

DESIGN LANDSCAPE: ONLINE COLLECTION INTERFACES

3

About this report series

This report is part #3 in a series documenting the research process and practice of Lozana Rossenova, a PhD researcher embedded at Rhizome between 2016–2020. These reports trace the development of a practice-based interaction design research project, starting with a Discovery and User Research Phase. This phase includes the study of the organizational context and history, documented in Report #1; gathering information about past and current use-cases and user expectations, documented in Report #2, as well as a review of the current landscape of digital design for cultural heritage archives and collections, documented in Report #3. The next phase—Design Exploration, including low-fidelity sketches and prototypes and continuing the conversations with users, is documented in Report #4. This report also includes a summary of the Evaluation Phase, since it is an iterative process throughout the other phases, rather than one final step. The final outcomes of the Design Specification Phase, wherein the initial design proposals are transformed into interactive prototypes and specific recommendations for a data model schema, can be found under the [Prototypes](#) and [Data Models](#) sections of the PhD portfolio website, respectively.

About the researcher

Lozana Rossenova is a digital designer and researcher, and a PhD candidate at London South Bank University's Centre for the Study of the Network Image. Her PhD is a practice-based collaboration with Rhizome. Lozana is particularly interested in working with open source and community-driven approaches to infrastructure, which organizes, stores and makes cultural heritage data accessible. Her current research focuses on born-digital archives and born-digital art. Her PhD project develops design methods which build understanding across diverse communities of practice and facilitate informed interaction, favoring nuance and complexity over reductive simplification.

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Executive summary

Introduction

This report reviews the landscape of digital collection interfaces utilized for cultural heritage preservation purposes (as of 2018). It asks questions such as: What are the common visual and interaction design paradigms in the field?; How do forms of information architecture or choice of databases and content management systems inform user interactions with these interfaces? This report does not claim to be a comprehensive state-of-the-art survey.

Methods

The study used a range of methods for selecting interfaces to be reviewed. Conducting user research—asking users about which collection interfaces they access often, reviewing existing academic literature, as well as attending relevant talks and demonstrations at profession or academic conferences proved to be key. This report acknowledges the selection’s bias towards interfaces accessible in English and institutions based in the Europe (predominantly UK) or the US, due to the researcher’s own academic position and access to resources.

Selected interfaces are represented via sample screenshots, and are captioned with their respective URL addresses and dates of reference. Visuals are supplemented by short analysis and specific elements are highlighted as design feature cards (designed to be used in conjunction with the user story cards from Report #2). The focus is not on creating a detailed taxonomy of all design elements of each interface, but rather to identify specific elements, which could prove relevant to other collection interface use-cases in general, and the ArtBase specifically.

Structure of the report

This report is divided into sections, reflecting different strands of inquiry—all relevant to the new ArtBase interface:

1. **Interfaces for net art archives**
2. **Interfaces for artwork records in institutional collections**
3. **Interfaces for collection entry**



4. Interfaces utilizing collection overview visualizations
5. Interfaces for linked data cultural projects
6. Interfaces utilizing data visualizations to express relationships in collections
7. Interfaces exhibiting net art

The report concludes with a mapping exercise, which links design feature cards from all seven sections to the User Story cards in Report #2, and recommends ways these suggestions could be implemented in the ArtBase re-design.

Key findings and recommendations

The report highlights 46 different interfaces, ranging from institutional to experimental projects. The design feature cards extracted from these have been assorted into categories relating to: the general structure of the data in the archive; discovery and entry into the collections; the single-record-level page and its metadata; and finally, to exhibiting net art online. The report recommends several of the suggestions summarized on the feature cards to be implemented in the new design prototypes for the ArtBase, not just because they map to specific user stories, but because they can facilitate many of the requirements identified throughout the Discovery and User Research Phase. These recommendations include:

- ▶ **A linked data database:** facilitating complex relationships between items in the database (and across databases), as well as complex search queries within the database.
- ▶ **Explorable terminology:** providing richer metadata around conservation procedures or technical dependencies.
- ▶ **Capacity for contradiction:** making it possible to add new metadata to the database alongside existing metadata statements, and to use data provenance information to differentiate, but not erase potential contradictions.
- ▶ **Expression of relations:** making explicit links between various items in the linked data database, such as those which share exhibition histories, or have common technical dependencies.
- ▶ **Links to pre-set queries:** providing one-click access to other records in the ArtBase with shared visual characteristics, material properties, provenance or histories.

- ▶ **SPARQL query GUI¹:** serving complex research needs without extensive data science expertise.
- ▶ **Single-object timeline:** providing temporal context, versioning and preservation history metadata for digital cultural heritage.
- ▶ **Metadata related to literature and events:** providing additional temporal and historical context around artworks, such as exhibitions and reviews.
- ▶ **Metadata clustering:** providing granular access to data.
- ▶ **Access statement:** helping users know what to expect before they access different variants of net art works.
- ▶ **Emulated environments:** providing users of the ArtBase with access to complex, dynamic artworks in environments appropriate to their historical contexts.
- ▶ **Overlay state for contextual information:** providing additional context alongside artwork reperformances, within a granular approach to data presentation.
- ▶ **Including the browser frame (in thumbnail or static screenshot representations):** providing historical context around net art works, which is often integral to the user experience of the works.

¹ SPARQL is an acronym for SPARQL Protocol and RDF Query Language. It is an RDF query language, i.e., a semantic query language for databases, and is able to retrieve and manipulate data modelled in RDF (Resource Description Framework, a standard for linked open data modelling). GUI is an acronym for Graphical User Interface.

Introduction

Problem statement

Research into interface design for online collections and digital cultural heritage preservation is underway in various settings, but remains somewhat fragmented (see Bibliography). Those surveys which aim to be comprehensive, are necessarily more narrowly focused on a specific strand of inquiry, for example, the use of data visualization, design for serendipitous discoveries and browsing, or design for advanced search utilities. While all of these topics are interesting in their own right, they do not provide all the necessary reference points for benchmark evaluation needed for the redesign of the ArtBase.

This report reviews the landscape of digital collection interfaces (as of 2018) and asks questions such as: What are the common visual and interaction design paradigms in the field?; How do forms of information architecture and choice of databases or content management systems inform user interactions with these interfaces? Of particular interest are areas in the design of interfaces focusing on the presentation of complex born-digital artifacts, metadata around temporal and historical context, as well as discovery and search within the framework of a linked data database.

Methods for selection and analysis

The methods of selecting interfaces for review included conducting user research (asking users about collection interfaces they access often), reviewing existing academic literature, and attending relevant talks and demos at professional or academic conferences. The decisions about how to group and discuss interfaces in sections relate to the existing context of the ArtBase archive (an archive of net art, a Wikibase instance, a linked data database), balanced against the primary focus of the research project which is the presentation of the individual artwork record and related records, and the potential need for future research into collection-level visualizations and query-capabilities.

Selected interfaces are represented by screenshots (with respective URL addresses and dates of reference). Visuals are supplemented by short analysis and specific elements are highlighted as design feature cards (designed to be used in conjunction with the user story cards from Report #2). The focus is not on creating a detailed taxonomy of all design elements of each interface, but



rather to identify specific elements, which might be relevant to other collection interface use-cases in general, and the ArtBase in particular.

Structure of the report

The report presents an overview of the landscape divided into sections, reflecting different strands of inquiry—all relevant to the new ArtBase interface:

1. **Interfaces for net art archives:** this section focuses on other net art archives online, how they present artworks and metadata.
2. **Interfaces for artwork records in institutional collections:** this section expands on the previous one by broadening the scope beyond net-art-only collections to include collections in larger institutions which may have some net art or software-based art pieces. This section also includes some institutional interfaces which utilize relevant design patterns, although not dealing specifically with born-digital art.
3. **Interfaces for collection entry points:** taking a step back from the individual record page, this section considers how collections and archives can be accessed.
4. **Interfaces utilizing collection overview visualizations:** this section focuses on the use of various data visualization approaches towards providing alternative collection or archive entry points.
5. **Interfaces for linked data cultural projects:** having looked at how item records are represented in general institutional interfaces, as well as the various entry points into these interfaces (including those that utilize data visualizations), this section focuses on projects which use applications specifically built around a linked data database. This section, therefore, provides guidance as to how applications such as Wikibase (the linked data system underlying the ArtBase archive) might be utilized for cultural heritage purposes.
6. **Interfaces utilizing data visualizations to express relationships in collections:** this section focuses on a specific strand of collection data visualization—how data visualization techniques, in combination with a linked data database, can provide ways to express complex relationships between various items (or concepts) in the archive or collection.
7. **Interfaces exhibiting net art:** this final section looks beyond interfaces built for archives and collections, focusing instead on the exhibition format. How can net art be exhibited online and what paradigms are typically used? The section highlights features which might be useful for the reperformance platforms Rhizome is developing in addition to the main archival interface.

Limitations of the method

This landscape overview does not claim to be a comprehensive state-of-the-art survey. Such a survey would require a larger research team, and broader time framework. The review here was conducted over several months in 2018. Some of the interfaces (and attendant notes) may be outdated by time of publishing.

To mitigate the effects of link rot, in addition to providing the original source URLs for the interfaces under review, this report is complemented by a web archive collection of all referenced interfaces, which can be accessed at: https://conifer.rhizome.org/lozana_r/collection-design-landscape

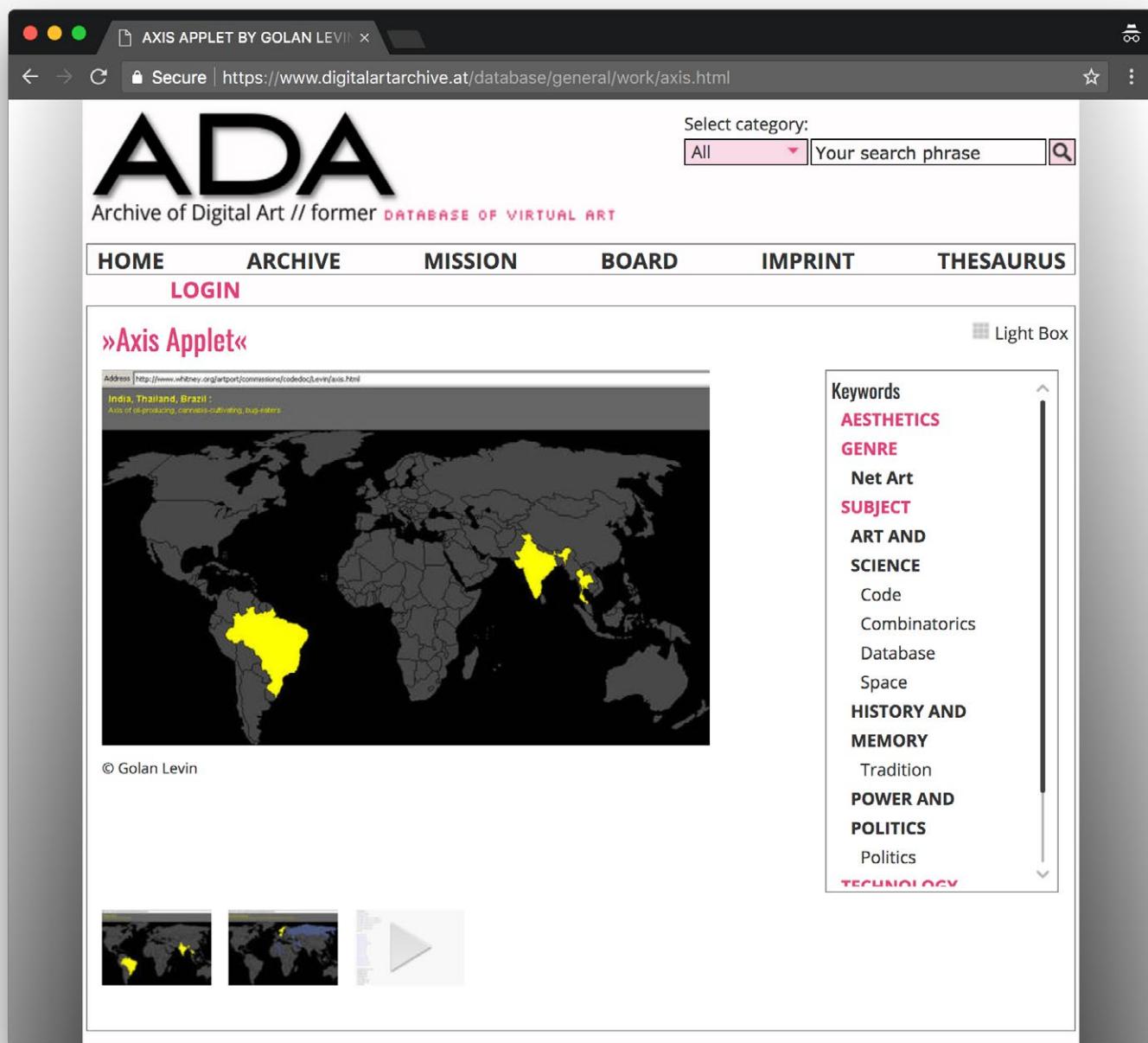
The net art exhibitions referenced in section 6 of this report are available as separate, complete web archive collections, listed under each exhibition's respective title here: https://conifer.rhizome.org/lozana_r/

A further limitation of the research method is the bias of the selection towards interfaces accessible in English, and managed by institutions based in Europe (mostly UK) or the US. This reflects the researcher's own academic position and the reach of possible collaborations from her current network. Goals for future extensions of this research include more international collaborations that can extend the cultural reach and relevance of the survey.²

² Some discussions for possible expansions of scope have already started.
See: <https://twitter.com/phivk/status/1256931372486340608?s=20>

1 Interfaces for net art archives

Archive of Digital Art (active)



Example view of an artwork record: Screenshot previews and keyword categories are featured near the top of the page.



Metadata clustering



Metadata related to
literature & events

The screenshot shows a web page with a dark background and several pink header sections. At the top, a navigation bar includes a back button, forward button, refresh button, a lock icon indicating a secure connection, the URL 'https://www.digitalartarchive.at/database/general/work/axis.html', and a star icon for bookmarks. Below the navigation is a horizontal menu bar with icons for file, edit, view, insert, format, table, cell, and help.

Information

Golan Levin >
»Axis Applet«, 2002

Technology

SOFTWARE
JAVA applet

Literature

Marchese, Francis T.. »Software Archaeology and the Preservation of Code-based Digital Art.« In *Proceedings of Archiving Conference 2013*, edited by Society for Imaging Science and Technology, 25-30 Springfield, VA, 2013.

Descriptions & Essays

enter project here:
artport.whitney.org

Scroll down to the bottom of the code to launch its results.

Please adjust your [Java Security Settings](#) for Whitney Museum Artport, in order to launch the Programme.

Commissioned by the Whitney Museum.

ADA Community Team 16-06-2015
Comment by John Klima:
Indeed, as Martin said, VERY competent programming, runs like a charm and is a pleasure to look at. I notice that Golan uses the "official" United Nations map projection, rather than a strict lat/lon projection. Don't you think it over-emphasizes Europe and Africa? I love the sense of humor (if you can call it humor) and the very "profession ... [read more](#)

ADA Community Team: Axis Applet, 16-06-2015, in:
Archive of Digital Art

ADA Community Team 16-06-2015
Comment by Scott Snibbe:
Your piece is very entertaining. It seems that the ties

Exhibitions & Events

2003
Exhibition :
»CODEDOC II«
Ara Electronics Linz

Example view of an artwork record: Additional metadata available for the record is grouped in categories near the bottom of the page.

Reference URL: <https://www.digitalartarchive.at>

Date of screenshots: 2018-05-14

Notes: Participants in some of the user studies found parts of the metadata presented here useful; in particular, elements such as essays, literature, or exhibitions and events related to a specific artworks (where such data was available).

Turbulence (legacy database)

The screenshot shows the Turbulence legacy database interface. At the top, there's a navigation bar with a back/forward button, a refresh button, and a URL bar that says "Not Secure | turbulence.org". Below the bar is a search bar with the placeholder "Search or filter". To the left of the search bar is a menu icon (three horizontal lines) and the word "turbulence". On the right side of the header, there are date navigation buttons: "2015 / 1996" with arrows pointing left and right.

Below the header, there are three filtering options: "projects grid" (represented by a dotted square icon), "projects with titles" (represented by a dashed square icon), and "people" (represented by a dashed square icon). The main content area displays a grid of project thumbnails, ordered chronologically from 2015 at the top to 1996 at the bottom. Each row contains ten thumbnails, with some rows having fewer than ten due to the grid layout.

2015 >

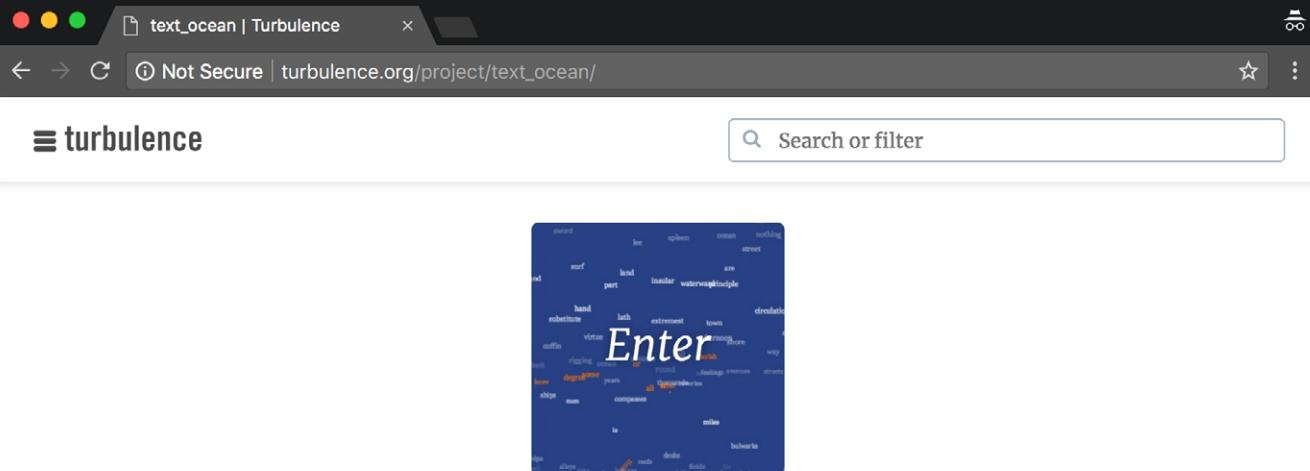
2014 >

2013 >

Collection overview: Thumbnails of the projects are ordered chronologically.



Overviews & previews



turbulence

Search or filter

text_ocean

A Random Access Reading of Moby Dick

— September 2015 —

by Zannah Marsh

Supported by Jerome Foundation

text_ocean is an experiment in random access reading and text visualization, using Herman Melville's notoriously impenetrable whalefishery epic 'Moby Dick' as source material. Selections of the text are blown apart and become a dynamic sea of words, animated according to grammatical function. A new text selection appears each time the browser is refreshed.

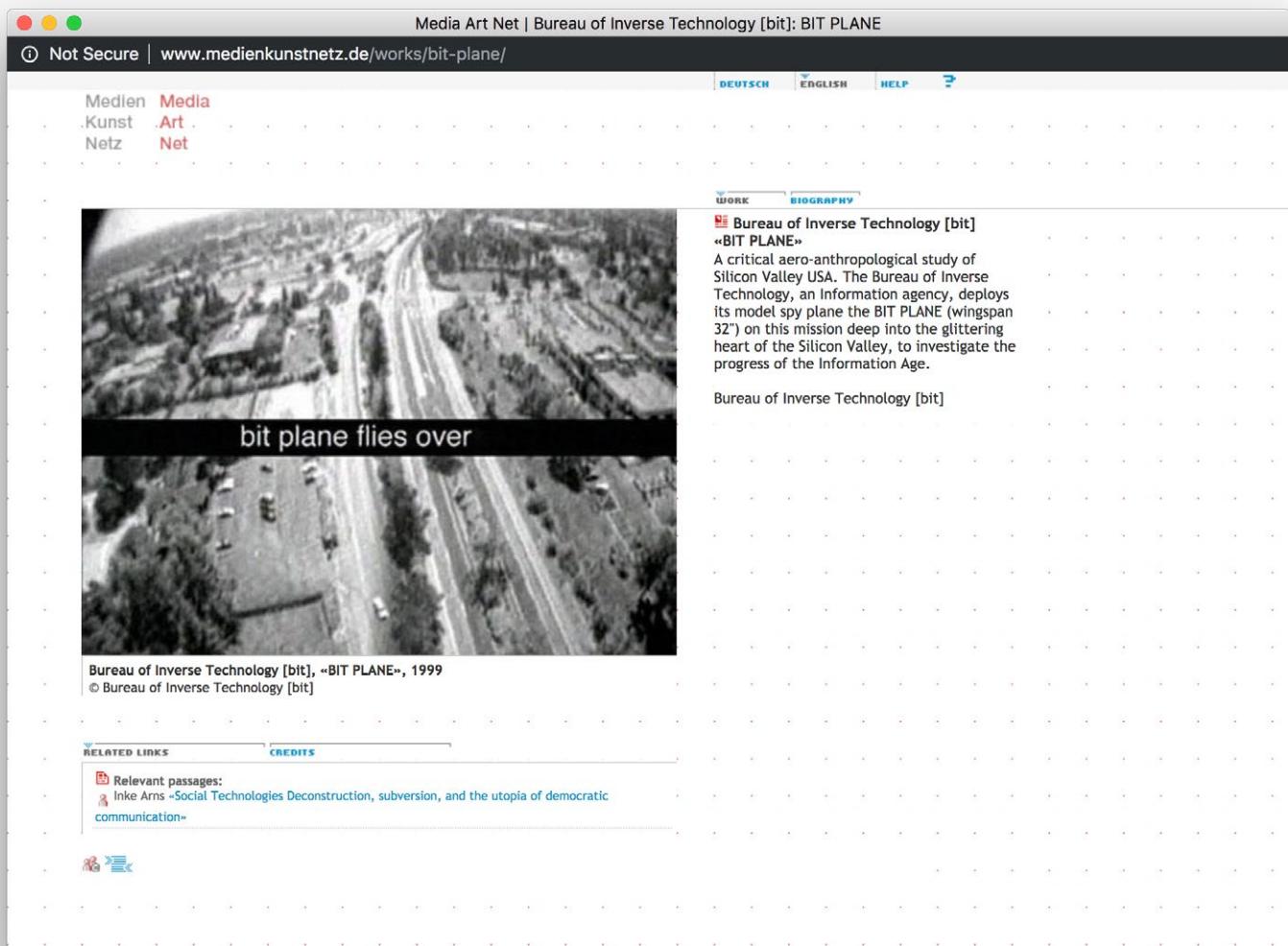
Example view of an artwork record: A prominent access point, title, description and few other metadata entries are featured near the top of the page.

Reference URL: <http://turbulence.org>

Date of screenshots: 2018-05-14

Notes: Participants in the user studies did not find the collection overview particularly useful, nor the metadata provided with each artwork record sufficient.

Media Kunst Netz (legacy database)



Example view of an artwork record 1: Features include image thumbnail, short description and related citations.



Metadata related to
literature & events



Metadata clustering

Media Art Net | Jodi: walkmonster_start ()

① Not Secure | www.mediakunstnetz.de/works/walkmonster-start/

DEUTSCH ENGLISH HELP

Medien Media
Kunst .Art
Netz Net

WORK BIOGRAPHY

Jodi
«walkmonster_start ()»
On October 22, 2001, Jodi put an extensive text onto the international e-mail list Netttime. The text seemed to be a critical comment on contemporary political crises and wars and the way they were discussed on cultural platforms on the Web. But above all, the text turned out to be an impressive poetic work. The military order of linguistic and typographical features gave the text the appearance of an obsessively encoded inventory or a strategic diagram or plan. Readers who know both English and programming languages were also able to see that the poem is a functional source code in the programming language C. Indeed, the text is one part of a source code of Jodi's untitled game. This code is based on the source code of the commercial computer game Quake. By holding back the information about its origin and function, Jodi's e-mail made visible the esthetical and political subtexts of seemingly neutral sequences of technical commands.

