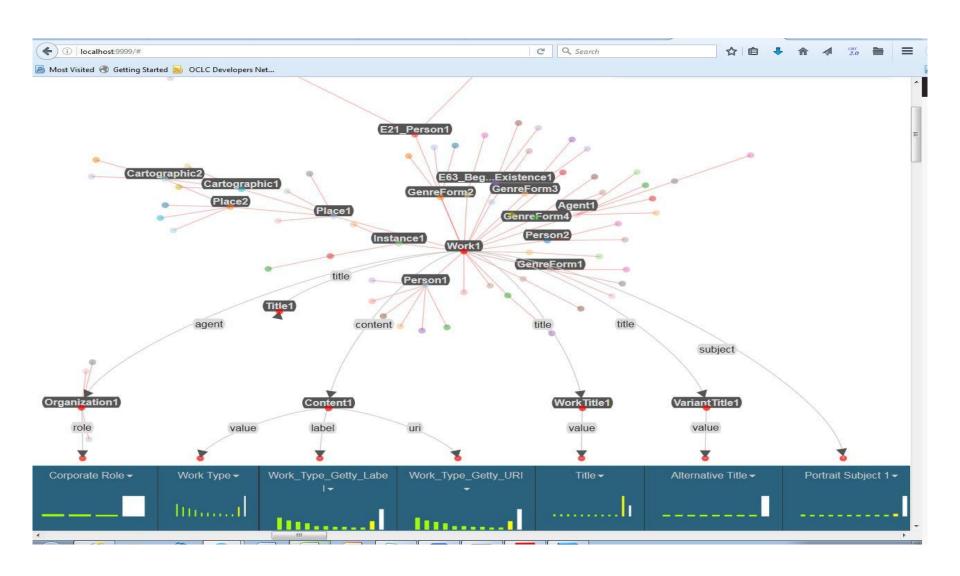
- OpenRefine
- KARMA: A Data Integration Tool
- VitroLib
- Transformation Tool

# **Tools: LODRefine for Reconciling Data**

Country	Country_Getty_	Country_Getty_l	Country_latitud	Country_longite
Japan	Japan	http://vocab.getty.edu /tgn/1000120	36	138
United States	United States	http://vocab.getty.edu /tgn/7012149	38	-98
United States	United States	http://vocab.getty.edu /tgn/7012149	38	-98
China	China	http://vocab.getty.edu /tgn/1000111	35	105

Classification	n P Classification	n_F Classification_P
Decorative arts	decorative arts	http://vocab.getty.edu /aat/300054168
Decorative arts	decorative arts	http://vocab.getty.edu /aat/300054168
Decorative arts	decorative arts	http://vocab.getty.edu /aat/300054168
Decorative arts	decorative arts	http://vocab.getty.edu /aat/300054168

# **Tools: Karma for Mapping and Visualization**





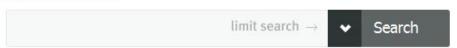
#### What is Vitrol ib?

VitroLib is an ontology-based cataloging editor enabling manual cataloging in RDF based on a generalized bibliographic ontology with extensions for specialized cataloging. Built on Vitro, a generalized semantic web ontology and instance editor with customizable browsing, VitroLib is a joint product of the Mellon-funded Linked Data for Libraries Labs and Linked Data for Production projects.

With VitroLib, you can:

- Create or load ontologies in OWL format
- Edit instances and relationships
- Build a public web site to display your data
- Search your data

#### Search Vitrol ib



Search



Home Works Instances Items People Organizations







## What's next?

- In-person meeting in Washington DC (Nov. 17-18)
- More modelling!
- More mapping!
- More testing!

# Questions?

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rcf2123@columbia.edu