36724***_p
Content-Type: text/plain; charset="us-ascii"

void up/soldier3
{
origin 0 -6 24
shake base
skin skin

frame soldier
frame soldiers
/*
*/

void() army_fice;
void() army_stand1 *{ Isoldiero, army_stand2 }
void() army_stand2 *{ Isoldiero, army_stand3 }
(is_stand1());
void() army_stand3 *{ Isoldiero, army_stand4 }
(is_stand2());
void() army_stand4 *{ Isoldiero, army_stand5 }
(is_stand3());
void() army_stand5 *{ Isoldiero, army_stand6 }
(is_stand4());
void() army_stand6 *{ Isoldiero, army_stand7 }
(is_stand5());
void() army_stand7 *{ Isoldiero, army_stand8 }
(is_stand6());
void() army_stand8 *{ Isoldiero, army_stand1 }
(is_stand7());

void() army_walk1 *{ Isoldiero, army_walk2 }
if (endwin) < 0.21
sound (self, CHAN_VOICE, "soldier/idle.wav", 1, ATTN_IDLE);
ai_walk1();
void() army_walk2 *{ Isoldiero, army_walk3 }
(is_walk1());

Jodi, «walkmonster_start ()», 2001
Screenshot | © Jodi

RELATED LINKS CREDITS

Categories: Internet
Keywords: Computer graphic | Interface | Material
Relevant passages:
Inke Arns -Read_me, run_me, execute_me. Code as Executable Text: Software Art and its Focus on Program Code as Performative Text.
Works by Jodi:
JET SET WILLY ©1984 OSS****

(Source: Florian Cramer, «Discordia Concors: www.jodi.org,» in: [plugin] / Tilman Baumgärtel / BüroFriedrich (eds.), *Install.exe-Jodi*, Basel, 2002)

Example view of an artwork record 2: Features include image thumbnail, short description and ‘Related links’, such as keywords, citations, as well as other works by the same artist.

Reference URL: <http://www.mediakunstnetz.de>

Date of screenshots: 2018-11-15

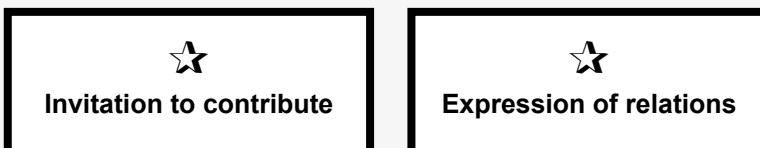
runme.org (legacy database)

This screenshot shows the homepage of runme.org. At the top, there's a navigation bar with links like 'front | latest | featured | categories | keywords | news archive | submit a project | read_me festival | about | faq | feedback'. Below the navigation is a search bar. The main content area is titled 'Collection overview by keywords.' It features a large grid of words categorized by decade (1960s, 1970s, 1980s, 1990s, 2000s) and various themes. To the right of the grid is a sidebar with a 'newcomers' sign-up link, a 'login' form, and sections for 'latest projects' and 'featured projects'.

Collection overview by keywords.

This screenshot shows a project page for 'naked-on-pluto' by Aymeric Mansoux, Maroës de Valk & Dave Griffiths. The page title is 'naked-on-pluto'. It includes a small logo of a stylized letter 'P'. Below the title is a brief description: 'Naked on Pluto proposes a playful yet disturbing online game world, developed with Free/ Libre Open Source Software, which parodies the insidiously invasive traits of much "social software". The city of "Elastic Versailles" is animated by the quirky combinatorial logics of a community of fifty seven AI bots that glean Facebook data from subscribers to the game.' A note below says 'Please read this disclaimer before downloading.' The sidebar on the right is identical to the one in the first screenshot, showing 'newcomers' sign-up, login, latest projects, and featured projects.

Example view of an artwork record.



The screenshot shows a web browser window for the runme.org website. The address bar indicates the site is not secure. The main content area displays a hierarchical list of categories under 'say it with software art!'. Categories include: algorithmic appreciation (2), appropriation and plagiarism (5), artificial intelligence (10), artistic tool (38), bots and agents (16), browser art (21), code art (24), conceptual software (31), data transformation (37), digital aesthetics r&d (12), digital folk and artisanship (20), existing software manipulations (8), and games (16). Each category has a sub-menu with specific items. To the right of the categories is a sidebar with sections for newcomers (sign up here), login (with email and password fields and a login button), forgot your password?, latest projects (naked on pluto, torrent.py, 100.000.000 stolen pixels, Excerpts From the Chronicles of Pookie & JR, Satromizer.pl, CodeSounding, Velato, Destroy the Web, [more]), and featured projects (LYCAY (Let Your Code.pLAY), Reject Me, Go-Logo, Outsource me!, The Invisible Hand Machine, aPpRoPiRaTe!, Towards a Permanently Temporary Software Art Factory, [more]).

Collection overview by categories.

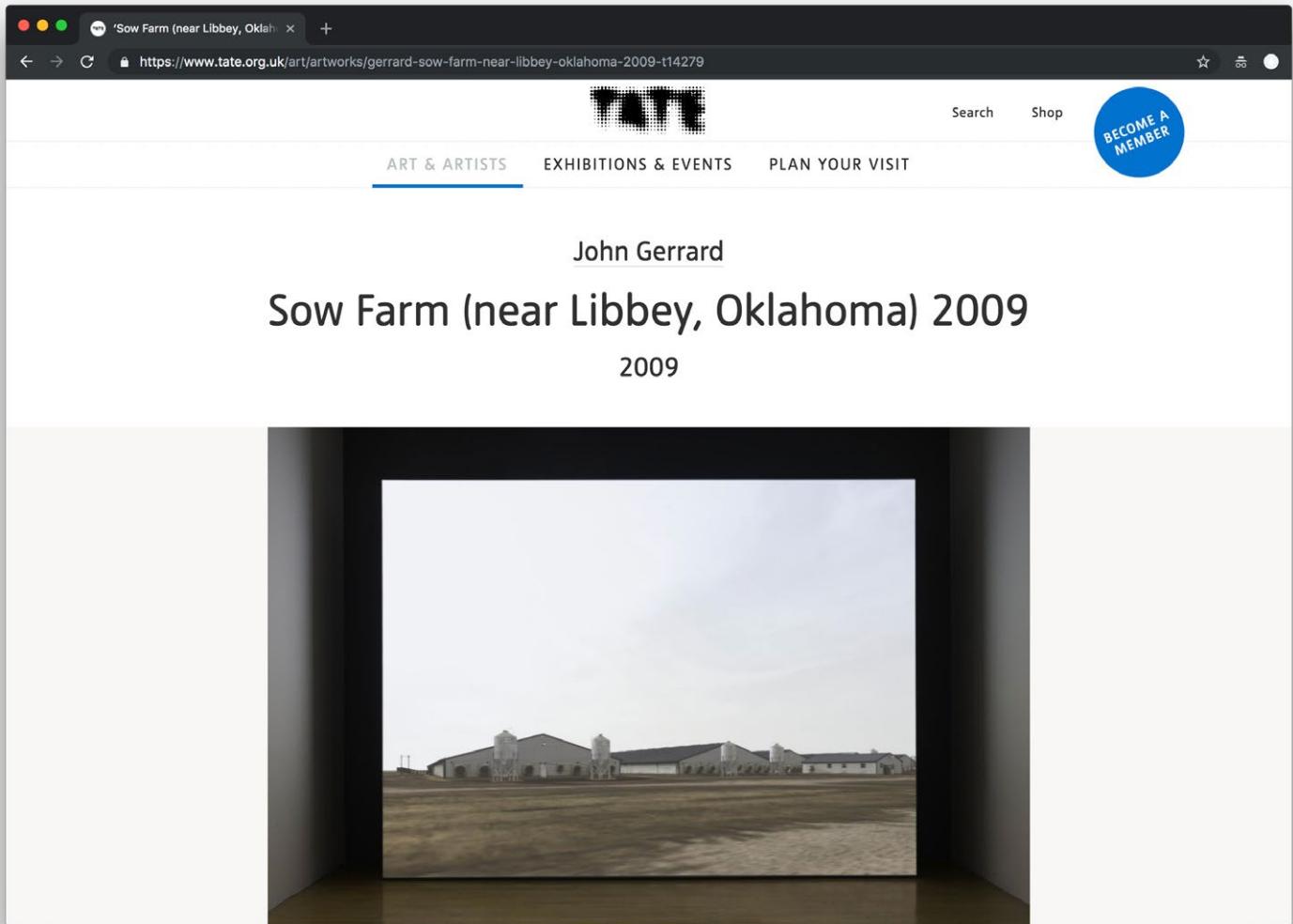
Reference URL: <http://runme.org>

Date of screenshots: 2018-11-15

Notes: One participant in the user studies commented on this site and its creative use of categories and keywords for organization. This approach, however, is only sustainable when information is consistently provided by artists within a purpose-built framework for artists' submissions. The early history of the ArtBase followed a similar path, but the ArtBase later developed different collection policies.

2 Interfaces for artwork records in institutional collections

Tate (UK)



Example view of an artwork record: An image slideshow is featured near the top of the page.



Access statement

SUMMARY

John Gerrard's *Sow Farm (Near Libby, Oklahoma) 2009* 2009 is a digital projection that depicts a huge, unmanned, entirely computer-controlled agricultural complex set on the American Great Plains. Presented as a single screen projection, the pig farm, desolate and sprawling, is depicted with blank dispassion. Although based on photographs taken on location by the artist, the work itself has been painstakingly constructed by Gerrard and a number of collaborators over many months using Realtime 3D, a computer software that is used primarily in the video-gaming industry. Gerrard has developed a distinctive engagement with the possibilities of this software since his discovery of it in the late 1990s. Realtime 3D involves creating three-dimensional objects through the software and displaying them on a screen almost immediately. The computer-generated image is deemed to be 'real time' because the software renders it on screen without any delay time.

Gerrard has described the process of making his works using Realtime 3D: 'I take my camera, walk around this facility and take four or five thousand pictures of it. We use that to remake it as a 3D model which is then clad in photographs to make almost a three-dimensional photograph. What you produce is a piece of software, which is a set of instructions which are then executed to produce this vision.' (Quoted in *Tate Shots* 2016, accessed 29 August 2018.) The results are eerie virtual portraits of real places which offer a strange and sometimes

NOT ON DISPLAY	
ARTIST	John Gerrard born 1974
MEDIUM	Realtime 3D projection, single screen, colour
DIMENSIONS	Duration: 365days
COLLECTION	Tate
ACQUISITION	Purchased with funds provided by The Ampersand Foundation in memory of Michael Stanley 2015
REFERENCE	T14279

Example view of an artwork record: Descriptive text and other metadata available for the record are featured near the bottom of the page.

Reference URL: <https://www.tate.org.uk>

Date of screenshots: 2018-11-15

Notes: Tate classify all their born-digital artworks as time-based media and use the field "medium" (which is part of the traditional museum CMS structure) to record basic requirements for the artwork performance such as "single screen" or "color". The discrepancy between dimensions and durations reveals the limits of the CMS in use in the gallery, which only serves traditional items in the collection. The "Not on Display" disclaimer can be argued to serve as an access statement.

MoMA (US)

The screenshot shows the MoMA website with the URL https://www.moma.org/collection/works/202995?classifications=39&include_uncatalogued_works=1&locale=en&page=1. The page features the MoMA logo and navigation links for 'Plan your visit', 'Exhibitions and events', 'Art and artists' (underlined), 'Store', and a search icon. A large image of the artwork is displayed, followed by descriptive text: 'Not on view', 'Medium: Live simulation and story (color, sound)', 'Dimensions: Infinite duration', 'Credit: Fund for the Twenty-First Century', 'Object number: 248.2016', 'Copyright: © 2018 Ian Cheng. Courtesy of the Artist', 'Department: Media and Performance Art', and a note about research being incomplete. There are also links to 'Ian Cheng has 2 works online.' and '72 software works online.'

Example view of an artwork record 1: An image slideshow is featured near the top of the page.

The screenshot shows the MoMA website with the same URL as the previous screenshot. The page layout is identical, but the bottom section contains more detailed structured metadata. It includes: 'Medium: Live simulation and story (color, sound)', 'Dimensions: Infinite duration', 'Credit: Fund for the Twenty-First Century', 'Object number: 248.2016', 'Copyright: © 2018 Ian Cheng. Courtesy of the Artist', 'Department: Media and Performance Art', and a note about research being incomplete. Additionally, it features links to 'Ian Cheng has 2 works online.' and '72 software works online.'

Example view of an artwork record 1: Structured metadata is featured near the bottom of the page. There are also links to suggested query results for related works at the right hand side of the page.



Structured data



Links to related queries



Invitation to contribute

Example view of an artwork record 1: Licensing information is provided near the bottom of the page.

A screenshot of a web browser displaying a MoMA artwork record. The URL in the address bar is https://www.moma.org/collection/works/202995?classifications=39&include_uncataloged_works=1&locale=en&page=1. The page title is "Ian Cheng, Emissary In the Square". The navigation menu includes "Plan your visit", "Exhibitions and events", "Art and artists" (which is underlined), "Store", and a search icon. A sub-menu for "Licensing" is open. The main content area contains text about reproduction rights for MoMA's collection and publications, mentioning Art Resource and Scala Archives. It also discusses licensing for motion picture film footage, pointing to the Film Study Center and the Circulating Film and Video Library. At the bottom, there is a note about reproducing text from MoMA publications or moma.org, with an email address: text_permissions@moma.org. The footer of the page includes standard links like "Top ↑", "About us", "Support", "Research and learning", and "Magazine".

Example view of an artwork record 1: There is also an option to contribute metadata or suggest corrections.

A screenshot of a web browser displaying a MoMA artwork record. The URL in the address bar is https://www.moma.org/collection/works/202995?classifications=39&include_uncataloged_works=1&locale=en&page=1. The page title is "Ian Cheng, Emissary In the Square". The navigation menu includes "Plan your visit", "Exhibitions and events", "Art and artists" (underlined), "Store", and a search icon. A sub-menu for "Feedback" is open. The main content area contains a note stating that the record is a "work in progress" and encourages users to send feedback to digital@moma.org. The footer of the page includes standard links like "Top ↑", "About us", "Support", "Research and learning", and "Magazine".

Reference URL: <https://www.moma.org>

Date of screenshots: 2018-11-15

Notes: MoMA group their born-digital artworks in categories such as “website” and “software”. Information on “medium” varies widely across these artwork categories without an apparent consistent pattern of application. It appears to function as a catch-all field in the CMS. The discrepancy between dimensions and duration reveals same traditional-media bias in the CMS here, as seen in the Tate example. The use of structured metadata allows the construction of natural language ‘suggestions’ for queries which produce lists of related results. The invitation to the public to contribute (albeit via email, rather than database login) is a growing trend in US cultural institutions.

MoMA (US) continued

The screenshot shows a web browser window for the MoMA collection page. The URL is https://www.moma.org/collection/works/163892?classifications=40&date_begin=Pre-1850&date_end=2018&include_uncataloged_works=1&locale=en&page=1. The page title is "Fernanda Bertini Viégas, Marti". The navigation bar includes "Plan your visit", "Exhibitions and events", "Art and artists" (underlined), "Store", and a search icon. A large image of a wind map of the United States is displayed above the text. Below the image, the artist names "Fernanda Bertini Viégas, Martin Wattenberg" and the title "Wind Map" are shown, along with the year "2012". A "Not on view" button is visible. To the right, there is a sidebar with links: "Fernanda Bertini Viégas has 2 works online.", "Martin Wattenberg has 2 works online.", "There are 9,860 design works online.", and "There are 2 websites online.". A note at the bottom left states: "Gallery label from Applied Design, March 2, 2013–January 31, 2014." Navigation arrows are at the bottom right.

Example view of an artwork record 2: Image, text description and links to related queries are featured near the top of the page.

The screenshot shows a web browser window for the MoMA collection page. The URL is https://www.moma.org/collection/works/163892?classifications=40&date_begin=Pre-1850&date_end=2018&include_uncataloged_works=1&locale=en&page=1. The page title is "Fernanda Bertini Viégas, Marti". The navigation bar includes "Plan your visit", "Exhibitions and events", "Art and artists" (underlined), "Store", and a search icon. Below the navigation, there is a list of metadata: "Medium Interactive software", "Credit Gift of the designers", "Object number 1751.2012", "Copyright © 2018 Fernanda Bertini Viégas and Martin Wattenberg", and "Department Architecture and Design". At the bottom, a section titled "Installation views" is shown with the text: "We used machine learning to identify this work in photos from our exhibition history." Navigation arrows are at the bottom right.

Example view of an artwork record 2: Through a machine-learning experiment with Google Labs, some artwork records also feature installation views.

Reference URL: <https://www.moma.org>

Date of screenshots: 2018-11-15

Whitney Museum of American Art (US)

The screenshot shows a website page for the Whitney Museum of American Art. At the top, there's a navigation bar with links for VISIT, EXHIBITIONS, EVENTS, ART & ARTISTS, LEARN, SHOP, a search icon, BUY TICKETS, and BECOME A MEMBER. Below the navigation, a title reads "Douglas Davis" and "THE WORLD'S FIRST COLLABORATIVE SENTENCE 1994-, CONSERVED 2012". To the right of the title is a search bar with "Search by artist, artwork, or credit line" and a "SEARCH" button. There are also collection filters: "Collection" (radio button selected) and "Rest of site". Below the title, there's a thumbnail image of a computer screen displaying a video titled "The World's First...". To the right of the image, detailed metadata is listed:

Artist Douglas Davis (1933-2014)	Medium Website (HTML)	Credit line Whitney Museum of American Art, New York; Whitney Museum of American Art, New York; gift of Barbara Schwartz in honor of Eugene M. Schwartz 95.253. Originally commissioned by the Lehman College Art Gallery, The City University of New York, with the assistance of Gary Welz, Robert Schneider, and Susan Hoeltzel.
Title The World's First Collaborative Sentence	Dimensions Dimensions variable	Accession number 95.253
Date 1994-, conserved 2012		Rights and Reproductions Information © artist or artist's estate

Example view of an artwork record: Only an image thumbnail and minimal amount of metadata for the record are provided.



Reference URL: <http://collection.whitney.org>

Date of screenshots: 2018-11-15

Notes: The medium is given as “website (HTML)”, but there are no other fields where more detailed preservation or performance-related information can be provided. The dimensions field here, once again, reveals the limits of the CMS in use in the museum, which serves traditional items in the collection better.

Guggenheim (US)

The screenshot shows the Guggenheim Collection Online website. At the top, there's a navigation bar with links for ARTISTS, VENUES, MEDIUMS, SPECIAL COLLECTIONS, DATES, and MOVEMENTS. On the left, a sidebar menu includes VISIT, ART, ENGAGE, JOIN & GIVE, RESEARCH, ABOUT, SHOP, and a SEARCH bar. A message at the bottom of the sidebar says "OPEN TOMORROW 10 AM–5:45 PM". The main content area features a grid of images from the artwork "Brandon" by Shu Lea Cheang, which consists of various photographs and text elements like "SWAP" and "EXPOSURE". To the right of the images, descriptive text and metadata are provided:

Shu Lea Cheang
Brandon
In 1993 Brandon Teena (born Teena Renae Brandon), a young transgender man, was raped and murdered in Nebraska when it was discovered that he was anatomically female. Shu Lea Cheang's 1998 work *Brandon* is a multifaceted web project that uses the nonlinear and participatory nature of the Internet as a means to explore and illuminate Brandon Teena's tragic story. From the opening image of morphing gender signifiers, Cheang propels the viewer into a probing investigation of human sexuality. It is an inquiry that utilizes hyperlinked images of a disembodied human form, once-live chat rooms on the subject of crime and punishment, and graphic moving

ARTIST
[Shu Lea Cheang](#)
b. 1954, Taiwan

TITLE
Brandon

DATE
1998–99

MEDIUM
Interactive networked code (html, Java, Javascript and server database)

Example view of an artwork record: Representative image, descriptive text and some metadata elements are featured near the top of the page.



The screenshot shows a web browser window with the URL <https://www.guggenheim.org/artwork/15337>. The page is titled "Brandon" and features the Guggenheim logo on the left. A sidebar on the left includes links for VISIT, ART, ENGAGE, JOIN & GIVE, RESEARCH, ABOUT, SHOP, and SEARCH. A banner at the bottom of the sidebar says "OPEN TOMORROW 10 AM-5:45 PM". The main content area is titled "Shu Lea Cheang" and "Brandon". It describes the artwork as a multifaceted web project from 1998 that explores Brandon Teena's tragic story through nonlinear and participatory means. The page also lists metadata such as artist, title, date, medium, dimensions, credit line, accession number, copyright, artwork type, and movement. The text is presented in a clean, modern layout with some sections in bold.

Shu Lea Cheang
Brandon

In 1993 Brandon Teena (born Teena Renae Brandon), a young transgender man, was raped and murdered in Nebraska when it was discovered that he was anatomically female. Shu Lea Cheang's 1998 work *Brandon* is a multifaceted web project that uses the nonlinear and participatory nature of the Internet as a means to explore and illuminate Brandon Teena's tragic story. From the opening image of morphing gender signifiers, Cheang propels the viewer into a probing investigation of human sexuality. It is an inquiry that utilizes hyperlinked images of a disembodied human form, once-live chat rooms on the subject of crime and punishment, and graphic moving images in order to illuminate the wide-reaching effect of Brandon's life and death. Exploiting the highly mutable "skin" of the Internet, Cheang reveals how this emerging virtual environment enables individuals to inhabit and play with different gender roles and characters. A prime example of "cyberfeminism," *Brandon* utilizes technology as a means to break down social assumptions about gender in both the realm of technology and in society at large.

Originally presented in conjunction with the Society for Old and New Media (DeWaag) in the Netherlands, *Brandon* was not only a website, but for one year also served as a social and academic space through which a broad audience communicated both casually and as participants in a number of organized events. Staged in physical spaces but broadcast and represented online, two notable events, "Digi Gender Social Body: Under the Knife, Under the Spell of Anesthesia" and "Would the Jurors Please Stand Up," blurred the distinctions between online and offline platforms and highlighted the far-reaching capabilities of the early Internet.

Notable for being the Guggenheim Museum's first official engagement with the then-emerging medium of Internet art and one of the first works of this medium commissioned by a major institution, *Brandon* is often cited as a watershed moment for the movement and for its important place in the history of contemporary art.

ARTIST
Shu Lea Cheang
b. 1954, Taiwan

TITLE
Brandon

DATE
1998–99

MEDIUM
Interactive networked code (html, Java, Javascript and server database)

DIMENSIONS
dimensions vary with installation

CREDIT LINE
Solomon R. Guggenheim Museum, New York Commissioned by the Solomon R. Guggenheim Museum, and produced in association with the Waag Society for Old and New Media, The Institute on the Arts and Civic Dialogue at Harvard University, and The Banff Centre, with additional funding from The Bohem Foundation, The Rockefeller Foundation, the New York Foundation for the Arts, and the Mondriaan Foundation

ACCESSION
2005.44

COPYRIGHT
© Shu Lea Cheang

ARTWORK TYPE
Internet Art

MOVEMENT
Networked art

Example view of an artwork record: Descriptive text and other metadata elements continue further on the page.

Reference URL: <https://www.guggenheim.org>

Date of screenshots: 2018-11-15

Notes: As with other museum interfaces, the "dimensions" metadata field here once again is of no use. The metadata field "medium" here is used to provide some high level of technical information, but as noted in discussion with conservators, this information can quickly become outdated and won't necessarily hold true for preserved variants of the artwork. This interface uses the field "artwork type" to differentiate internet artworks from other works in the collection such as paintings, sculptures, etc. There is also a "movement" term associated with the artwork. This latter field is something curators might assign to artworks they have selected for collection acquisition, but is likely to be harder to define with a collection driven by artists' submissions.

SFMOMA (US)

The screenshot shows a web browser window for the SFMOMA website. The URL is https://www.sfmoma.org/artwork/2008.230. The page features a large, artistic image at the top depicting a close-up of a face with red eyes and lips, overlaid with digital and organic elements like a DNA helix and a grid. To the right of the image is a 'CONNECT' interface titled 'AGENT RUBY'S EDREAM PORTAL'. It includes text input fields for 'Ruby:' and 'Seeker:', and buttons for '[Put Ruby on your Palm]' and '[Info]'. Below the interface are links to 'rosetta's research' and 'lynnhershman.com'. The SFMOMA logo is in the top right corner, and a search bar is on the far right.

Example view of an artwork record: A representative image occupies the top of the page.

☆
Access statement

Lynn Hershman Leeson, Agent

<https://www.sfmoma.org/artwork/2008.230>

SFMOMA

Artwork Image Artwork Info

Artwork Info

Artwork title	Agent Ruby	Date acquired	2008
Artist name	Lynn Hershman Leeson	Credit	Collection SFMOMA
Date created	1999-2002	Copyright	Gift of bitforms gallery, Gallery Paule Anglim, and the artist © Lynn Hershman Leeson
Classification	digital media	Permanent URL	https://www.sfmoma.org/artwork/2008.230
Medium	web project	Artwork status	View this work online

Other Works by Lynn Hershman Leeson

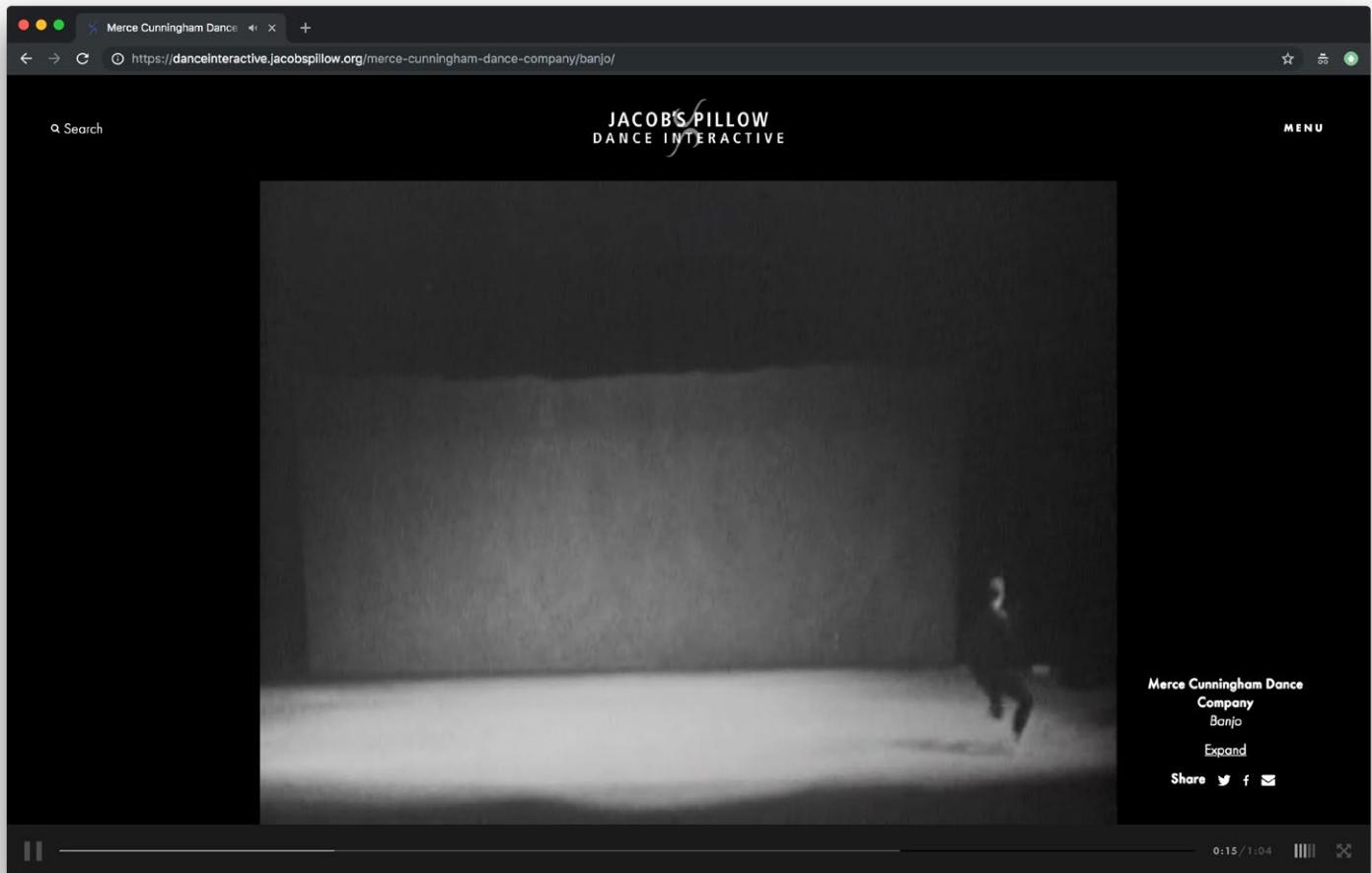
Example view of an artwork record: Several relevant metadata elements, as well as more works by the artist, are featured near the bottom of the page.

Reference URL: <https://www.sfmoma.org>

Date of screenshots: 2018-11-15

Notes: The work here is classified as “digital media”. The metadata field “medium” is used only to imply the work is web-based—“web project”. The “permanent URL” is a new element not present in other museum interfaces, but is crucial for all web-based works. Also the “status” of the artwork is made more explicit as part of the metadata record, which is helpful. In comparison, Guggenheim’s restored version of Brandon is only accessible from a text link in the artwork description (without even revealing the URL of the link). Making the access point a clear statement, part of the metadata record, is a much more effective user interaction pattern. Admittedly, some of the other museum interfaces provide a label, such as “not on display” or “not on view”, which is also a form of access statement, but they don’t actually make the works available online, which is the ArtBase’s aim.

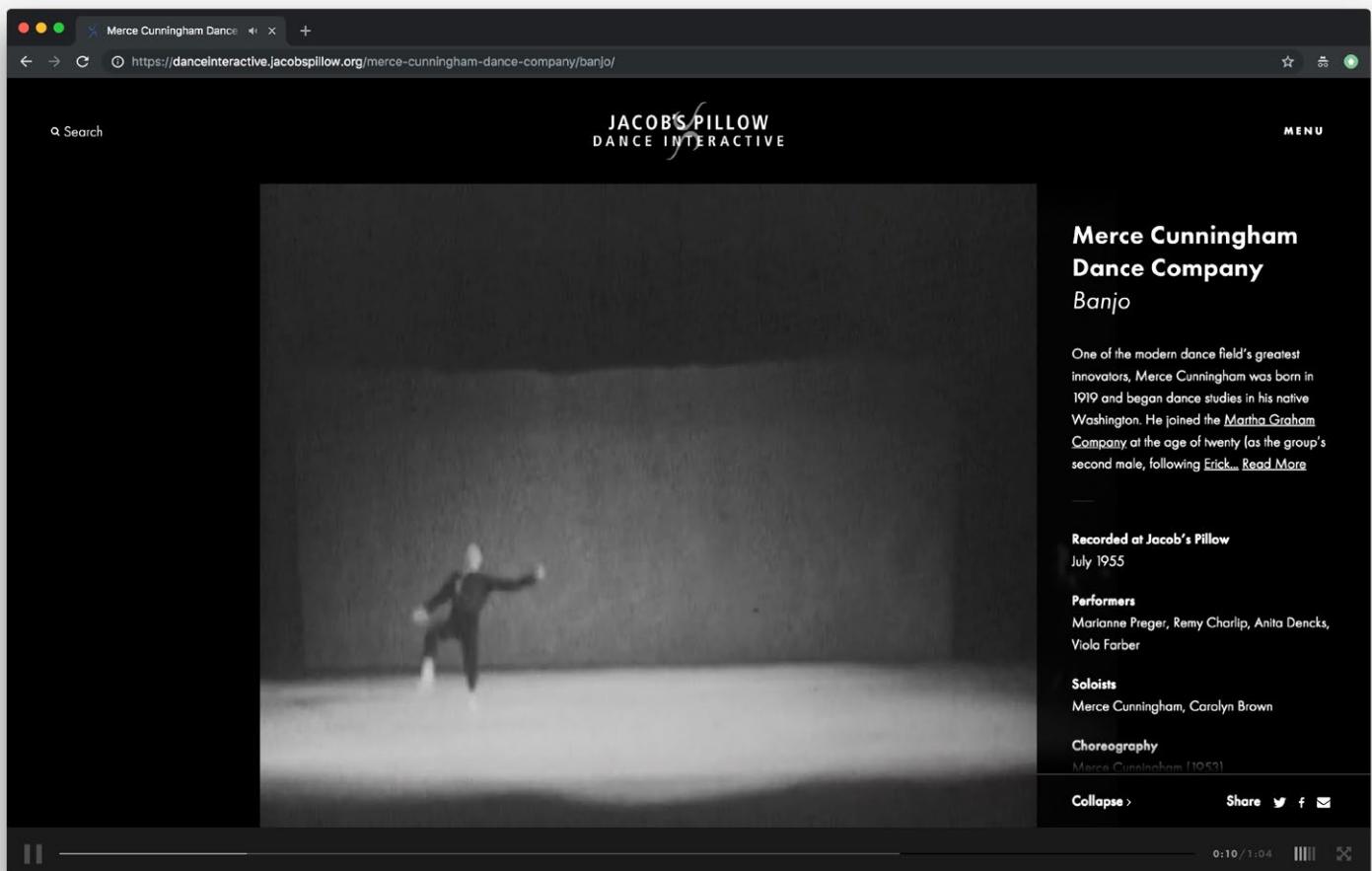
Jacob's Pillow Dance Archive (US)



Example view of an artwork record: Video representation featured at the top of the page.



**Metadata in collapsed
sidepanel**



Example view of an artwork record: Relevant metadata elements are available as an expandable/ collapsible sidepanel on the right side of the browser window.

Reference URL: <https://danceinteractive.jacobspillow.org>

Date of screenshots: 2018-11-20

Notes: While not an archive containing digital art, this archive was suggested by a participant in the user studies as a rare example of a performing arts archive. The collapsible metadata sidepanel is a relevant interaction pattern for a design framework presenting artwork reperformances in the ArtBase, e.g. via Webenact or emulated representations.

Cooper Hewitt (US)

The screenshot shows a digital artwork titled "DIGITAL PROJECT, TEN THOUSAND CENTS, 2007-08". It features a 100-dollar bill that has been divided into 10,000 equal parts. The main image shows a single piece of the bill. Below it, there is a small thumbnail of the entire 100-dollar bill. The page includes social sharing icons (Email, Print, Copy, etc.), a save button, and a note about the object's history and medium.

Example view of an artwork record: Image representation, followed by title, timeline, and a description compiled as natural language from structured data statements, are all featured near the top of the page.

This screenshot shows the same digital artwork record as above, but with additional content below. It includes a detailed description of the project, links to related objects like "Sidewall Alimony, 1977" and "Border, Pocket Change, ca. 1970", and a timeline at the bottom.

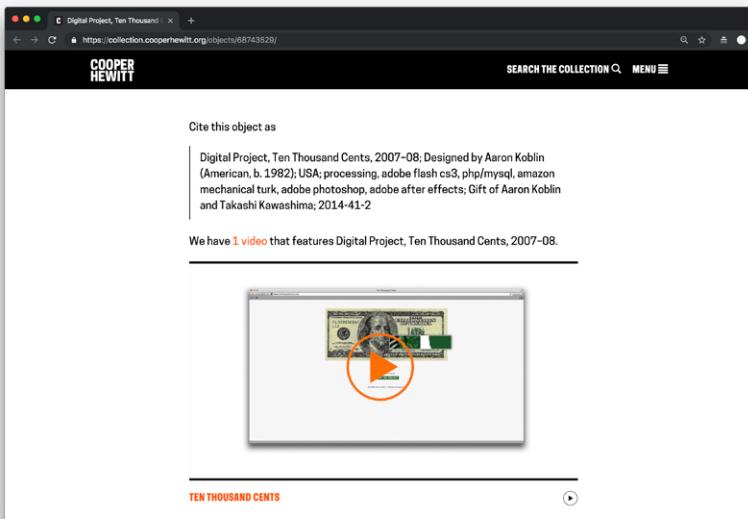
Example view of an artwork record: Links to suggested related works are featured further down the page.

★
Structured data

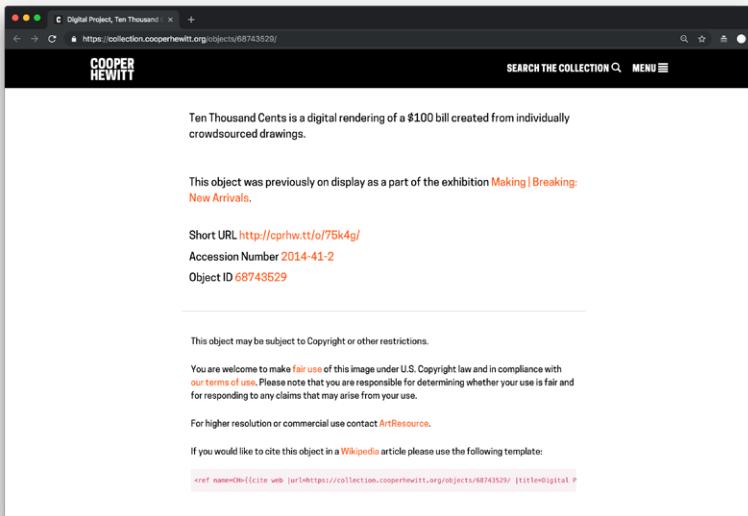
★
Natural language summary generated from structured data

★
Single-object timeline

Example view of an artwork record: Citation information and video documentation are featured near the bottom of the page.



Example view of an artwork record: Additional administrative metadata (identifiers and licensing) is also provided at the end of the record page.



Reference URL: <https://collection.cooperhewitt.org>

Date of screenshots: 2018-11-15

Notes: This museum interface doesn't provide access to born-digital artworks per se, but represents many of the widely-used contemporary paradigms in institutional interfaces. Structured data is utilized to enable multiple relations across the collection to be drawn. Additionally, the natural language descriptions generated from structured data were identified as a positive feature by multiple users during the user research. The timeline for the object history was also identified as useful, but at the same time frustrating due to lack of interactivity. One problem for longer, richer records in this interface, however, appears to be the lack of clustering or any other hierarchy of organization for metadata, as unrelated statements run on into each other without discernable visual distinction (as partly illustrated in the screenshots).

Rijksmuseum (NL)

The screenshot shows a detailed view of the painting 'The Milkmaid' by Johannes Vermeer. At the top, there's a navigation bar with the title 'Rijks: The Milkmaid, Johannes Vermeer'. Below the image, a red button displays '18,301' with a heart icon, followed by icons for sharing, saving, and searching. To the right of the image are color swatches and a download button labeled 'Download image'. The main text area describes the painting as a maid pouring milk, noting Vermeer's use of light and color. It also mentions its display in the Eregalerij. Below this, a section titled 'Collections with this work' lists other artworks by Vermeer and others, each with a thumbnail image.

i

X The Milkmaid, Johannes Vermeer, c. 1660

oil on canvas, h 45.5cm x w 41cm [More details](#)

A maid servant pours milk, entirely absorbed in her work. Except for the stream of milk, everything else is still. Vermeer took this simple everyday activity and made it the subject of an impressive painting – the woman stands like a statue in the brightly lit room. Vermeer also had an eye for how light by means of hundreds of colourful dots plays over the surface of objects.

On display in Eregalerij

Collections with this work

Johannes Vermeer

RUKS MUSEUM

Schilderijen

Gorm Tigh
14 hours ago - 21 works • 49 ★ 0

dada magazine

diane
3 hours ago - 6 works • 4 ★ 0

Example view of an artwork record: High-res image and brief description are featured at the top of the page, alongside other user interaction prompts.

- ★
Metadata clustering
- ★
Metadata in collapsible element
- ★
Access statement
- ★
Expression of relations

The screenshot shows a detailed metadata record for the painting 'The Milkmaid' by Johannes Vermeer. The record is organized into several sections: Identification, Creation, Material and Technique, Subject, Acquisition and rights, Relations, and Documentation. The 'Subject' section is expanded, listing various concepts related to the painting. The 'Documentation' section lists a reference URL and a date.

Identification	Title(s)	The Milkmaid
	Object type	painting
	Object number	SK-A-2344
	Description	Een dienstmaagd staat achter een tafel en schenkt melk uit een melkkannetje in een kookpot. Op de tafel staat een mand met brood en een stenen kruik, links een venster met een rieten mand en een koperen pot. Onderaan de muur rechts een rijtje tegels en een stoofje.
Creation	Artist	painter: Johannes Vermeer
	Dating	c. 1660
Material and Technique	Physical features	oil on canvas
	Material	canvas, oil paint (paint)
	Measurements	h 45.5 cm x w 41 cm
Subject	What	<ul style="list-style-type: none"> • kitchen-maid, kitchen servant • milkmaid • milk • bread, loaf • foot-stove • container of ceramics: jar, jug, pot, vase
Acquisition and rights	Credit line	Purchased with the support of the Vereniging Rembrandt
	Acquisition	1908
	Copyright	Public domain
Relations	Related	Glorie van de Gouden Eeuw: De Keukenmeid
Documentation		<ul style="list-style-type: none"> • Vermeer : the life and work of a master, J. Henderson, V. Schiferli

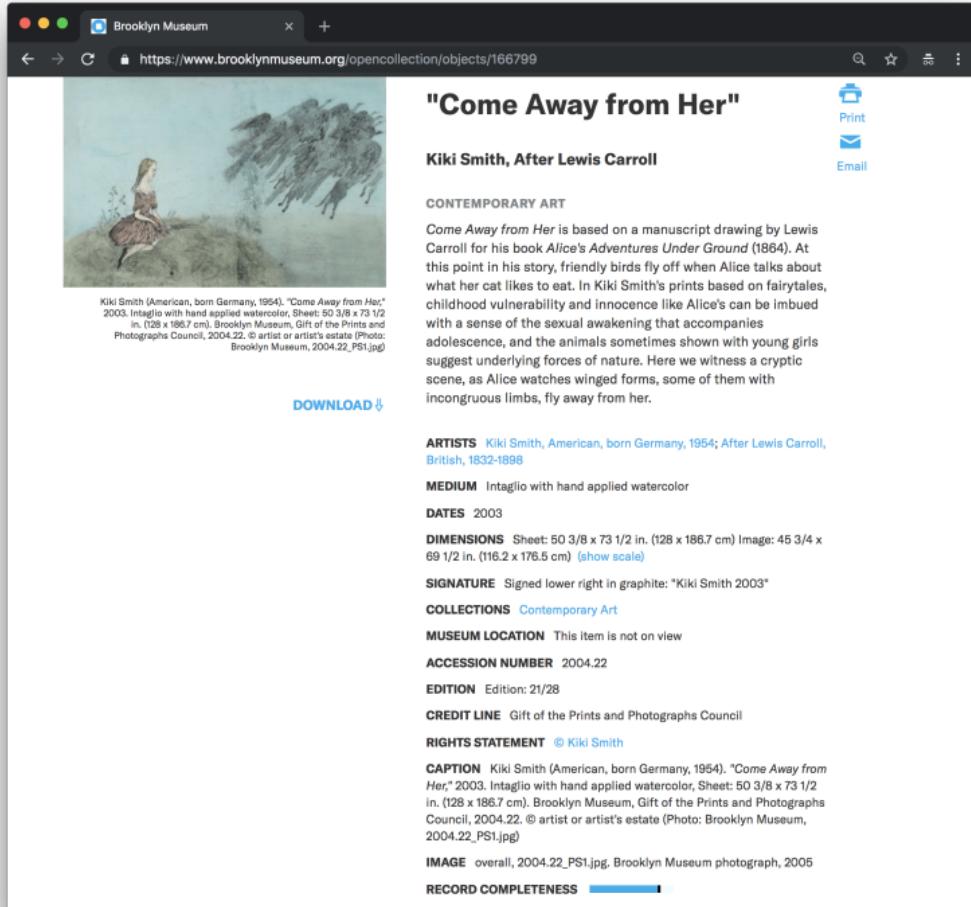
Example view of an artwork record: Relevant metadata elements are available as a long list of clusters, which are collapsed by default, but the user can expand by clicking an “Object data” button.

Reference URL: <https://www.rijksmuseum.nl>

Date of screenshots: 2018-05-14

Notes: This museum interface doesn't provide any access to born-digital artworks, but represents many of the widely-used contemporary paradigms in institutional interfaces. Providing different levels of detail at different steps in the user interface (via scroll/ collapsible elements) is a good example of how to cater to a wide variety of use-cases. Clustering relevant data under headings, and making relations explicit and explorable, are also helpful strategies for making large amounts of data more accessible for human reading vs machine processing.

Brooklyn Museum (US)



The screenshot shows a web browser window for the Brooklyn Museum's website. The URL is https://www.brooklynmuseum.org/opencollection/objects/166799. The main content is an artwork titled "Come Away from Her" by Kiki Smith, After Lewis Carroll. The image is a black and white intaglio print with hand-applied watercolor, depicting a young girl sitting on a grassy hill looking up at birds flying away. Below the image is a descriptive text block. To the right of the image are three buttons: Print, Email, and a menu icon. Further down are sections for ARTISTS, MEDIUM, DATES, DIMENSIONS, SIGNATURE, COLLECTIONS, MUSEUM LOCATION, ACCESSION NUMBER, EDITION, CREDIT LINE, RIGHTS STATEMENT, CAPTION, and IMAGE. At the bottom is a progress bar labeled RECORD COMPLETENESS.

"Come Away from Her"

Kiki Smith, After Lewis Carroll

CONTEMPORARY ART

Come Away from Her is based on a manuscript drawing by Lewis Carroll for his book *Alice's Adventures Under Ground* (1864). At this point in his story, friendly birds fly off when Alice talks about what her cat likes to eat. In Kiki Smith's prints based on fairytales, childhood vulnerability and innocence like Alice's can be imbued with a sense of the sexual awakening that accompanies adolescence, and the animals sometimes shown with young girls suggest underlying forces of nature. Here we witness a cryptic scene, as Alice watches winged forms, some of them with incongruous limbs, fly away from her.

ARTISTS Kiki Smith, American, born Germany, 1954; After Lewis Carroll, British, 1832-1898

MEDIUM Intaglio with hand applied watercolor

DATES 2003

DIMENSIONS Sheet: 50 3/8 x 73 1/2 in. (128 x 186.7 cm) Image: 45 3/4 x 69 1/2 in. (116.2 x 178.5 cm) [\(show scale\)](#)

SIGNATURE Signed lower right in graphite: "Kiki Smith 2003"

COLLECTIONS Contemporary Art

MUSEUM LOCATION This item is not on view

ACCESSION NUMBER 2004.22

EDITION Edition: 21/28

CREDIT LINE Gift of the Prints and Photographs Council

RIGHTS STATEMENT © Kiki Smith

CAPTION Kiki Smith (American, born Germany, 1954). "Come Away from Her," 2003. Intaglio with hand applied watercolor, Sheet: 50 3/8 x 73 1/2 in. (128 x 186.7 cm). Brooklyn Museum, Gift of the Prints and Photographs Council, 2004.22. © artist or artist's estate (Photo: Brooklyn Museum, 2004.22_PS1.jpg)

IMAGE overall, 2004.22_PS1.jpg. Brooklyn Museum photograph, 2005

RECORD COMPLETENESS █

Example view of an artwork record: Image thumbnail, descriptive text and a list of metadata statements are featured near the top of the page.

RECORD COMPLETENESS █

Not every record you will find here is complete. More information is available for some works than for others, and some entries have been updated more recently. Records are frequently reviewed and revised, and we welcome any additional information you might have.

The artwork record page also features a “record completeness” statement, which (upon click) explains the variation between records in the collections and invites contributions from the public.



Metadata richness
indicator



Invitation to contribute

Reference URL: <https://www.brooklynmuseum.org>

Date of screenshots: 2018-05-14

Notes: This museum interface is included in this review for its use of the concept of record completeness, or richness. This makes the explicit statement that the museum doesn't try to present an absolute truth, but rather that the collection and all archival records are a continuous work-in-progress. Also, this interface invites the public to contribute.

Auckland Museum (NZ)

Example view of an artwork record: Image thumbnail, descriptive text and a list of metadata statements are featured near the top of the page.

The screenshot shows a detailed view of an artwork record for a photograph titled "The ruins of Ypres Cathedral. N.Z. troops looking for souveniers." The page includes a header with search and navigation links, a main title, a library classification, and social sharing icons. Below the title is a large image of the photograph showing soldiers in the rubble of a cathedral. Metadata fields include description, other number, collection area, and record richness. There are also links for enquiring and adding to a collection. A "Catalogue" section provides a summary of the record's details.

CATALOGUE TITLE	The ruins of Ypres Cathedral. N.Z. troops looking for souveniers.
IDENTIFIERS	PH-ALB-419 (Reference Number)
CREATOR	Sanders, Henry Armytage Bradley, 1886-1936
PERIOD	1914-1918
DESCRIPTION	Hand written inscription reads: "The ruins of Ypres Cathedral. N.Z. troops looking for souveniers. 20/10/17." New Zealand soldiers looking through the rubble outside the heavily damaged leper Cathedral in Belgium.
COLLECTION	Official H Series

The artwork record page also features a “record richness” statement with a gradation of three possible states. The condition of the collection and the possibility of errors or omissions is stated at the bottom of the page, but there is no invitation for public contribution.

OTHER NUMBER
COLLECTION AREA
RECORD RICHNESS

PH-ALB-419

Indication of record richness

★
Metadata richness
indicator

Reference URL: <https://www.rijksmuseum.nl>

Date of screenshots: 2018-05-14

Notes: This museum interface is included in this review for its use of the concept of record completeness, or richness.

3 Interfaces for collection entry points

Victoria & Albert Museum (UK)

HOME VISIT WHAT'S ON COLLECTIONS LEARN JOIN & SUPPORT SHOP

From the Collections

From ancient Chinese ceramics to Alexander McQueen evening dresses, take an incredible journey through 5000 years of human creativity with our online collections.

LATEST

Postmodernism Embroidery Fashion in Motion Garry Fabian Miller

EXPLORE THE COLLECTIONS

SPACES PERIODS AND STYLES PEOPLE FEATURED MATERIALS AND TECHNIQUES PLACES

Raphael Cartoons Glass Sculpture

Knitting Embroidery Textiles

Tapestry Paintings Print

Ceramics Quilting and patchwork Cast collection

Photography

Want to discover more?
Dive into our collections online

SEARCH THE COLLECTIONS

BACK TO THE TOP

Victoria and Albert Museum

*Entry point to all collections:
Various collection categories,
represented via image
thumbnail surrogates give a
broad overview of collection
holdings.*

★
Overviews & previews

★
Curated selections

Entry point to a specific collection: Limited number of pre-set curated object previews are represented via image thumbnails, with the option to “show more”.

The screenshot shows the homepage of the Victoria & Albert Museum's Photography section. At the top, there is a navigation bar with links to HOME, VISIT, WHAT'S ON, COLLECTIONS, LEARN, JOIN & SUPPORT, and SHOP. A search icon is also present. The main header features the word "Photography" and "Photography Centre, Rooms 99–101". Below this is a large image of a group of people in white shirts and ties, some holding cameras, with the V&A logo overlaid. A "PLAN A VISIT" button is visible. The main content area includes a brief history of the collection, a "Photography Spotlight" section with a collage of images, and a "EXPLORING PHOTOGRAPHY" section with several thumbnail images of historical photographs. A "SHOW MORE" button is located at the bottom of this section.

Reference URL: <https://www.vam.ac.uk>

Date of screenshots: 2018-11-20

Notes: This museum interface doesn't provide access to born-digital artworks, but represents some contemporary paradigms in institutional interfaces, specifically the provision of some form of “overviews” and “previews” for what's in the collections. Despite lack of data visualizations, the general approach follows some of the principles of “generous interfaces” (see Whitelaw, 2015).

Tate (UK)

The screenshot shows the Tate (UK) website's search results page. At the top, there is a navigation bar with links for 'ART & ARTISTS', 'EXHIBITIONS & EVENTS', and 'PLAN YOUR VISIT'. A 'BECOME A MEMBER' button is located in the top right corner. Below the navigation, there is a search bar with the word 'Search' and a magnifying glass icon. Underneath the search bar is a horizontal menu with categories: 'All (127,679)', 'Artists (4,986)', 'Artworks (79,245)' (which is highlighted in blue), 'Exhibitions & Events (5,018)', 'Displays (128)', 'Archive Items (22,566)', 'Video & Audio (4,954)', 'In Depth (3,596)', and 'Location (104)'. A 'Refine your search' dropdown arrow is positioned to the right of the menu. Below this, it says 'Showing 1–20 of 79,245 results'. There are four cards displayed, each featuring a thumbnail image of a painting or artwork, the artist's name, the title, and the year. The first card is for Sir John Everett Millais' 'Ophelia' from 1851–2. The second is for Pablo Picasso's 'Bust of a Woman' from 1909. The third is for Roy Lichtenstein's 'Whaam!' from 1963. The fourth is for John Constable's 'Salisbury Cathedral from the Meadows' exhibited in 1831. Each card also includes a note indicating where the work is on display: 'On display at Tate Modern part of In the Studio' for Millais and Picasso, 'On display at Tate Modern part of Media Networks' for Lichtenstein, and 'On display at Tate Britain part of Turner Collection' for Constable.

Entry point to the collection: The interface offers overviews (in the form of categories) and previews (via image thumbnail surrogates).



Overviews & previews

Reference URL: <https://www.tate.org.uk>

Date of screenshots: 2018-11-15

Notes: This interface offers different ways to 'slice' the collection into categories, but does not take a generous approach in visualizing specific areas of the collection. The search box maintains the most prominent position in the interface.

Cooper Hewitt (US)

The screenshot shows the homepage of the Cooper Hewitt website. At the top, there's a navigation bar with links for 'COOPER HEWITT', 'SEARCH THE COLLECTION', and 'MENU'. Below the navigation, there are links for 'YOU', 'TOYS', and 'EXPLORE THE COLLECTION'. A 'RANDOM' button is also present. A large orange banner at the top says 'WELCOME TO OUR COLLECTION!'. Below the banner, there are three square images of objects from the collection: a colorful textile or book cover, a Christmas card with a winter scene, and another textile with a floral pattern. Each image has a small color palette below it. A link 'show me more things!' is located between the middle and right images.

This website represents Cooper Hewitt, Smithsonian Design Museum's diverse collection, spanning thirty centuries of historic and contemporary design, including [the world's coolest office](#), [a large snail shell](#), [snakes](#), [a dragon](#) and [four bearded men](#), [a cone propped up on a bench](#), [a pair of colorful hands](#), [a mysterious tv](#) and [a perpetual calendar](#).

Entry point to the collection: Six (random) object previews are featured, with option to “show more”. In addition, descriptive text offers various possible ‘routes’ through the collection.



Reference URL: <https://collection.cooperhewitt.org>

Date of screenshots: 2018-11-15

Notes: This interface takes a generous approach. Removing the search box from a central position on the page, it instead previews random items from the collection, which are reloaded each time a user launches the page. Additionally, the descriptive text provides more ‘fun’ entry points into the collection and conceptually links well to the way users can navigate via the natural language summaries which are generated from the structured data associated with each object.

MoMA (US)

The screenshot shows the MoMA collection search interface. At the top, there is a navigation bar with links to 'Plan your visit', 'Exhibitions and events', 'Art and artists' (which is underlined), 'Store', and a search icon. Below the navigation is a search bar labeled 'Search artists and works' with a magnifying glass icon. Underneath the search bar is a 'Filters' section with a dropdown menu set to 'Software (72)'. It also includes date filters 'Pre-1850 through 2018', a checkbox for 'Recent acquisition' (unchecked), and a checked checkbox for 'Include uncataloged works'. There are also two radio buttons for 'Has image' (unchecked) and 'On view' (unchecked). Below the filters, a message says 'Showing 72 out of 79,873 works online'. A row of five preview cards is shown, each with a small thumbnail image and the artist's name followed by the title and year. The first card is for Ian Cheng's 'Emissary Forks at Perfect'. The second card is for Ian Cheng's 'Emissary in the Squat o...'. The third, fourth, and fifth cards are for Andrew John Hessel's 'Synthetic PhiX174 Bact...' from 2014.

Showing 72 out of 79,873 works online

	Ian Cheng Emissary Forks at Perfect 2015 - 2016		Ian Cheng Emissary in the Squat o... 2015		Andrew John Hessel, Ja... Synthetic PhiX174 Bact... 2014						
--	---	--	---	--	--	--	--	--	--	--	--

Entry point to the collection: The search box is centred at the top of the page. Advanced search is facilitated via filters and previews (with image thumbnail surrogates).



Overviews & previews

The Collection | MoMA

Showing 68,750 out of 79,873 works online

Wyatt Kahn
Untitled
2018

Martirene Alcántara
Speculum (From the series)
2017

Archi-Union Architects,
"In Bamboo" Cultural Exchange
2017

Fiona Banner
The Vanity Press 2018
2017

Sofia Borges
Yellow Chalk
2017

Matthew Brannon
Concerning Vietnam: One
2017

Silvia Buonvicini
Sans titre
2017

Maurizio Cattelan
Untitled (for Parkett, no. 100)
2017

Marlene Dumas
Art Is/Always/Having to
2017

Shannon Ebner
PHOTORAMA
2017

Nicole Eisenman
Beer Garden with Big Holes
2012-17

Omer Fast
White Male Selfies (for /
2017

Entry point to the collection: Scrolling past the search box and filters, offers previews of everything in the collection (with image thumbnail surrogates).

Reference URL: <https://www.moma.org>

Date of screenshots: 2018-11-15

Notes: This interface offers different ways to “filter” the collection via categories and temporal dimensions, but does not take a generous approach in visualizing specific areas of the collection. The search box still holds the most prominent place in the interface.

Whitney Museum of American Art (US)

The screenshot shows the Whitney Museum of American Art's website. At the top, there is a navigation bar with links for VISIT, EXHIBITIONS, EVENTS, ART & ARTISTS, LEARN, SHOP, and a search icon. Below the navigation is a section titled "BROWSE ALL ARTISTS" with a grid of artist thumbnails. Each thumbnail includes the artist's name and the number of works in the collection. There are also filters at the top for "Works on view", "Recent acquisitions", "With texts", "With audio/video", and "For teachers". A search bar and a member sign-up link are also present.

BROWSE ALL ARTISTS

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Search by artist, artwork, or credit line **SEARCH**

Collection Rest of site

1 2 3 4 >
1–36 of 139

[Works on view](#) [Browse all artists](#) [Recent acquisitions](#) [With texts](#) [With audio/video](#) [For teachers](#)

 Berenice Abbott 3 works	 Matthew Abbott 1 work	 Zarouhie Abdalian 1 work	 Michele Abeles 3 works	 Sigmund Abeles 2 works	 Ida Abelman 2 works
 Satoru Abe 1 work	 Marina Abramovic 1 work	 Vito Acconci 11 works	 Keith Achonel		

Entry point to the collection: Some filters and sorting utilities are featured near the top of the page, followed by previews (with image thumbnail surrogates).



Overviews & previews

Reference URL: <https://collection.whitney.org>

Date of screenshots: 2018-11-15

Notes: This interface provides very few ways of discovering items in the collection without having a very specific search query (and search is also limited to knowing the exact artwork title or name of the artist). The use of previews does not mitigate this and casual browsing is poorly facilitated.

SFMOMA (US)

The screenshot shows the SFMOMA website's collection page. At the top, there's a navigation bar with links for 'Collection', 'Artist Interviews', 'Collecting Areas', 'Public Practice', and 'Research'. A 'Back to top' link is also present. Below the navigation, there are eight grid items, each featuring a thumbnail image and a caption with the artist's name, the title of the work, and its year.

Image	Caption
	Frank Lobdell <i>Summer 1965</i> 1965
	Martin Venezky <i>2001 Sundance Film Festival Postcard</i> 2000
	Henry Wessel <i>Civic Center Plaza, San Francisco, California</i> 1985
	Loom <i>Movement 4, from Thailand Unfolding House</i> 1994-1996
	Martin Venezky <i>Open, Number 3</i> 2000
	Dr. William J. Pierce <i>Spirit Photographs</i> 1902
	Judith Joy Ross <i>Susan Ravitz, Protesting the U.S. War in Iraq, Factor, Pennsylvania, from the series</i> 1991
	Henry Wessel <i>Untitled, from the series Continental Divide</i>

Entry point to the collection: Some overviews and previews are provided based on a limited number of categories (e.g. “collecting areas”).

★
Randomization

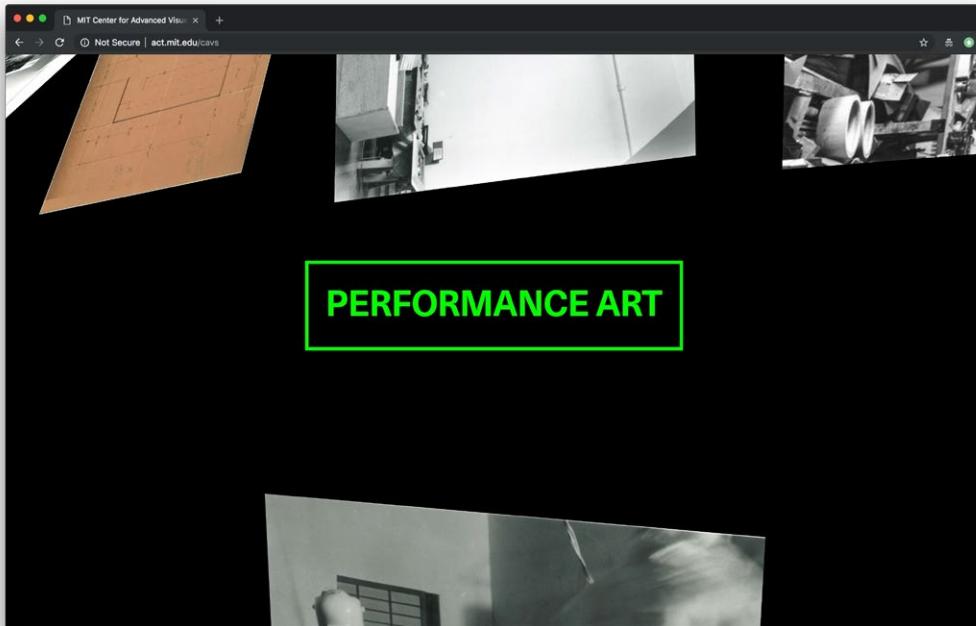
★
Overviews & previews

Reference URL: <https://www.sfmoma.org>

Date of screenshots: 2018-11-15

Notes: This interface takes an exploratory approach to the collection offering overviews and previews across a few different categories, but is more limited in scope compared to the V&A and Cooper Hewitt examples. Search box and filters are available as a second step via the “Explore the collection” button. It does feature eight random items from the collection (shown above), which reload every time the user visits the collection entry page.

MIT's Center for Advanced Visual Studies (CAVS) (US)



Entry point to the collection:
The collection can be
navigated via a randomized
3D environment of collection
materials.



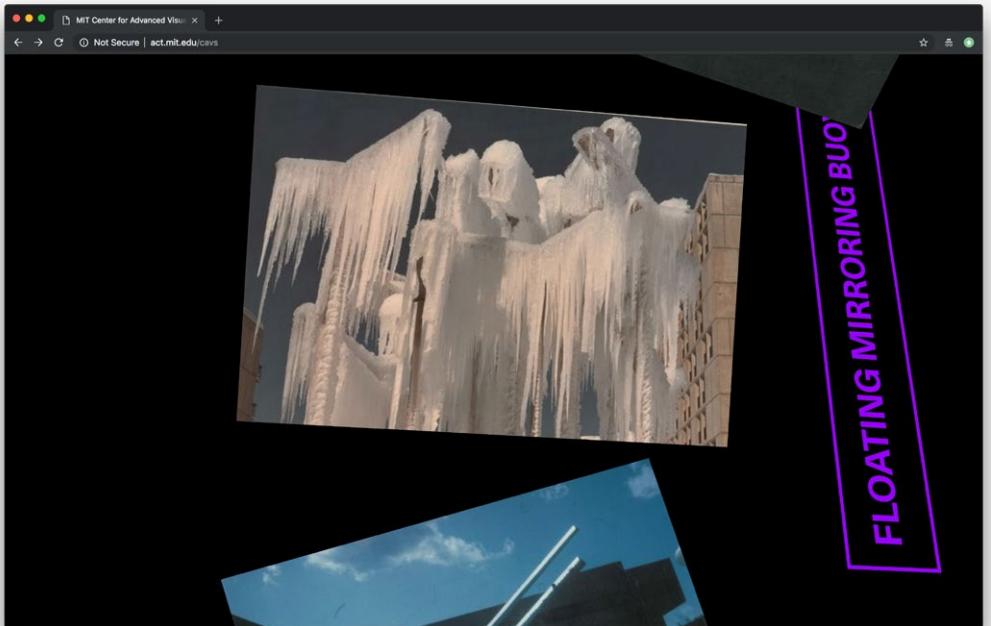
Entry point to the collection
(cont.).

★
Generous interfaces

★
Overviews & previews

★
Randomization

*Entry point to the collection
(cont.).*



Example view of an item record: An image and minimal amount of metadata represent the item.

A screenshot of a web-based item record for "Butler Fountain" by Carl Nesjar. The top half of the screen shows a photograph of the fountain, which consists of several large, thin, curved metal structures supported by a central pillar, set in a paved plaza. Below the image, the text "Part of: Butler Fountain by Carl Nesjar" is displayed. Underneath that, the title "Butler Fountain, 1983" is shown, followed by a descriptive sentence: "Photograph of CAVS Fellow Carl Nesjar's sculpture 'The Butler Fountain,' for the State University College at Buffalo. Photograph: unknown." At the bottom of the record, there is metadata information: "Subjects: Art works, Sculpture, Fountains Format: sculpture (visual works)" and "Holding Institution: Massachusetts Institute of Technology, Program in Art, Culture and Technology".

Reference URL: <http://act.mit.edu/cavs>

Date of screenshots: 2018-11-20

Notes: This interface takes a generous approach to giving an overview of the collection—in the form of an experimental 3D viewing plane where order is randomised and categories branch out vertically and horizontally. This is a creative solution to encourage users to interact with what is otherwise primarily static documentation of time-based and performance-based artworks. The work/documentation records reveal very little metadata and a frustrating aspect of user interaction here is the inability to 'go back' to the 3D environment after opening an item record. Instead, the user is taken back to the opening screen of the collection. There are, however, other more standard ways to browse (or search) lists of work previews which can be sorted and filtered.

Google Arts & Culture

The screenshot shows the 'Explore' section of the Google Arts & Culture website. At the top, there's a navigation bar with 'HOME', 'EXPLORE' (which is underlined), 'NEARBY', 'PROFILE', a search icon, and a 'SIGN IN' button. Below the navigation, there's a 'Highlights' section with three cards: 'Art Camera' (Explore high-definition artworks), '360° videos' (Experience culture in 360 degrees), and 'Street View' (Tour famous sites and landmarks). The 'Categories' section follows, featuring five categories with images: 'Artists' (5,933 artists), 'Mediums' (231 mediums), 'Art Movements' (121 art movements), 'Historic Events' (638 historical events), and 'Historical Figures' (6,415 historical figures). Finally, the 'Collections' section is shown, displaying five museum collections with images: a fossil exhibit, a decorative object, a purple patterned wall, a room with a large mural, and a painting.

Entry point to all collections: Overviews and previews (with image thumbnail surrogates) are provided based on various categorizations.



Overviews & previews



Curated selections

The screenshot shows the Google Arts & Culture homepage with the following layout:

- Header:** Google Arts & Culture, HOME (highlighted), EXPLORE, NEARBY, PROFILE, SIGN IN.
- Section: Featured stories**
 - VIRTUAL EXPLORER:** The Kinoscope in 360°. Description: Take a journey into the world of cinema. Preview image: A film strip with the word "KINOSCOPE".
 - VIRTUAL EXPLORER:** Beyond the Bucket List: 20 Can't-Miss Locations Around the Globe. Description: From sand dunes to jungles, these far-flung wonders will take your breath away. Preview image: A landscape with people in a field of yellow flowers.
 - WE WEAR CULTURE:** Traditional Korean Clothing with a Modern Twist. Description: The pioneering designs of Lee Young Hee. Preview image: A group of women in colorful traditional Korean dresses.
 - ART EXPERIMENTS:** "Until" at Mass MoCA. Description: A tour of Nick Cave's empowering installation. Preview image: A hand pointing upwards surrounded by flowers.
- Section: CULTURAL HERITAGE**
 - CULTURAL HERITAGE:** The Never-Ending Love of the Mountains. Description: The cultural significance of mountains in the UAE. Preview image: A person in a red headscarf looking at mountains.
- Section: FOOD FOR THOUGHT**
 - FOOD FOR THOUGHT:** The Story of Mexico's Mesquite. Description: Slow Food Foundation for Biodiversity - Ark of Taste. Preview image: Hands holding several dried mesquite pods.
- Section: VIRTUAL EXPLORER**
 - VIRTUAL EXPLORER:** La Mosquée des Omeyyades in 360°. Description: Travel to Syria to see this archaeological treasure. Preview image: A small icon of a mosque.
- Section: MUSEUM EXPLORER**
 - MUSEUM EXPLORER:** Explore Nafasi Art Space. Description: A contemporary art centre in Tanzania. Preview image: Two people looking at art.
- Section: AMAZING CRAFTSMANSHIP**
 - AMAZING CRAFTSMANSHIP:** Traditional Venetian boats. Description: From models to boatbuilding at the. Preview image: A traditional Venetian boat in a workshop.
- Section: UNBURIED TREASURES**
 - UNBURIED TREASURES:** Beautiful Jade from Jinsha. Description: The colorful artifacts of the ancient. Preview image: A piece of colorful jade.
- Section: CULTURAL HERITAGE**
 - CULTURAL HERITAGE:** The Intricate Art of Japanese Sweets. Description: A look at the history of wagashi. Preview image: Four pieces of different colored wagashi.
- Section: MUSEUM EXPLORER**
 - MUSEUM EXPLORER:** Go Inside the Rijksmuseum. Description: See world-famous masterworks. Preview image: The exterior of the Rijksmuseum building.

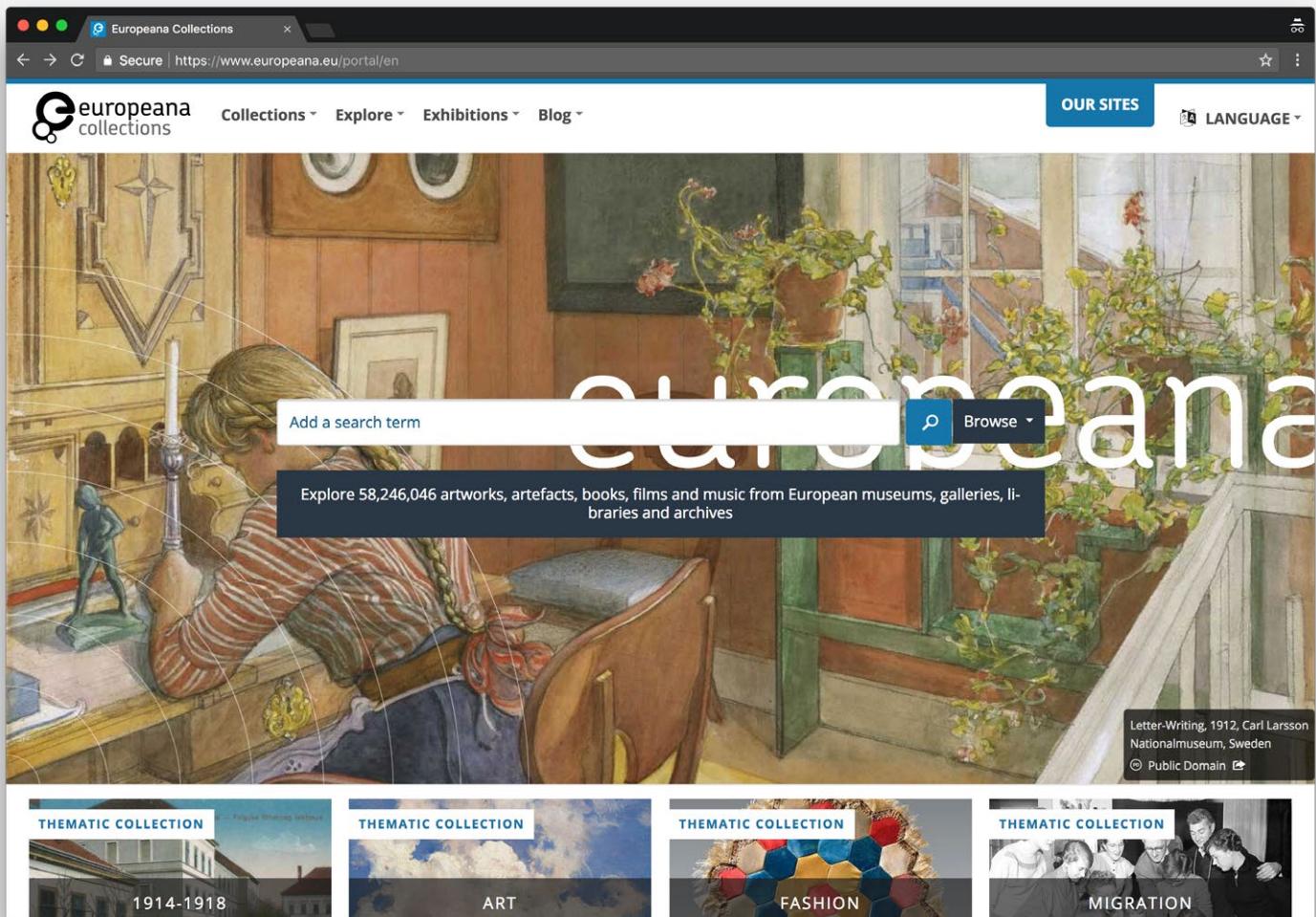
Entry point to all collections: Curated selections are also represented as previews (with image thumbnail surrogates).

Reference URL: <https://artsandculture.google.com>

Date of screenshots: 2018-05-14

Notes: While not an institutional interface, this interface aggregates many different institutional collections, as well as additional, specially-commissioned content. It utilizes many of the popular paradigms in collection interface design practices, such as overviews and previews, and curated selections, which minimize the need for direct search, and instead place the focus on exploratory browsing. However, the primary problem with implementation of this approach in an aggregator platform is the danger that each collection's specific cultural context becomes indistinct, or hidden altogether. This can inhibit users' ability to interpret individual collections.

Europeana (EU)



Entry point to all collections.

Reference URL: <https://www.europeana.eu>

Date of screenshots: 2018-09-12

Notes: Despite a recent redesign, the Europeana portal continues to uphold the dominance of the search box as primary navigation paradigm. The desire to emulate the 'Google experience' has been well-documented in research papers on collection interfaces, but when even Google's Arts&Culture portal is moving away from this paradigm, it's surprising that other cultural initiatives are still upholding it. There are some curated selections and additional browsing utilities within the interface, but search remains the primary entry point.



Curated selections

DPLA (US)

The screenshot shows the DPLA homepage. At the top, there's a navigation bar with links for "BROWSE BY TOPIC", "BROWSE BY PARTNER", "EXHIBITIONS", "PRIMARY SOURCE SETS", "MY LISTS", "ABOUT DPLA", "NEWS", and "DPLA PRO". Below the navigation is the DPLA logo and a "Digital Public Library of America" tagline. A prominent orange "Donate" button is visible. The main content area features a large text overlay: "Discover 29,467,826 images, texts, videos, and sounds from across the United States". Below this is a search bar with the placeholder "Search the collection" and a blue "Search" button. Further down are links for "Browse by Topic" and "New? Start Here". A sidebar on the left contains a "Primary Source Sets" section with thumbnail images of historical documents and artifacts. The right side has a "Teaching and Learning with DPLA" section with a "Learn more" button. At the bottom of the page, there's a "Online Exhibitions" section with a "Browse all Exhibitions >" link and a horizontal image strip.

Entry point to all collections.

Curated selections

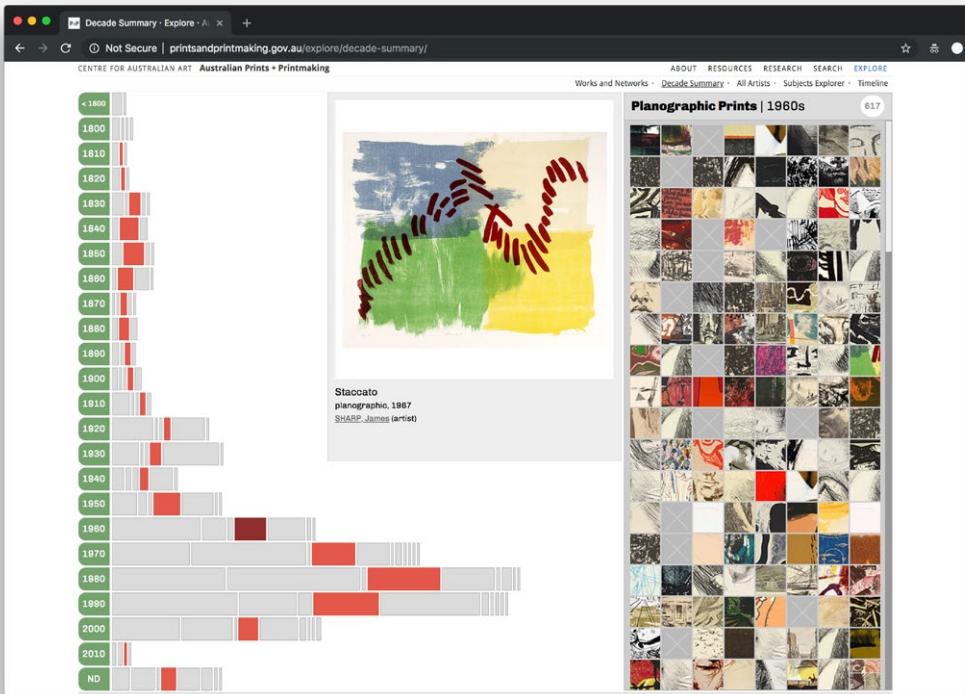
Reference URL: <https://dp.la>

Date of screenshots: 2018-09-12

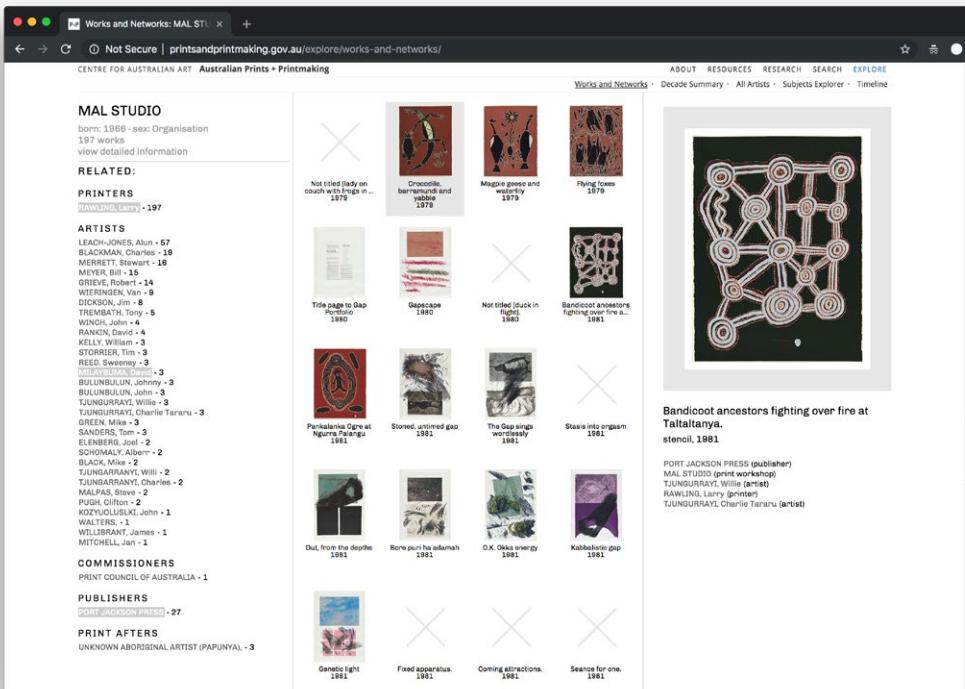
Notes: Similar to the Europeana portal, the DPLA portal focuses on search as a primary navigation mode. There are some curated selections and additional browsing utilities, but search remains the primary entry point.

4 Interfaces utilizing collection overview visualizations

The work of Mitchell Whitelaw



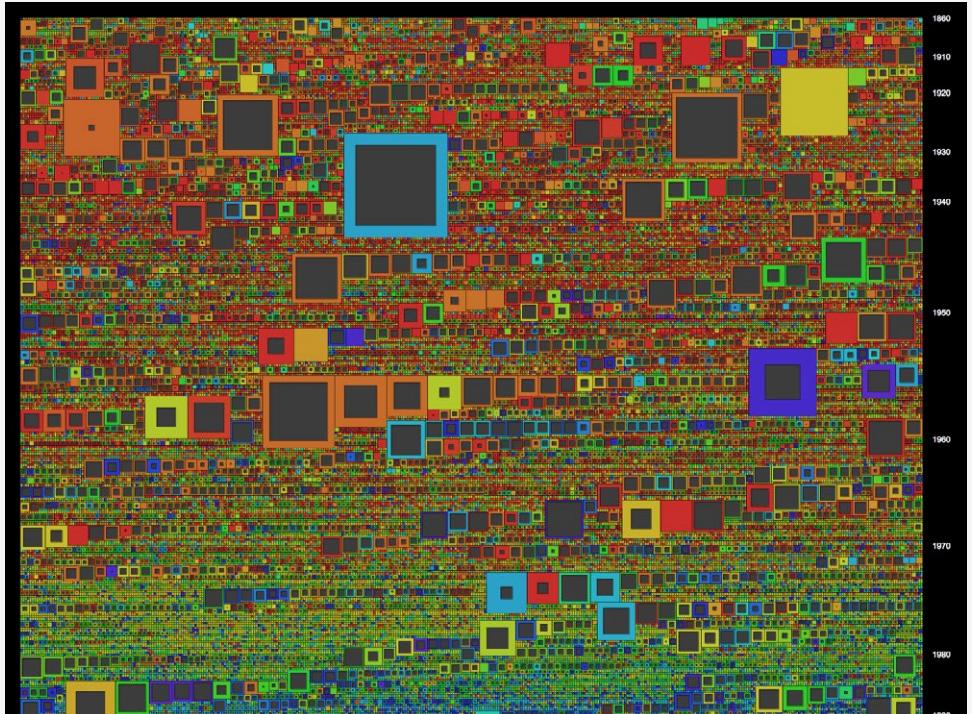
Example collection overview interface 1: Items are visualized on a timeline and supplemented by thumbnail previews.



Example collection overview interface 1: Items are visualized based on categories of relations and supplemented by thumbnail previews.



Example collection overview interface 2: Items are visualized on a timeline using abstract surrogate representation.



Example collection overview interface 2: Video screenshot shows the possible interactions with the abstract representations.



Reference URL: <http://mtchl.net/category/projects/>

Date of screenshots: 2018-11-20

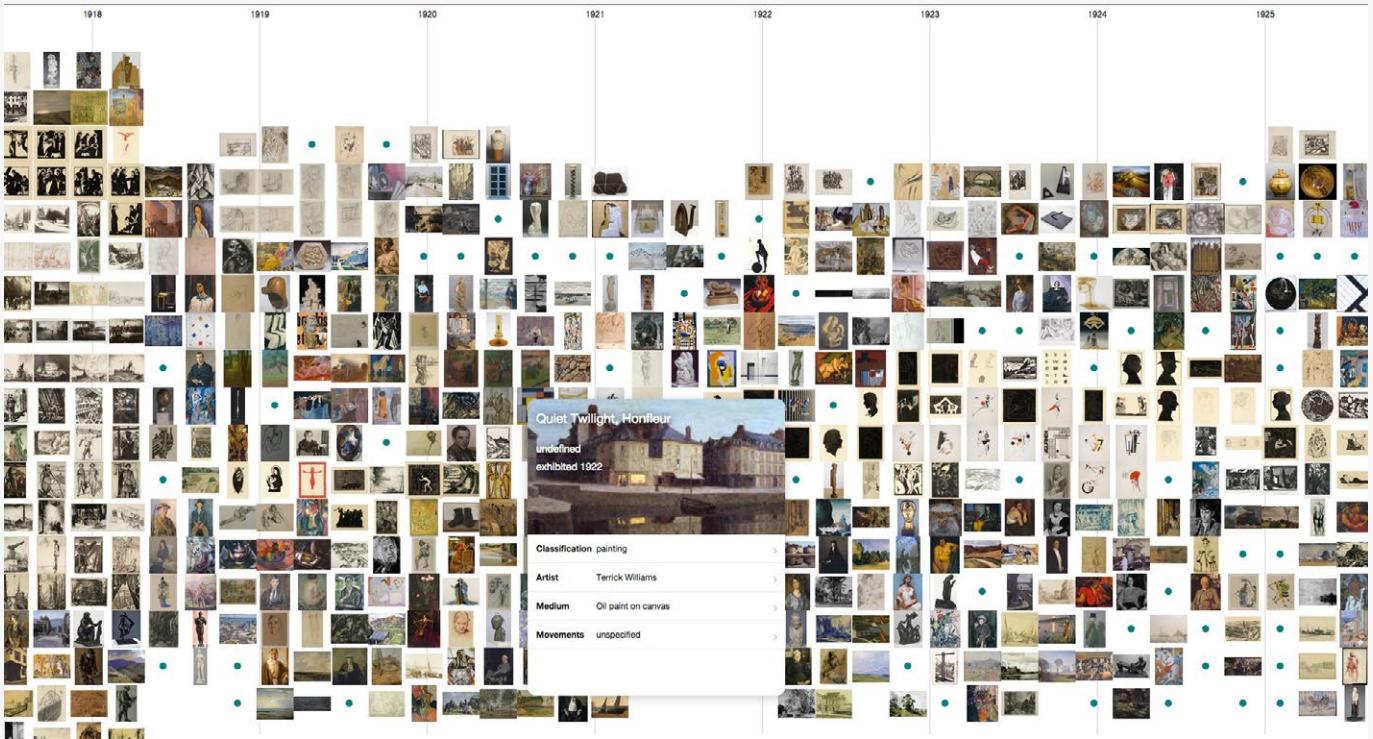
Notes: Designer and academic Mitchell Whitelaw developed the generous interfaces concept and design approach (Whitelaw, 2015). His interface design work has been influential among practitioners and researchers in the field. The various data visualization styles and techniques present a compelling overview of a collection's holdings. The only issue to keep in mind with this approach is the inevitable limitation of data visualization when it comes to heterogeneous ('unclean') datasets and the possibility to omit or obscure outliers in the dataset.



Multi-object timeline



The work of Florian Kräutli



Example collection overview prototype: Items are visualized on a timeline and supplemented by thumbnail previews. Additional metadata per item is available on click.



Generous interfaces



Overviews & previews



Data viz



Multi-object timeline

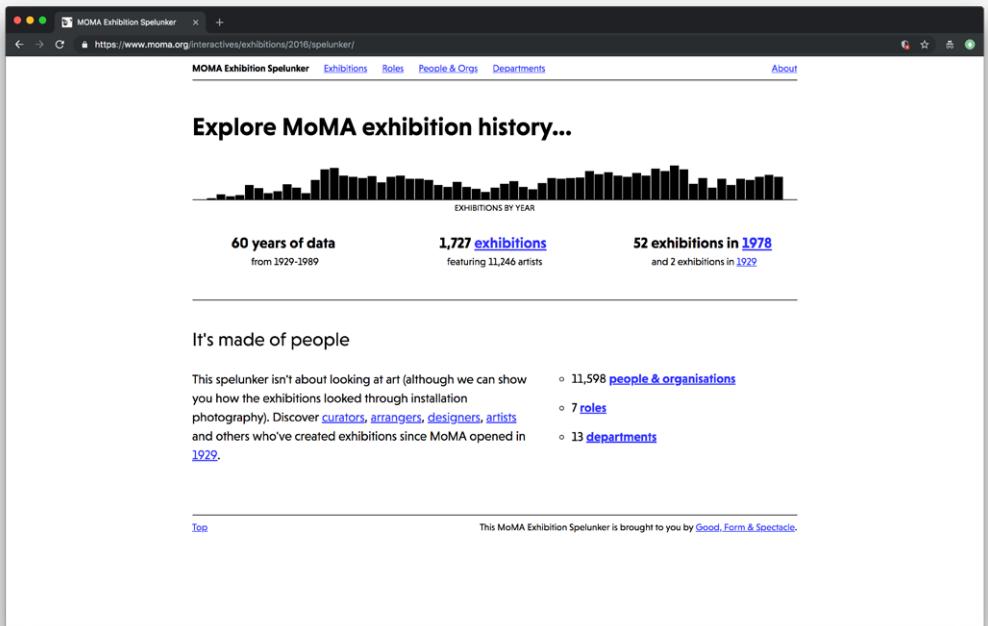
Reference URL: <http://www.kraeutli.com/index.php/category/projects/>

Date of screenshots: 2018-11-20

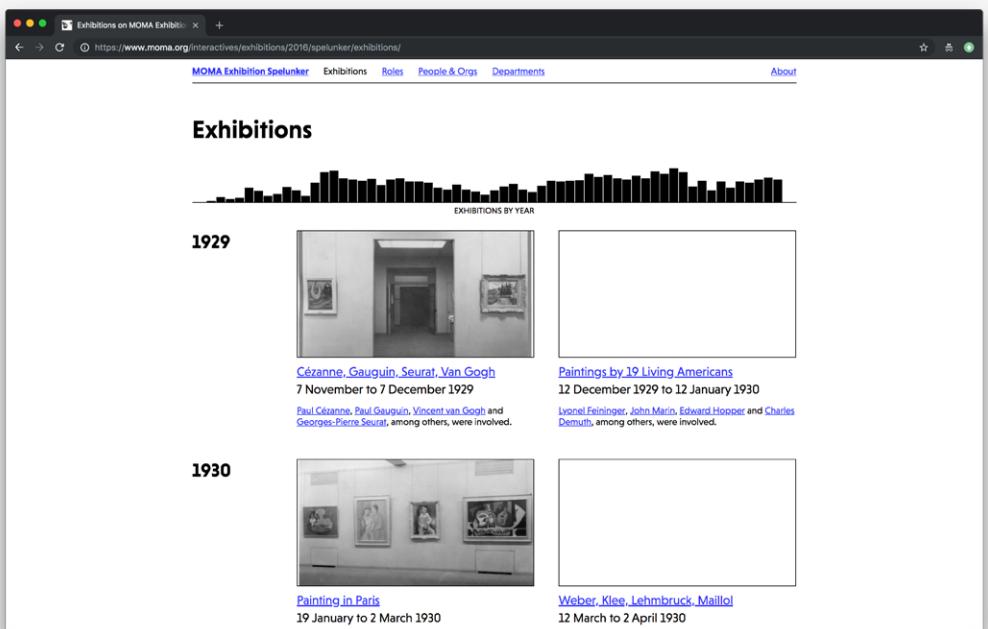
Notes: Designer and researcher Florian Kräutli has developed numerous collection interface prototypes and data visualizations aiming to tackle various questions around item exploration (particularly in relation to time) in collection interfaces. While these interfaces present dynamic and engaging user experiences, they work well with large collections of materials with visual surrogates (such as digitized image representations) and homogeneous metadata. Implementing such an approach to a highly heterogeneous dataset of born-digital artworks (where relations between time of creation and duration of performativity are more complex) remains limited.

The work of George Oates

Example collection overview interface: Items are visualized on a timeline and some data stats are also included.



Example collection overview interface: Items are visualized on a timeline and supplemented by thumbnail previews.



Generous interfaces



Data viz



Multi-object timeline

Reference URL: <http://goodformandspectacle.com/>

Date of screenshots: 2018-11-20

Notes: Designer George Oates has developed the concept of “spelunkers”: explorative interfaces presenting alternative views of collections, or sometimes just sections of collections. Her work often involves creative uses of data (and linked data) to reveal unusual aspects of collections—distinct from the traditional approach of simply listing works by date, author or category. Her approach, however, is bespoke to each individual collection and elements from these interfaces are not necessarily transferable across collections.

Rethinking Guernica



Example timeline view: Events and archival documents all relating to a single artwork are visualized on a timeline, supplemented by thumbnail previews.

Additional metadata per item is available on click.



Generous interfaces



Data viz



Single-object timeline

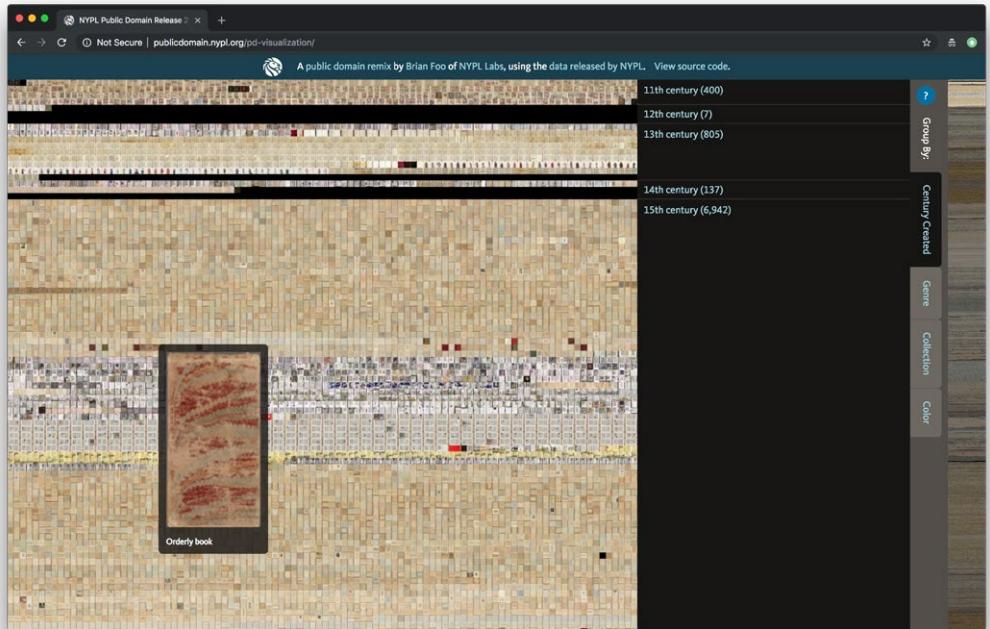
Reference URL: <https://guernica.museoreinasofia.es/cronologia/en/>

Date of screenshots: 2018-11-20

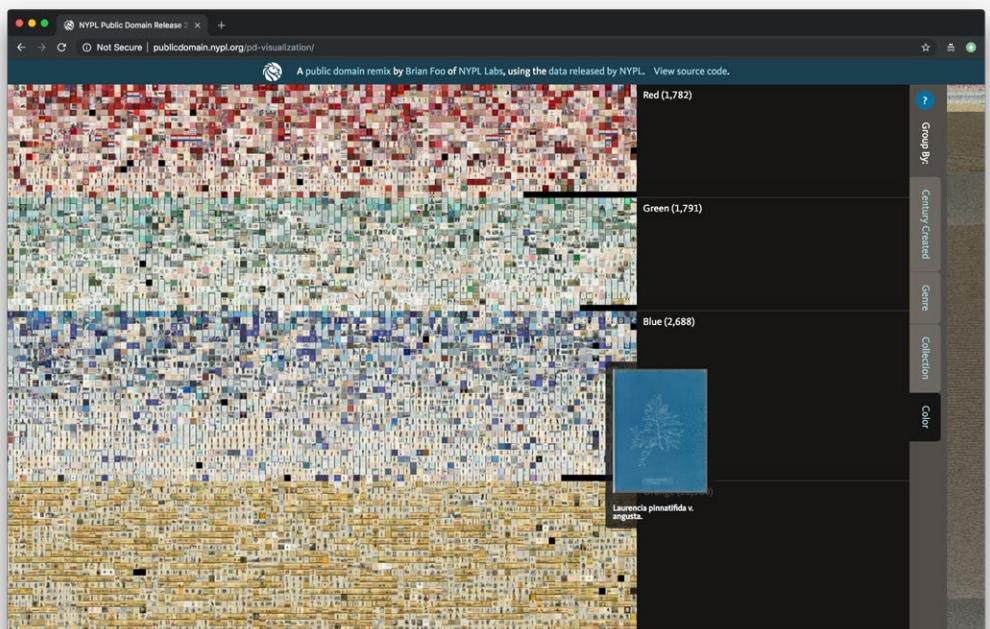
Notes: While not strictly a collection overview interface, this interface bears relation to the design examples reviewed so far. This chronological timeline presents a range of events and documents all relating to a single artwork. The project of researching the complex history of Guernica has generated a vast amount of data which benefits from visualization as much as other digital collections. This dynamic data visualization is a useful reference point for the ArtBase, as it sets an example of how a timeline visualization can be useful even if it tracks the history of a single artwork vs visualizations of all artworks in the collection. Data is revealed in different degrees of granularity depending on user interaction.

NYPL Labs

Example collection overview interface 1: Items are visualized on a timeline and supplemented by thumbnail previews.



Example collection overview interface 2: Items are visualized based on color similarity and supplemented by thumbnail previews.



★
Generous interfaces

★
Data viz

★
Multi-object timeline

★
Sort by color

Reference URL: <http://publicdomain.nypl.org/pd-visualization/>

Date of screenshots: 2018-11-20

Notes: NYPL Labs have developed a number of experimental interface prototypes aiming to visualize the collections according to different categories or criteria. A timeline approach is an already standard method for data visualization, which in this particular instance is supplemented by the option to also sort the collection based on color similarity, achieved through advances in computer vision and machine learning.

Google Arts & Culture

This screenshot shows the Google Arts & Culture interface for the artist Rembrandt. At the top, there's a navigation bar with links for HOME, EXPLORE, NEARBY, PROFILE, and SIGN IN. Below the navigation is a search bar. The main content area features a grid of Rembrandt's artworks, with a total of 1,705 items. A "Discover this artist" section is present. The interface includes a "Organize by" dropdown menu with options for popularity, time periods, or color, with "Time" currently selected. A quote by Rembrandt, "I can't paint the way they want me to paint and they know that too.", is displayed with his name and birth/death dates (Jul 15, 1606 - Oct 4, 1669).

Overview interface for all items related to a specific artist (or other search term):
This view can be sorted by popularity, time periods, or color.

This screenshot shows the Google Arts & Culture interface for Rembrandt, similar to the first one but with a different view. It features a timeline at the top where users can click on specific years to see the artworks from that period. The timeline includes years from 1634 to 1656. Below the timeline is a grid of Rembrandt's artworks, including paintings and etchings. A "Discover this artist" section is present. The interface includes a "Organize by" dropdown menu with options for popularity, time periods, or color, with "Time" currently selected. A quote by Rembrandt, "I can't paint the way they want me to paint and they know that too.", is displayed with his name and birth/death dates (Jul 15, 1606 - Oct 4, 1669).



Generous interfaces



Overviews & previews



Data viz

Discover this artist

1,705 items

Organize by

HOME EXPLORE NEARBY PROFILE SIGN IN

"I can't paint the way they want me to paint and they know that too."

Overview interface for all items related to a specific artist: This view can be sorted by color similarity based on a value within the color palette of the collection overview.

★
Multi-object timeline

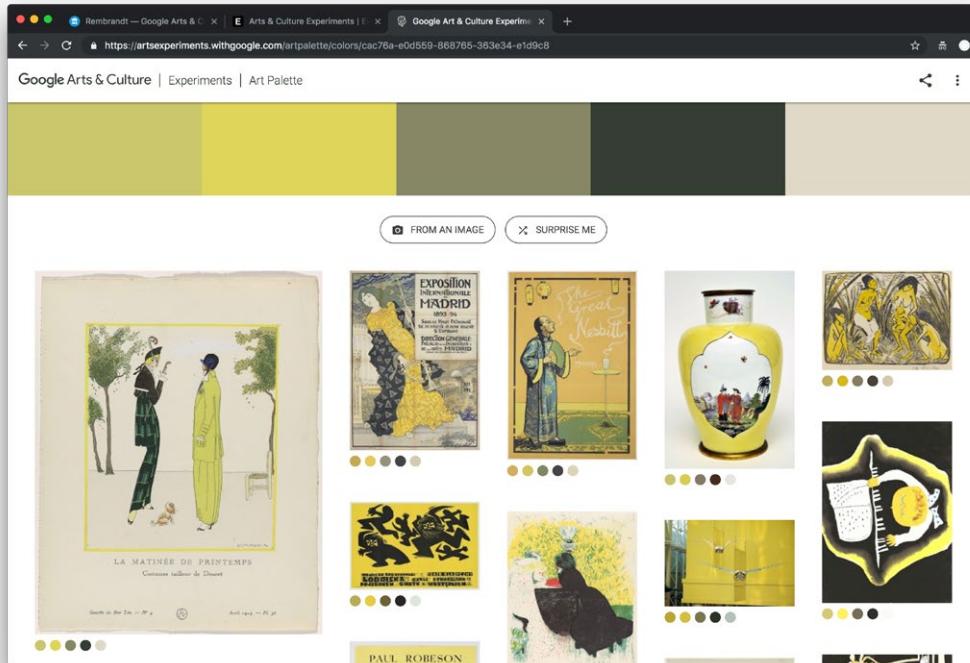
★
Sort by color

Reference URL: <https://artsandculture.google.com/>

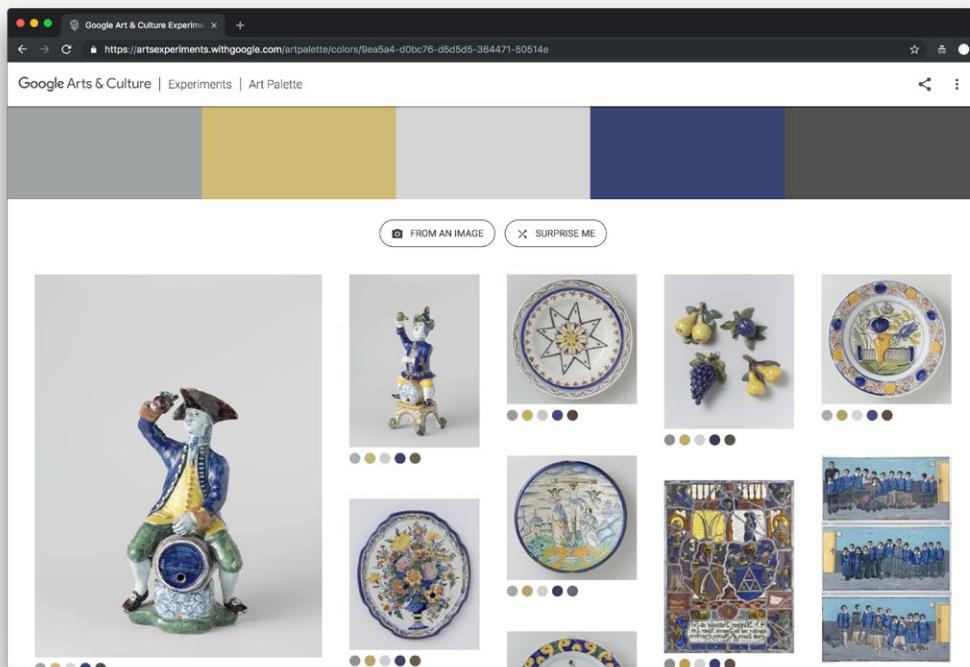
Date of screenshots: 2018-11-20

Notes: Google's Arts & Culture interface offers a few different ways to browse a selection from the collections based on a search term (such as an artist, a movement, a particular institution, etc). As with previous notes on the general platform, the lack of context provided about where the aggregated items come from is problematic in this seemingly 'transparent' approach to presenting collection overviews and previews (see: Bolter & Gromala, 2003, for more on interface transparency).

Google A&C Experiments: Art Palette



Example view of Art Palette 1:
Collection overview with
thumbnail previews organized
by color palette.



Example view of Art Palette 2.



Overviews & previews

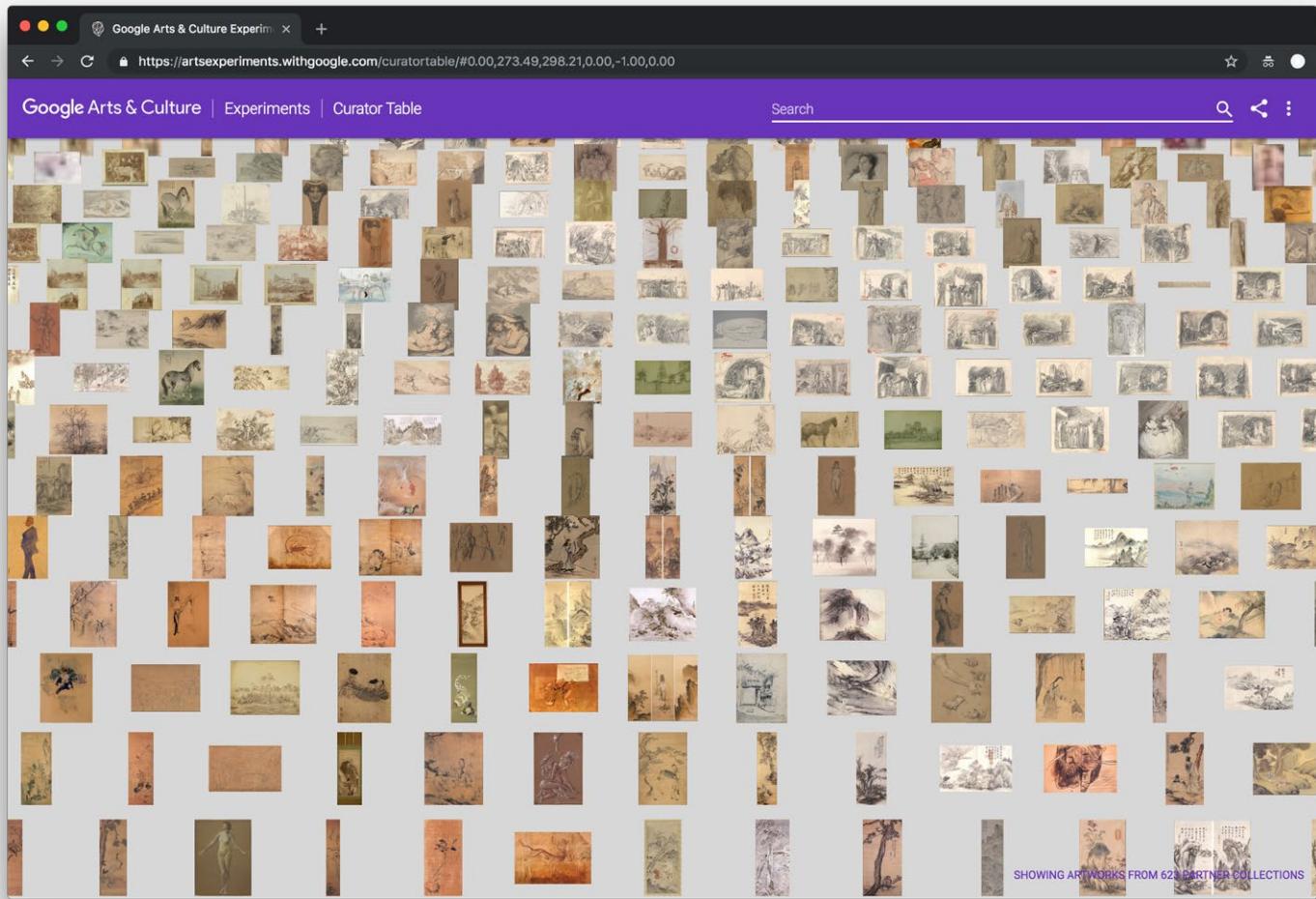


Sort by color

Reference URL: <http://act.mit.edu/cavs>

Date of screenshots: 2018-11-20

Google A&C Experiments: Curator Table



Example view of Curator Table 1: Collection overview with thumbnail previews presented in a 3-dimensional environment where computer vision and machine learning enable different modes for organizing and structuring collection items.

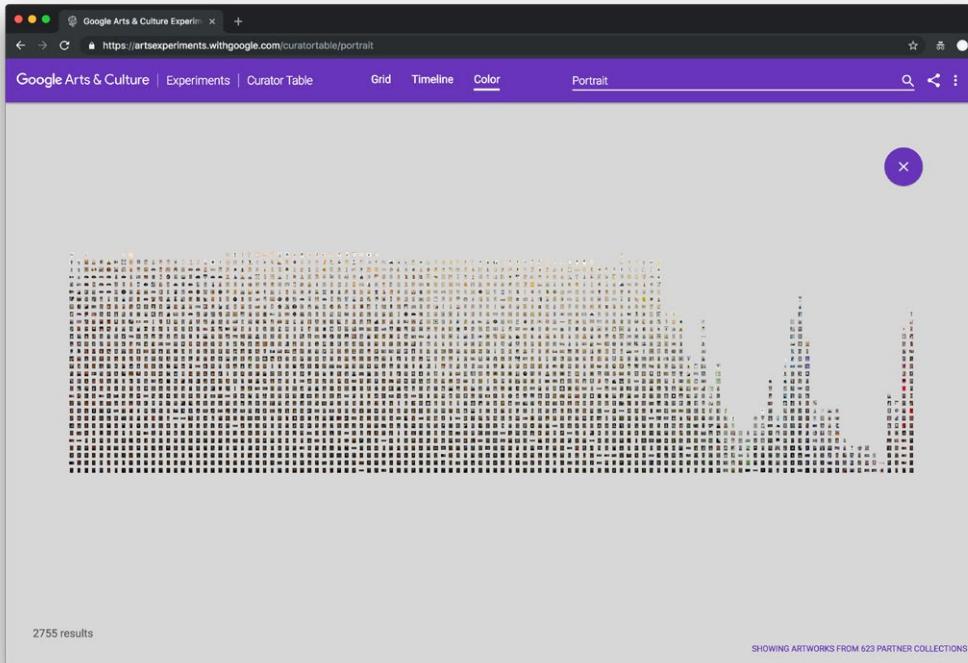


Generous interfaces

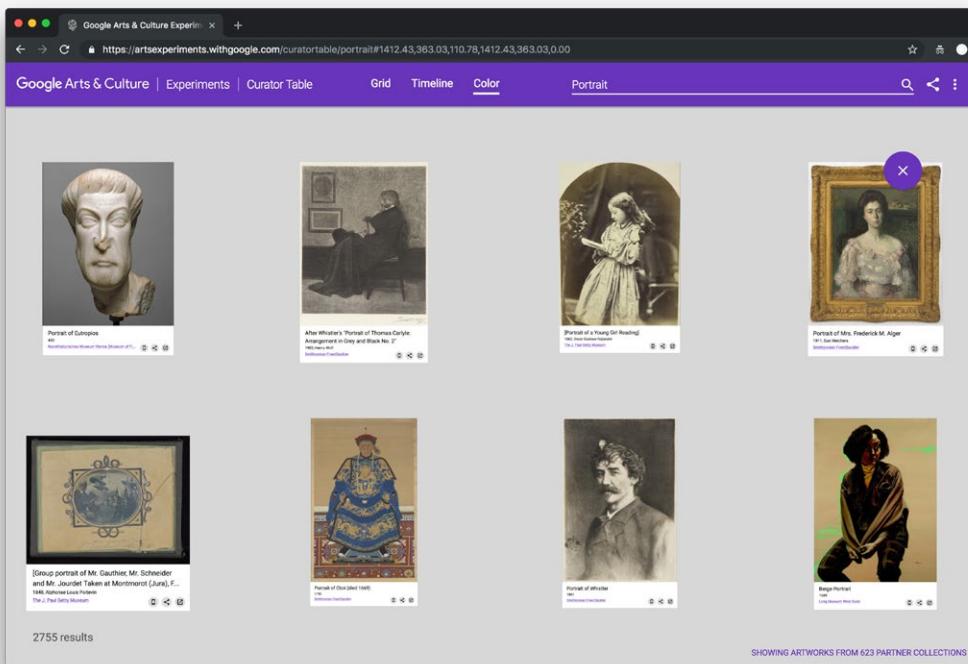
Reference URL: <https://artsexperiments.withgoogle.com/curatortable/>

Date of screenshots: 2018-11-20

Google A&C Experiments: Curator Table (cont.)



Example view of Curator Table 2: Collection overview can be narrowed down by search terms and organized by color similarities.



Example view of Curator Table 3: Zoomed-in view with thumbnail previews provides some contextual information.

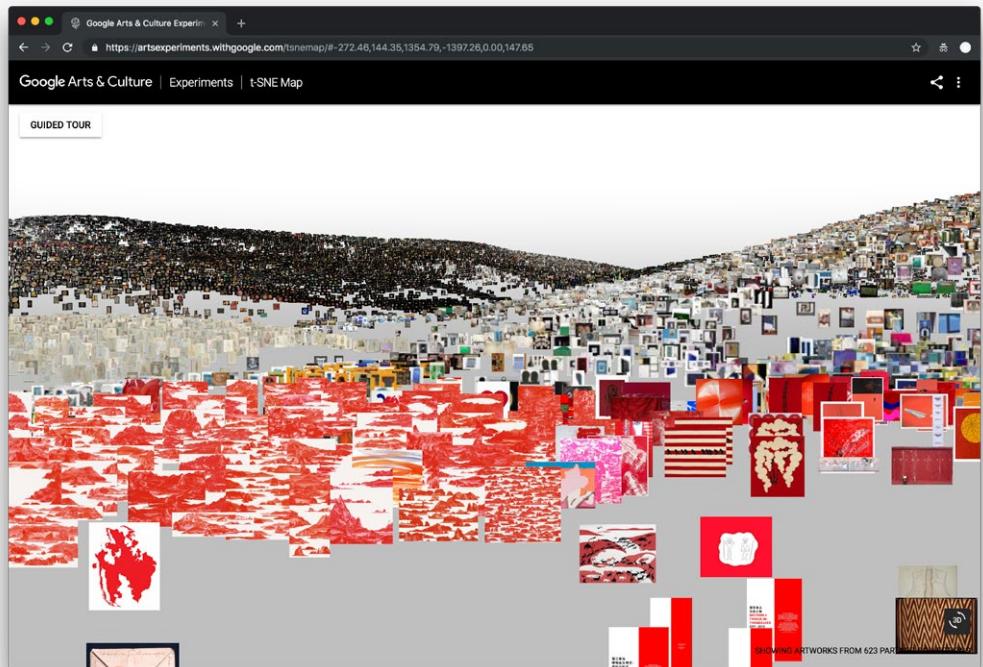
★
Overviews & previews

★
Sort by color

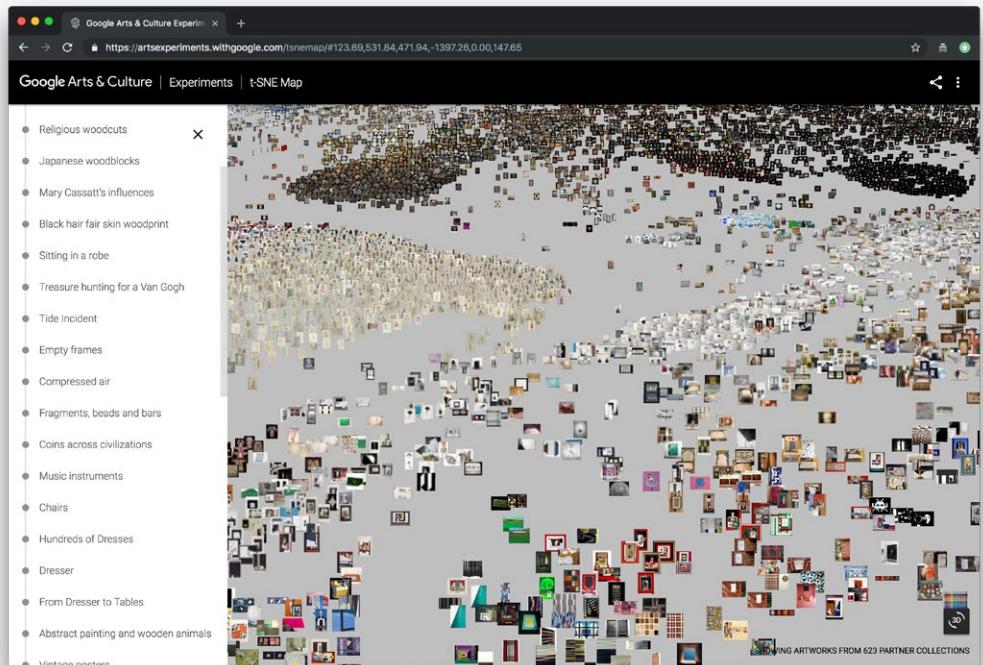
★
Multi-object timeline

Google A&C Experiments: t-SNE Map

Example view of t-SNE Map 1: Collection overview with thumbnail previews is mapped on a 3-dimensional landscape.



Example view of t-SNE Map 2: Suggested “points of interest” can be used to traverse the collection via a guided route.



★
Generous interfaces

★
Overviews & previews

★
Sort by color

Reference URL: <https://artsexperiments.withgoogle.com/tsnemap/>

Date of screenshots: 2018-11-20

Notes: Built similarly to the Curator's table experiment, this interface replaces the grid view with a 'landscape' generated through a mix of algorithmic approaches to data visualization. While an engaging way to browse the collection, this type of interface can only support artworks which can be clearly represented by a single digital image. Again, contextual information; including a sense of the artworks' scale, is missing from this experience.

5 Interfaces for linked data cultural projects

British Museum—Research space (UK)

The screenshot shows the homepage of the British Museum ResearchSpace. On the left, there's a sidebar with 'Getting Started' (Explore ResearchSpace features, Take a guided tour of search) and 'Example Searches' (Actor Search). In the center, there's a search interface with a dropdown menu for entity types: Thing, Actor, Place, Time, Event, Concept. The footer contains links to The British Museum, Mellon Foundation, and Metaphacts.

Entry point to the collection data: A graphical user interface (GUI) facilitates the construction of SPARQL queries without prior knowledge of SPARQL or the underlying data structure.

This screenshot is similar to the one above, but the dropdown menu in the center now includes a 'text search' option at the bottom.



Secure | https://public.researchspace.org/resource/?uri=http%3A%2F%2Fcollection.britishmuseum.org%2Fid%2Fobject%2FYCA62958

ResearchSpace beta Example Records ▾ Login ?

Home / The Rosetta Stone, granodiorite, Ptolemaic (.24)

 The Rosetta Stone, granodiorite, Ptolemaic (.24) ● Object (Man-Made Object) record, British Museum

Summary Annotations Explore Related

Field	Value	Annotations	Assertions
Title	The Rosetta Stone, granodiorite, Ptolemaic (.24)	0	0
Description	Part of grey and pink granodiorite stela bearing priestly decree concerning Ptolemy V in three blocks of text: Hieroglyphic (14 lines), Demotic (32 lines) and Greek (54 lines).	0	0
Object Type	stela	0	0
Asset ID	YCA62958	0	0
Material	granodiorite (en)	0	0
Dimensions	Length: 112.3 Centimeter Thickness: 28.4 Centimeter Width: 75.7 Centimeter	0	0

Example view of an item record: Linked data statements are represented in a tabular format (as fields and values).

Reference URL: <https://public.researchspace.org>

Date of screenshots: 2018-11-22

Notes: This project's interface aims to reveal the capabilities of a linked data database to users unfamiliar with the LOD paradigm. Particularly strong points are the GUI for running queries on the database and the ability to add annotations / assertions to each metadata statement. This functionality is similar to the qualifiers function in Wikidata: it enables the construction of contradictory statements which can co-exist because they are given appropriate sourcing and argumentation as a 'sub-statement'. The underlying data model in this case follows the CIDOC-CRM specification and its argumentation extension.

Max Planck Institute—Sphaera CorpusTracer (DE)

The screenshot shows the main interface of the Sphaera CorpusTracer. At the top, there's a navigation bar with links for 'Books', 'Persons', 'Places', 'Terms', and 'Search'. A search bar at the top left contains the placeholder 'type to search, minimum 3 symbols ...'. Below the search bar, there are two main sections: 'Books' on the left and 'Persons' on the right. Each section has a summary message ('There are currently 320 books in the database.' or 'There are currently 342 persons in the database.'), a 'List all books' or 'List all persons' button, and a 'Recently edited' link. Under the 'Books' section, there is a detailed text entry for a book titled 'El filosofo. Ocupacion de nobles, y discretos contra la cortesana ociosidad. Sobre los libros de cielo, y Mundo, Meteoro, Parvos Naturales, Ethica, Economic, Politica de Aristoteles, y Esfera de Sacro Bosco. Epitome claro, y curioso. Tratanse estas materias con rigor escolastico: y dividense en dos libros, Filosofia Natural, y Filosofia Moral. Por el licenciado Cosme Gomez Texada de los Reyes, Capellan mayor de las Bernardas Descalzas, y Patronazgo en S. Ildefonso de Talavera. Al licenciado Frey Martin Rodriguez de Corrales, del Abito de San Iuan, Prior de San Christoval de Salamanca, y Vicario'.

Entry point to the collection: A collection overview is provided based on two primary record types—books and persons.

This screenshot shows the search interface of the Sphaera CorpusTracer. The top navigation bar includes 'Books', 'Persons', 'Places', 'Terms', and 'Search'. Below the navigation, the URL indicates the search function. The main area features a search input field with a 'Book' icon and a dropdown menu titled '... related to' containing four options: 'Person' (with a person icon), 'Place' (with a location pin icon), 'Timeframe' (with a clock icon), and 'Language' (with a speech bubble icon). A 'cancel' button is also present in the dropdown menu. At the bottom of the page, a footer note states: 'CorpusTracer is based on Metaphactory and ResearchSpace. It has been developed within The Sphere project at the Max Planck Institute for the History of Science'.

Search interface view: This interface is an application of the SPARQL query GUI of Research Space.



Example view of an item record: A natural language summary of the structured data is featured alongside an image pulled from Wikimedia Commons via Wikidata.

The screenshot shows a web browser window for the Sphaera CorpusTracer application. The URL is db.sphaera.mpiwg-berlin.mpg.de/resource/?personiri=http%3A%2F%2Fspaera.mpiwg-berlin.mpg.de%2Fid%2Fperson%2F8b4f7955-2da2-45c1-a182-2b8... The page title is "Sphaera CorpusTracer". The main content area displays a summary of a person named "Hans Lufft", described as a "Printer". Below the summary is a portrait of Hans Lufft, a man with a beard and a turban-like hat. A "Give Feedback" button is visible in the top right corner.

Example view of an item record: More metadata statements are presented further down on the page.

The screenshot shows a continuation of the Sphaera CorpusTracer interface for the same person record. It includes a detailed title block for "JOHANNES LVFTT," listing his roles as a typographer, bibliopolis, and printer in Wittenberg. Below this are sections for "Other Names" (Iohannis Lufftij), "Books published and printed" (listing "Elementa doctrinae de circulis coelestibus, & primo motu" with a year of 1563), "External Links" (Wikidata and Thesaurus entries), "DOI" (http://doi.org/21.11103/sphaera.101013), and "Identifier" (the specific URL). The footer notes that the tool is based on Metaphactory and ResearchSpace.

Reference URL: <http://db.sphaera.mpiwg-berlin.mpg.de/resource/Start>

Date of screenshots: 2018-11-15

Notes: This project builds upon the Research Space platform with some adaptation to fit the context of the collection. The data model used is CIDOC-CRM with the bibliographic extension FRBRoo. The search GUI, relevant pre-set queries, natural language summaries, and even federation with other open datasets (i.e. Wikidata) demonstrate the benefits of linked data for cultural heritage projects at large.



Natural language
summary generated
from structured data



Wikidata / Wikibase default interface

Douglas Adams (Q42)

British author and humorist (1952–2001)

Labels: Douglas Noel Adams | Douglas Noël Adams | Douglas N. Adams

Statements

- instance of: human
 - 2 references
 - stated in: Virtual International Authority File
 - VIAF ID: 113230702
 - retrieved: 7 December 2013
 - stated in: BNF authorities
 - retrieved: 10 October 2015
 - reference URL: <http://data.bnf.fr/ark:/12148/cb11888092r>
- image:

Douglas adams portrait cropped.jpg
333 x 386; 32 KB

Example view of an item record 1: The item page features a text label, description, aliases, translations of the label and description, alongside a series of (unordered) statements.

country of citizenship: United Kingdom

name in native language: Douglas Adams (English)

birth name: Douglas Noel Adams (British English)

given name: Douglas

Noel

Example view of an item record 1: This particular example is often used as a model item to showcase Wikidata capacities; the statements on the page are extremely detailed.

★
Linked data

★
Invitation to contribute

Net Art Anthology (Q28050689)

online exhibition of the history of net art

Language	Label	Description	Also known as
English	Net Art Anthology	online exhibition of the history of net art	
French	Net Art Anthology	No description defined	
German	Net Art Anthology	No description defined	
Scots	No label defined	No description defined	

All entered languages

Statements

- Instance of
 - online exhibition of Internet art
 - anthology
- inception 27 October 2016
- organizer Rhizome
- official website https://anthology.rhizome.org/

Example view of an item record 2: An item page can also have just a few statements; there are no minimum or maximum metadata requirements.

Reference URL: <https://www.wikidata.org/>

Date of screenshots: 2018-11-22

Notes: The default Wikidata (Wikibase) interface is included here as a point of comparison with other interfaces which have been developed to pull data from Wikidata and present it in alternative ways. While this default interface is primarily intended for machine-reading (rather than human usability), it still sets out some useful paradigms, such as the fact that both properties and items within statements are clickable—thereby enabling horizontal browsing (and also discovery of what these statements mean). As mentioned already in relation to Research Space, Wikidata also allows contradictory statements, which are differentiated via qualifiers. The ways that such contradictions are made visible to users could be made more explicit in the design.



Wikimedia Labs—Reasonator

Example view of a an item record 1: Statements are presented in customized clusters and collapsible elements.



Douglas Adams - Reasonator

<https://tools.wmflabs.org/reasonator/?&q=42>

category: Category:Works by Douglas Adams Wikimedia category
 combines topics: Category:Books by Douglas Adams Wikimedia category
 Category:Novels by Douglas Adams Wikimedia category
 Category:Video games by Douglas Adams Wikimedia category

ia
 ifn
 it
 lv
 mg
 mk
 ml
 mr

Duglassius Adams
 Douglas Adams
 Douglas Adams
 Duglass Adams
 Douglas Adams
 Douglas Adams
 Douglas Adams
 Douglas Adams

Даглас Адамс
 ഡാഗ്ലസ് അദമ്സ്
 ଡାଗଲସ ଅଡମ୍ସ

Concept cloud

Timeline
1983
1979
nominated for: Hugo Award for Best Dramatic Presentation
NOVEMBER 25, 1991
sponsor: Jane Belson

twoed
rentwood
educated at: St John's College
nominated for: Locus Award for Best Science Fiction Novel
date of birth: Polly Jane Rocket Adams

nominated for: Hugo Award for Best Dramatic Presentation
spouse: Jane Belson
date of

1970
1980
1990
2000

Related media

Example view of an item record 1: A timeline of events connected to the item and other related media are featured further down on the page.



Single-object timeline



Open source

Reference URL: <https://tools.wmflabs.org/reasonator/>

Date of screenshots: 2018-11-22

Notes: This experimental interface, aiming to make Wikidata “pretty”, implements a number of approaches towards making Wikidata statements more “human-readable”. For a small number of record types (i.e. person, place, species, etc) the templates are customized to present data in hierarchical clusters (and even short natural language summaries). Note continued on p.81.

Wikimedia Labs—Reasonator (cont.)

The screenshot shows a web browser window with the title "Net Art Anthology - Reasonator". The URL is <https://tools.wmflabs.org/reasonator/?&q=28050689>. The page displays the item record for "Net Art Anthology" (Q28050689). The main content area includes sections for "Other properties", "From related items", and a sidebar with links for "Free images Google search", "External sites", "Wikimedia projects", and a "Concept cloud".

Net Art Anthology (Q28050689)

online exhibition of the history of net art

Other properties

instance of	online exhibition exhibition whose venue is cyberspace of : Internet art
anthology	collection of creative works chosen by the compiler
inception	2016-10-27
organizer	Rhizome Born-digital nonprofit organization supporting digital art and culture

From related items

exhibition history	A Cyberfeminist Manifesto for the 21st Century art project point in time : 2016-10-27
	Reabracadabra visual poem by Eduardo Kac point in time : 2016-11-03
	My Boyfriend Came Back From The War Internet artwork by Olia Lialina point in time : 2016-11-10
	The File Room artwork by Antoni Muntadas point in time : 2016-11-17
	FloodNet art project by Electronic Disturbance Theater point in time : 2016-12-01
	Mouchette.org internet artwork by Martine Neddam point in time : 2016-12-08
	Mezangelle artificial language and art project by Mez Breeze point in time : 2016-12-15
	Form Art internet artwork and art genre by Alexei Shulgin point in time : 2017-01-12
	BIT Plane art project by Bureau of Inverse Technology (BIT) point in time : 2017-01-19
	Heritage Gold art project by Mongrel point in time : 2017-01-26
	Blacklash video game mod and artwork by Mongrel point in time : 2017-02-03
	The Dollie Clone Series artwork by Lynn Hershman Leeson point in time : 2017-02-09
	The Web Stalker internet artwork by I/O/D point in time : 2017-02-16
	LOVE internet artwork by Group Z point in time : 2017-02-22
	Documenta Done internet artwork by Vuk Čosić point in time : 2017-02-22

Example view of a an item record 2: Statements are presented in customized clusters and collapsible elements, notably “related items”.

The screenshot shows a web-based interface for the Net Art Anthology - Reasonator. At the top, there's a navigation bar with icons for back, forward, search, and other functions. Below it is a URL bar with the address <https://tools.wmflabs.org/reasonator/?&q=28050689>. The main content area is divided into several sections:

- Artworks (List):**
 - Blacklash video game mod and artwork by Mongrel
point in time : 2017-02-03
 - The Dollie Clone Series artwork by Lynn Hershman Leeson
point in time : 2017-02-09
 - The Web Stalker internet artwork by I/O/D
point in time : 2017-02-16
 - LOVE internet artwork by Group Z
point in time : 2017-02-22
 - Documenta Done internet artwork by Vuk Čosić
point in time : 2017-03-02
 - Female Extension internet artwork by Cornelia Sollfrank
point in time : 2017-03-09
 - Bodies© INCORporated internet artwork by Victoria Vesna
point in time : 2017-03-17
 - Automatic Rain internet artwork by JODI
point in time : 2017-03-24
- Timeline:** A horizontal timeline from JAN. 10 to JAN. 30, 2017. It highlights specific events:
 - JANUARY 12, 2017: exhibition history: Form Art
 - JANUARY 19, 2017: exhibition history: BIT Plane (highlighted in blue)
 - JANUARY 26, 2017: exhibition history: Heritage Gold
- Related media:** A section containing three small images: a woman speaking at a podium, a diagram titled "Naae Net Art Diagram", and a screenshot of a computer interface.

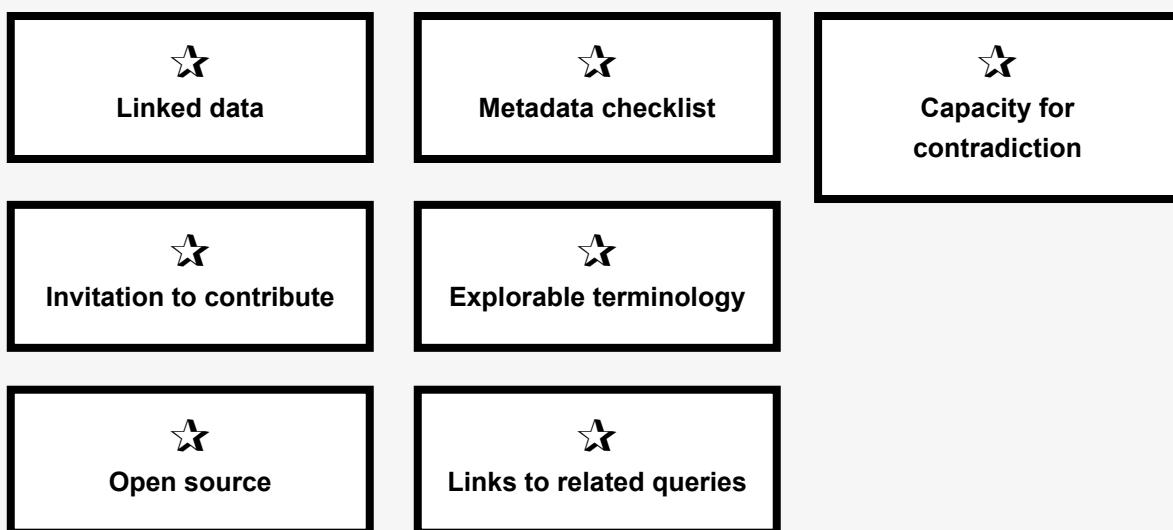
Example view of a an item record 2: A timeline features the related items, via the point-in-time qualifier on the “related” statement.

Notes (continued from p.79): For the majority of records, including the exhibition example above, statements tend to be lumped under “other properties”, but a very useful feature is the cluster of “related items”, which is retrieved via a SPARQL query. This feature could be extremely useful in the general Wikidata interface as well, because it enriches all item records without the need to create inverse properties. For example, the page for the NAA exhibition in Wikidata features very few statements. However, the same page in Reasonator is far richer, because it retrieves all artworks which have the property “exhibition history” with value “NAA exhibition”. This information can then also be rendered in a timeline visualization.

Wikidata for Digital Preservation portal

The screenshot shows a web browser window for the 'WikidP | Preview' page at wikidp.org/Q3297609. The main content area displays the item record for 'Netscape' (Q3297609). The title 'Netscape' is shown with its ID (Q3297609) in parentheses. Below the title, there are sections for 'Current Data About Netscape' and 'other details'. The 'Current Data' section includes statements like 'instance of (P31) software (Q7397)', 'developer (P178) AOL (Q27585)', and 'subclass of (P279) Netscape Navigator (Q235419)'. The 'other details' section shows aliases ('Netscape 7.0') and external links. On the left, a sidebar lists properties for the selected item: license (P275), software version (P276), official website (P277), depends on software (P278), developer (P178), readable file format (P179), writable file format (P180), file extension (P111), platform (P400), programming language (P197), operating system (P198), PRONOM software (P280), user manual link (P281), and bug tracking system (P282). Below the sidebar are buttons for actions (explore, preview, contribute).

Example view of an item record: Statements are pulled from Wikidata and presented in a custom-styled interface.



Example view of an item record: There is an option to contribute data directly within the portal via a form to create claims.

The screenshot shows a web browser window for the Wikidata for Digital Preservation portal. The URL is <https://wikidp.org/contribute>. The main content area is titled "Netscape (Q32976)". It features a "CREATE A CLAIM" form with a dropdown menu set to "platform". Below the form is a section titled "MY CLAIMS". To the left, a sidebar titled "selected item" displays "Netscape (Q32976)". Underneath this, a "property checklist" lists various properties with their counts: license (P275) 0, software version (L1) 0, official website (P70) 1, depends on software (P110) 0, developer (P178) 1, readable file format (P120) 0, writable file format (P121) 0, file extension (P111) 0, platform (P400) 0, platform family (P401) 0, operating system (P112) 6, PRONOM identifier (P113) 0, user manual link (L2) 0, bug tracking system (P114) 0. At the bottom of the sidebar are links for "actions", "explore", "preview", and "contribute".

Exploratory options: The portal features some links to pre-set Wikidata queries of common interest.

The screenshot shows a web browser window for the Wikidata for Digital Preservation portal. The URL is <https://wikidp.org/reports>. The main content area is titled "Reports". It contains a section titled "Wikidata Queries" with a list of metrics: Number of software titles recorded, Number of file formats recorded, Number of PRONOM Unique Identifiers recorded, Number of file signatures described, Number of emulators recorded, and Number of file systems recorded. Above this list, there is a placeholder text: "Need a description summarizing the purpose of the queries . Lorem ipsum dolor sit amet, consectetur adipisciing elit. Repudiandae, unde!"

Reference URL: <https://artsandculture.google.com/>

Date of screenshots: 2018-11-20

Notes: The Wikidata for Digital Preservation portal is a Python-based interface visualizing data from Wikidata. Unlike Reasonator, which functions as an overlay to the entire Wikidata database, this portal is specific to data related to software items and file formats. Record pages feature a checklist in a sidebar panel, which is designed to encourage contributions by explicitly exposing which metadata is recommended to be there, but is currently missing. Contributing data is made easier (compared to other interfaces such as Reasonator), by providing a quick-to-fill-out form within the portal, without the need to log-in or even go to Wikidata. But at the record-page level, this interface doesn't fundamentally change the interaction paradigms of Wikidata's generic interface. Metadata is presented without any particular hierarchy or clustering. Finally, the portal also features links to pre-set Wikidata queries of common interest. This is a useful feature, which could be utilized more in other linked data interfaces as a way to encourage exploration and/or avoid the need for a SPARQL GUI.

Science Stories

The screenshot shows a web browser window with the title "Grace Hopper - Story | Science Stories". The main content area features a black and white photograph of Grace Murray Hopper, a woman with glasses and a military-style uniform, standing in front of a computer console. Below the photo is the title "Grace Murray Hopper". A detailed text block provides information about her life and contributions to computer science. On the left side, there is a sidebar with a navigation menu containing links like "Introduction", "The college years", "Hopper at Work", "Book: The First Glossary of Programming Terminology", "Drawing: The Family Tree of Computers", "Image: Smithsonian Institution", "Video: Grace Hopper at MIT", "Education of Grace Hopper", "Timeline of Grace Hopper", "People Relevant to Grace Hopper", "Map of Grace Hopper", and "Library of Grace Hopper".

Example view of a “story”, dedicated to a person’s record.

The screenshot shows a web browser window with the title "Grace Hopper - Story | Science Stories". The main content area features a large yellow header with the title "Grace Murray at Vassar College". Below the header, a smaller text block states "This collection is provided by Yale University Library Manuscripts and Archives". The main content area contains two images: a portrait of Grace Murray Hopper and an image of a large Gothic-style building, likely Thompson Library at Vassar College. On the left side, there is a sidebar with a navigation menu containing links like "Introduction", "The college years", "Hopper at Work", "Book: The First Glossary of Programming Terminology", "Drawing: The Family Tree of Computers", "Image: Smithsonian Institution", "Video: Grace Hopper at MIT", "Education of Grace Hopper", "Timeline of Grace Hopper", "People Relevant to Grace Hopper", "Map of Grace Hopper", and "Library of Grace Hopper".

Example view of a “story”: The interface uses the IIIF-compliant Mirador image viewer to display images from open collections.



Linked data

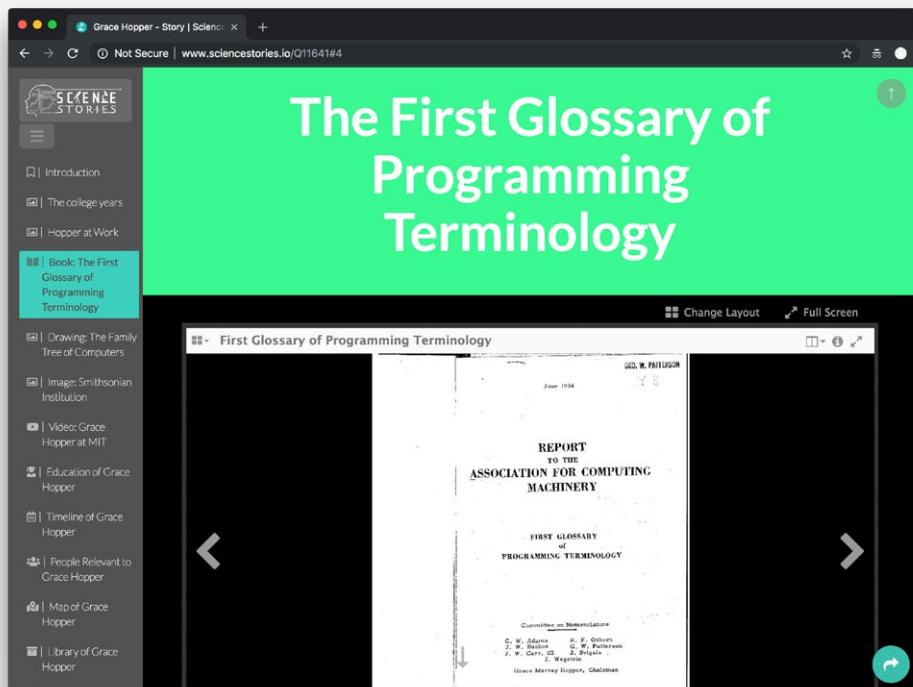


Explorable terminology



Single-object timeline

Example view of a “story”: The Mirador viewer can be used to display other media objects too, such as books or videos.



Example view of a “story”: A customized timeline view is rendered based on statements contained in the Wikidata record page.



Open source

Reference URL: <http://www.sciencestories.io/>

Date of screenshots: 2018-11-16

Notes: This project reimagines how linked data and media found in open collections can be combined to tell “stories” about people, in this case focusing on women in science. It demonstrates several different approaches to displaying data from Wikidata and Wikimedia Commons, including a timeline, a media viewer, and a custom view of Wikidata statements.



Science Stories (cont.)

The screenshot shows a web browser window titled "Grace Hopper - Story | Science". The URL is "www.sciencestories.io/Q11641#14". The main content area displays a Wikidata record for Grace Hopper (Q11641). The page title is "Grace Hopper (Q11641)". Below the title, it says "American computer scientist and United States Navy officer" and "Grace Murray Hopper | Grace M. Hopper". A sidebar on the left contains links to various resources related to Grace Hopper, including books, drawings, images, videos, and award rooms. A teal-colored button labeled "Wikidata Statements" is highlighted. The main content area has a "Statements" section which lists "instance of" (human), "award received" (Defense Distinguished Service Medal), and "image" (a portrait of Grace Hopper in military uniform).

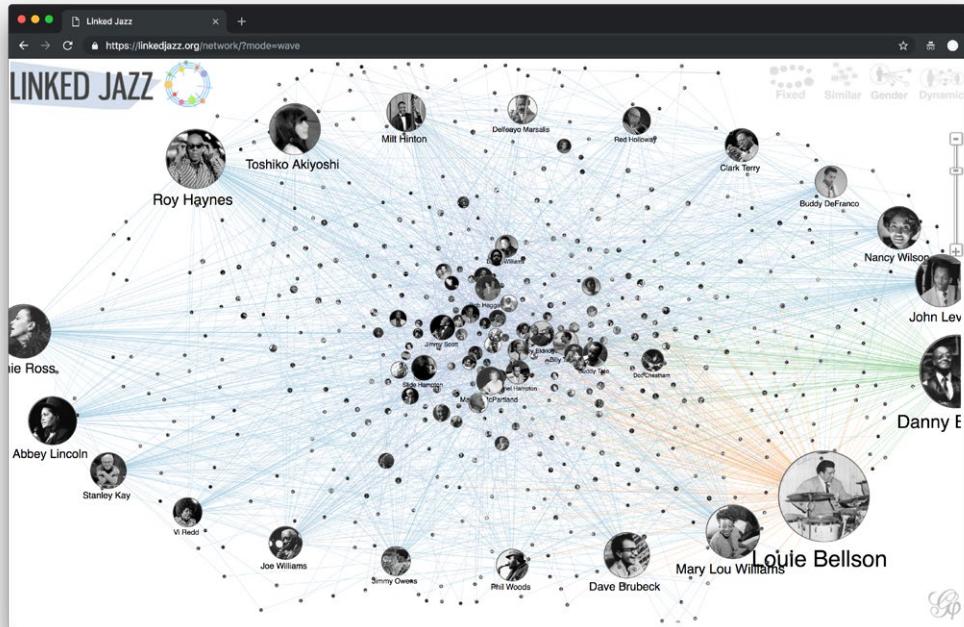
Example view of a “story”: The interface also features a customized view of the Wikidata record page.

This screenshot shows the same "Science Stories" interface for Grace Hopper, but with a different view of the Wikidata record. The main content area now displays a list of statements grouped by category. It includes entries for her name in native language (Grace Murray Hopper (English)), given name (Grace), family name (Hopper), date of birth (9 December 1906 Gregorian), place of birth (New York City), and various awards and honors such as the Defense Distinguished Service Medal, Legionnaire of Legion of Merit, National Medal of Technology and Innovation, Presidential Medal of Freedom, Computer History Museum fellow, Wilbur Cross Medal, World War II Victory Medal, W. Wallace McDowell Award, Meritorious Service Medal, and National Defense Service Medal. The sidebar and the "Wikidata Statements" button are visible on the left.

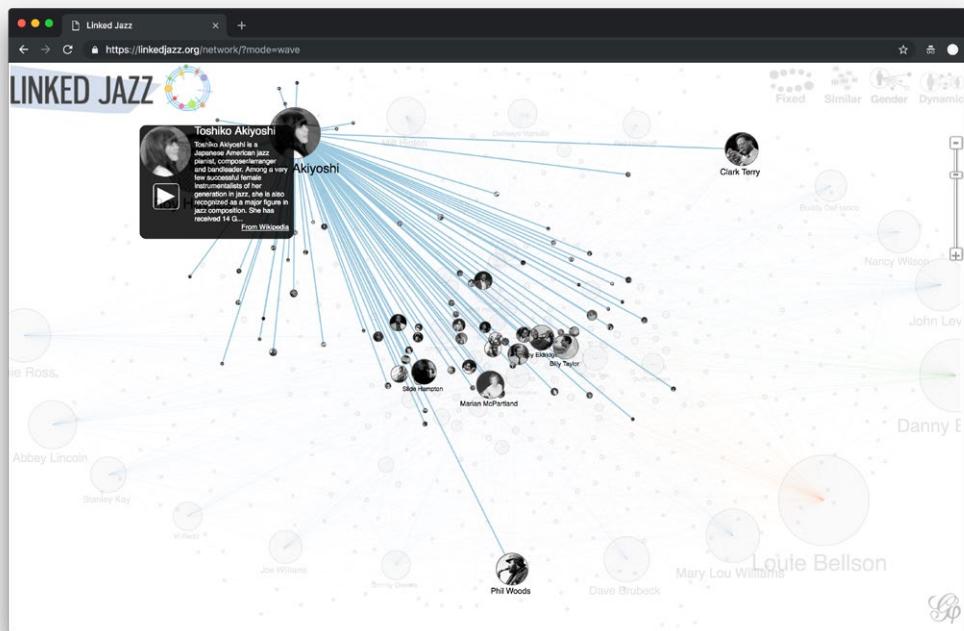
Notes (continued from p.85): Similarly to the previous portal interface, however, this one does not fundamentally redesign how Wikidata statements are presented to users. The overall ‘flow’ of the story is highly structured and works best for a single type of record—for example, a person’s records. Such highly structured fields may prove too limiting to describe complex artworks. The format would need to offer much greater flexibility to accommodate heterogeneous record types.

6 Interfaces utilizing data visualizations to express relationships in collections

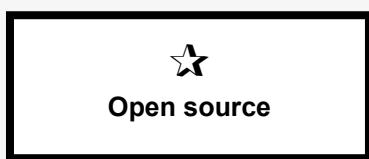
Pratt Institute—Linked Jazz (US)



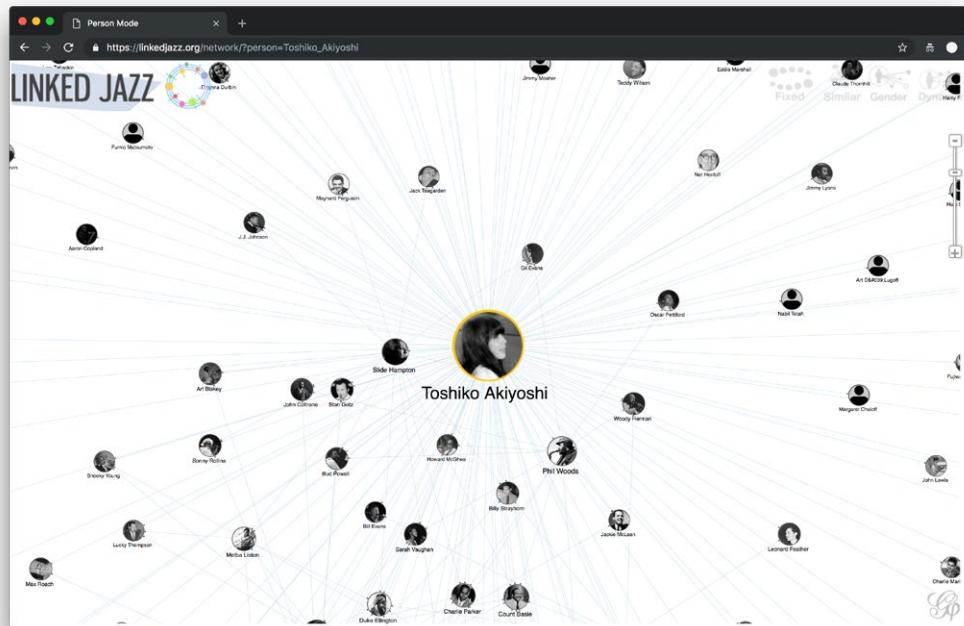
*Example collection overview:
A network diagram traces the
relations between actors in
the data set.*



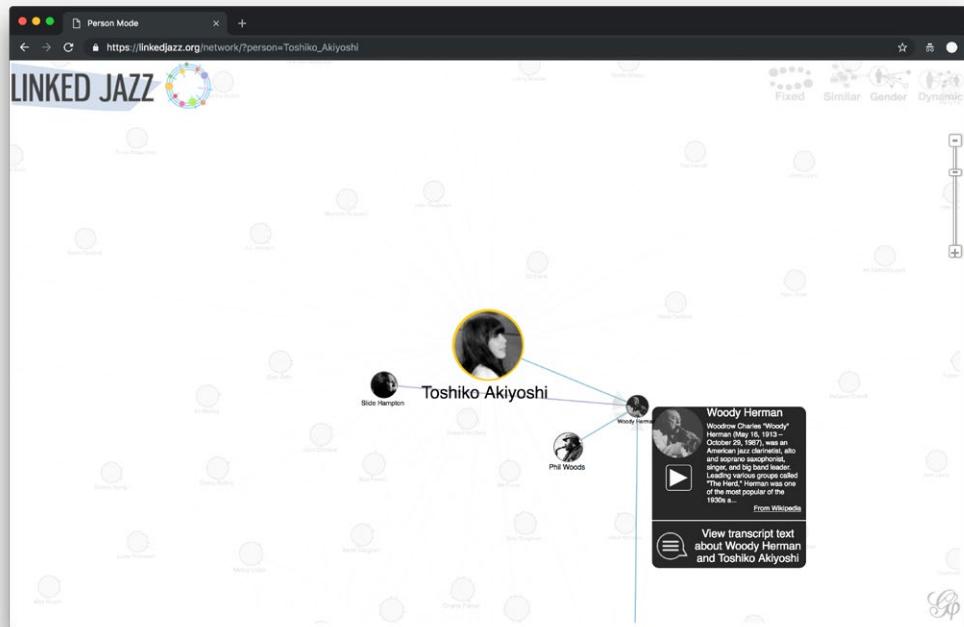
*Example collection overview:
Hovering over diagram nodes
narrows down the view of
possible relations.*



*Example collection overview:
Clicking on diagram nodes,
recenters the node and
highlights relevant relations.*



*Example collection overview:
Hovering over diagram nodes
in this 'filtered' state narrows
down the view even further,
plus features a 'preview' data
box for the relevant node.*

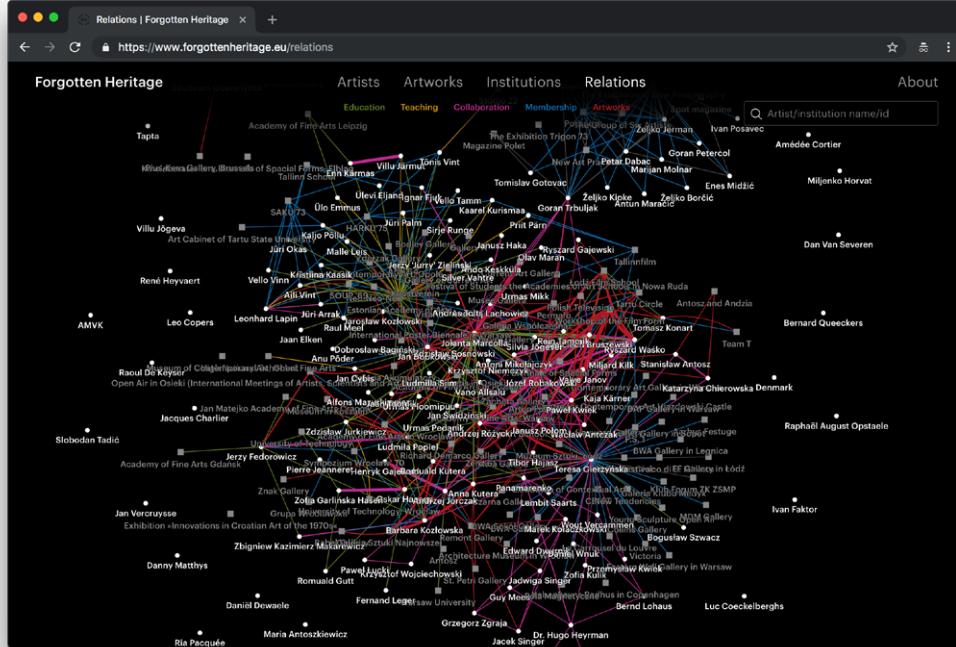


Reference URL: <https://linkedjazz.org>

Date of screenshots: 2018-11-16

Notes: This project from the Semantic Media Lab at Pratt features a number of different interfaces connected to their Linked Jazz linked data dataset. This particular project uses d3.js libraries to visualize the relations between the artists (or actors in the network of relations) in the data set. The interface gives a good overview of who may have some form of relation to whom, but as with most other network diagrams reviewed here, it remains somewhat opaque as to what exactly the nature of the relationship is. At times, this is due to the lack of more detailed data in the data model, or it may simply be a limitation of the visual design.

Forgotten Heritage (EU)



Example collection overview:
A network diagram traces the
relations between actors in
the data set.



Example collection overview:
A zoomed-in view of the sub-
set of relations which gets
highlighted once an 'actor'
node is clicked.

Reference URL: <https://www.forgottenheritage.eu/relations>

Date of screenshots: 2018-11-23

Notes: This is a collaborative initiative to collect archival information relating to Avant-Garde (mostly Eastern-)European artists among several art institutions in Europe. The project presents the data in different visualization styles, e.g. timelines and network diagrams. While at first, the amount of information in the diagram makes it unreadable, there are different filters that can 'sort' the relations. Searching for a specific name zooms in on the relations connected to that name, as does clicking on any node in the diagram. Within this zoomed-in view, the 'property' of the relation becomes readable on mouse-over. While this is a visually sophisticated interface designed to a higher standard than most other prototypes or experimental projects reviewed here, its underlying structure is opaque—there is no information on the website about the database or the data model used. In addition, the project does not appear to be open source, making it harder to evaluate in terms of potential interoperability and usefulness as a reference point for the Artbase.

Linked data

Network diagram

Expression of relations

NYPL Labs: Beta Tools (US)

The screenshot shows a network diagram visualization on the NYPL Archives & Manuscripts website. The interface includes a search bar at the top right and four buttons: 'About', 'Contact', and 'Digitized'. On the left, there are four 'Add' buttons: '+ Add Person', '+ Add Org.', '+ Add Topic', and '+ Add Title'. The main area displays a network of documents related to George Washington. Nodes are represented by icons of books or documents, and lines connect them with labels indicating the nature of the relationship. Some labels visible include 'Letter to General Washington [Cambridge, Mass.]', 'Letter to Lawrence Lewis', 'Letter to General George Washington [New York, N.Y.]', 'Letter to the Honble the Mayor, Recorder, Aldermen and Commonalty of the City of New York', 'Order of United Americans records', 'Farewell address', 'Mabel Washburn-William H. Cobb correspondence', 'Allan McLane letters', 'Richard John Levy and Sally Waldman Stevens' papers', 'Philip Schuyler papers', 'T.H. Morrell collection of original autograph letters of the presidents of the United States', 'George Washington notebook as a Virginian soldier', 'Thomas Crosson papers', and 'Worthington Chauncy Ford papers'. A central node is labeled 'Washington, George, 1732-1799'. A blue person icon is also present in the center. The bottom of the page contains copyright information and links to privacy policy, rules and regulations, website terms and conditions, and gifts of materials to NYPL.

Example collection overview: A network diagram of items in the collection related to the ‘term’ George Washington.

Linked data

Network diagram

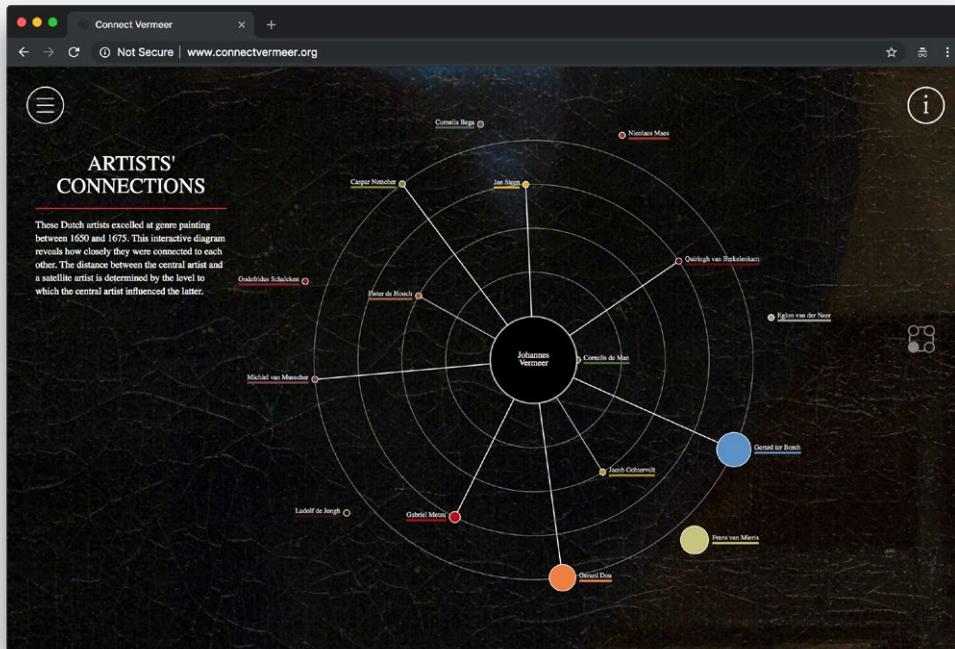
Expression of relations

Reference URL: <http://archives.nypl.org/terms/#>

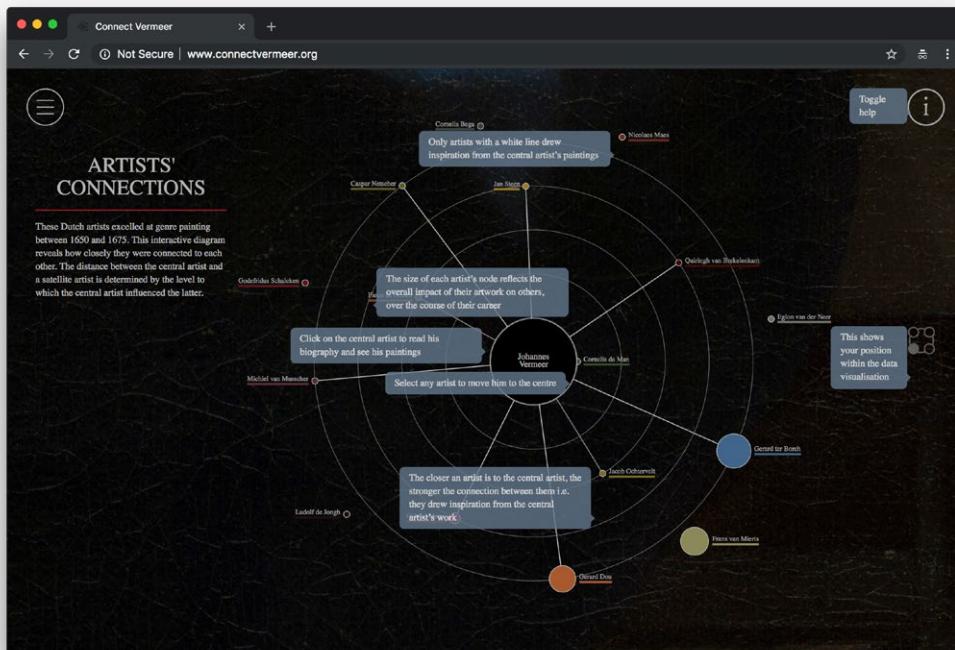
Date of screenshots: 2018-11-23

Notes: This interface is a beta tool developed by NYPL Labs to visualize relationships between related terms in their archives and manuscript collections. It utilizes a network diagram visualization and draws lines between different collection items identified by icons with short labels. While an interesting exploratory tool, like most other network diagrams, it obscures the nature of the relation between the items. This makes it a less useful tool for expert researchers/ users who may be looking for specific types of relations.

National Gallery of Ireland, Dublin; National Gallery of Art, Washington; Musée du Louvre, Paris—Connect Vermeer (EU/US)



Example collection overview:
Data visualization presenting
relations between actors in
the data set.



Example collection overview:
Data visualization presenting
relations between actors in
the data set with an overlay
providing explanatory text.



Linked data

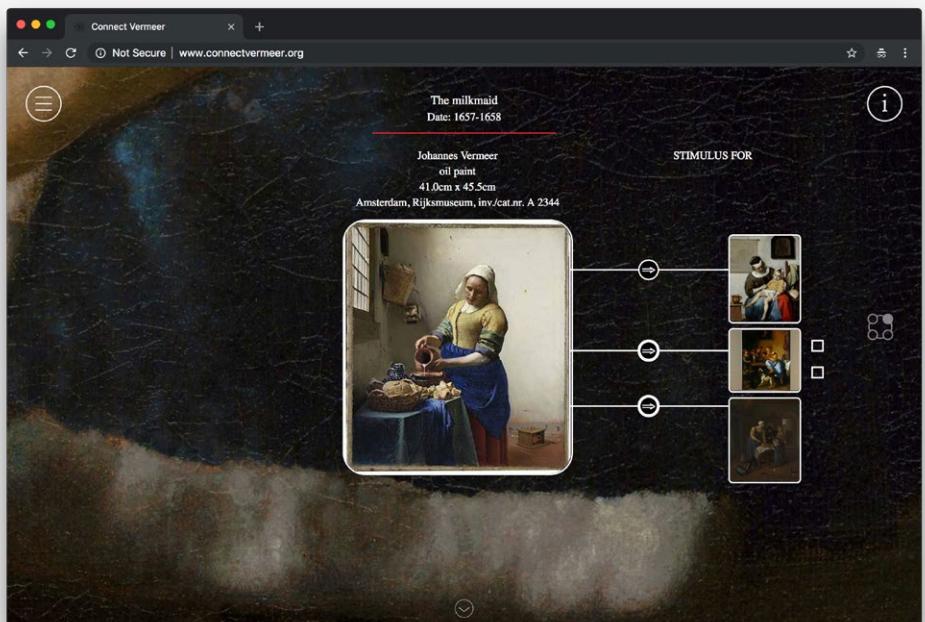


Data viz

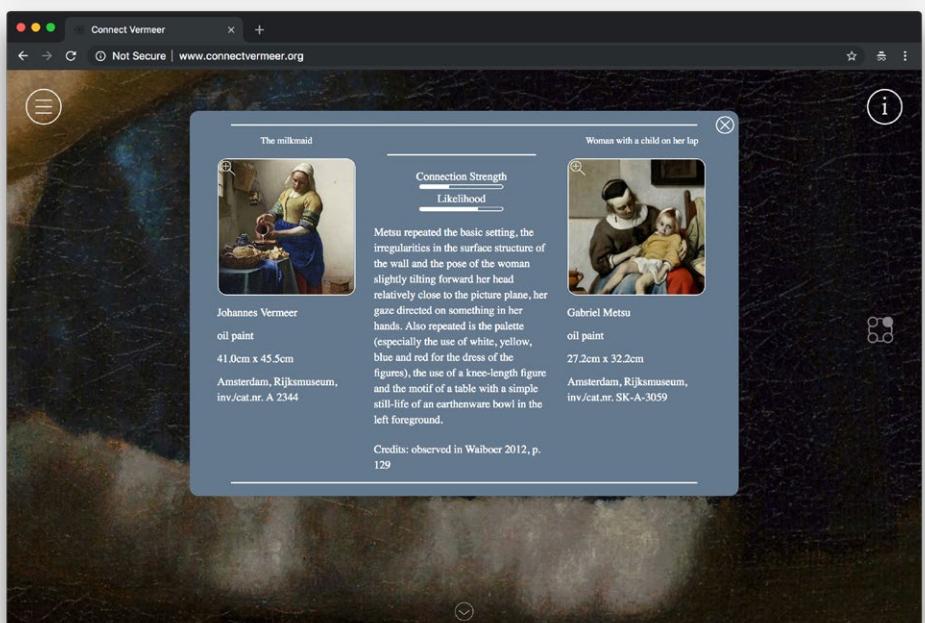


Expression of relations

Example view of an item record: Each artwork item is presented within a diagram of connections to other artworks it has influenced or has been influenced by.



Example view of an item record: An explanatory overlay provides further information about the nature of the relationship between two artworks.



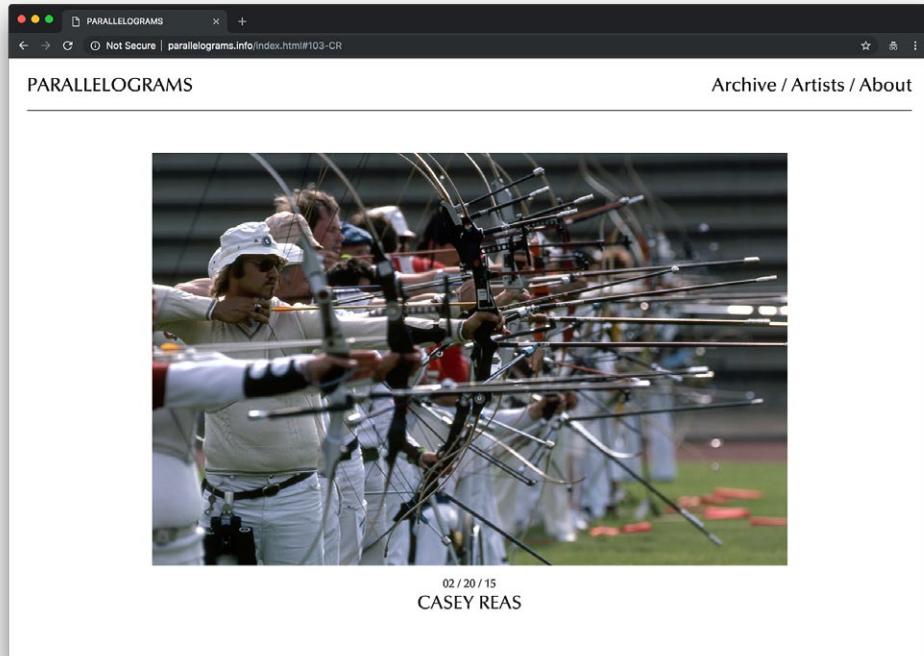
Reference URL: <http://www.connectvermeer.org/>

Date of screenshots: 2018-11-23

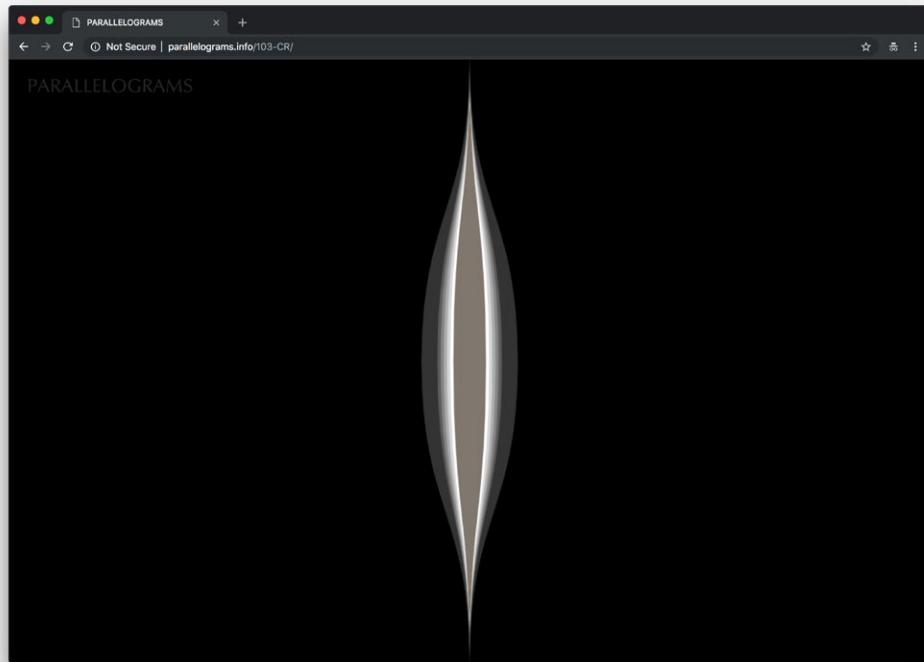
Notes: This joint project between three art institutions brings together research within a common linked data framework (using the CIDOC-CRM standard). While the visualization relating to artists remains largely opaque (despite the explanatory overlay text), the relations between artworks are clearly visualized and articulated further through a combination of qualitative historical argumentation and quantitative methods of analysis. Opting out of the more traditional approach of the network graph diagram, this interface aims to make relationships between items in the data set more explicit. Yet, much of the backend data modelling remains opaque, thus limiting the usefulness of the interface to expert users.

7 Interfaces for net art exhibitions

Parallelograms (2010-2015)



*Landing view of the exhibition:
The site can be navigated via
a long-scroll illustrated list of
artworks, displaying the most
recent first, or via an Archive
page of thumbnails organized
chronologically.*



*Example artwork view 1:
The artwork is presented full
screen. The only reference
back to the exhibition index is
the logo just visible (gray text
upon black ground) in the top
left corner.*



'White cube' exhibition
approach

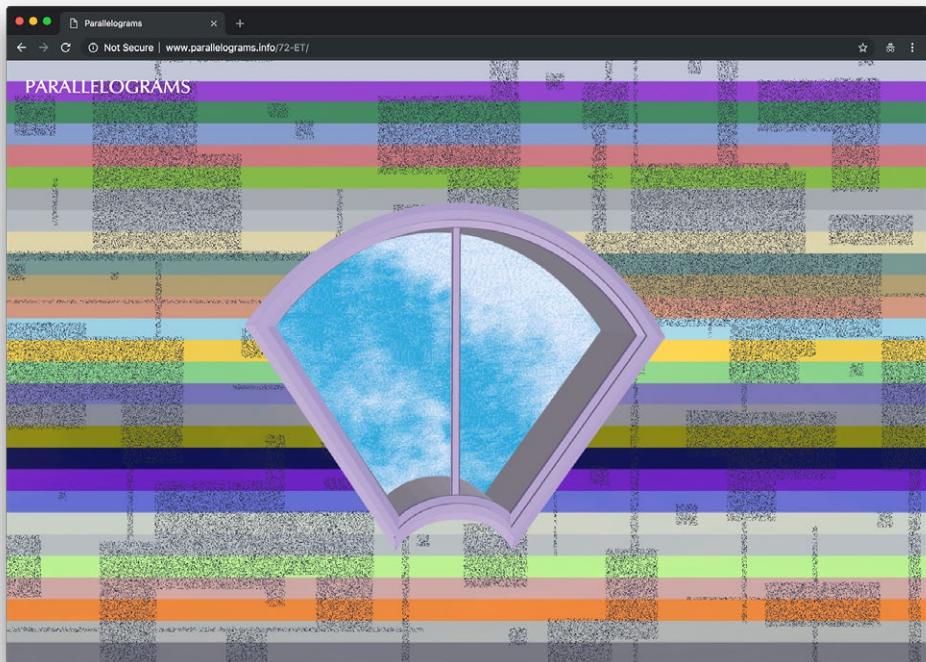


Overviews & previews



Artworks hosted on
exhibition site

Example artwork view 2.



The only contextual information provided is a list of artists' names and short biographies.

PARALLELOGRAMS

Archive / Artists / About

CAREY DENNISTON

For several years, artist Carey Denniston photographed what she argued was the same male Northern Cardinal living in her Brooklyn backyard. In late Spring of 2012, she saw two.

CASEY REAS

Casey Reas' software, prints, and installations have been featured in solo and group exhibitions at museums and galleries around the world. He lives and works in Los Angeles.

CATHERINE CZACKI

Catherine Czacki is an artist living and working in San Diego. She has a BFA from the San Francisco Art Institute and an MFA from Columbia University, and has traveled to Poland on a research grant at the University of Warsaw.

Reference URL: <http://parallelograms.info/>

Date of screenshots: 2018-11-25

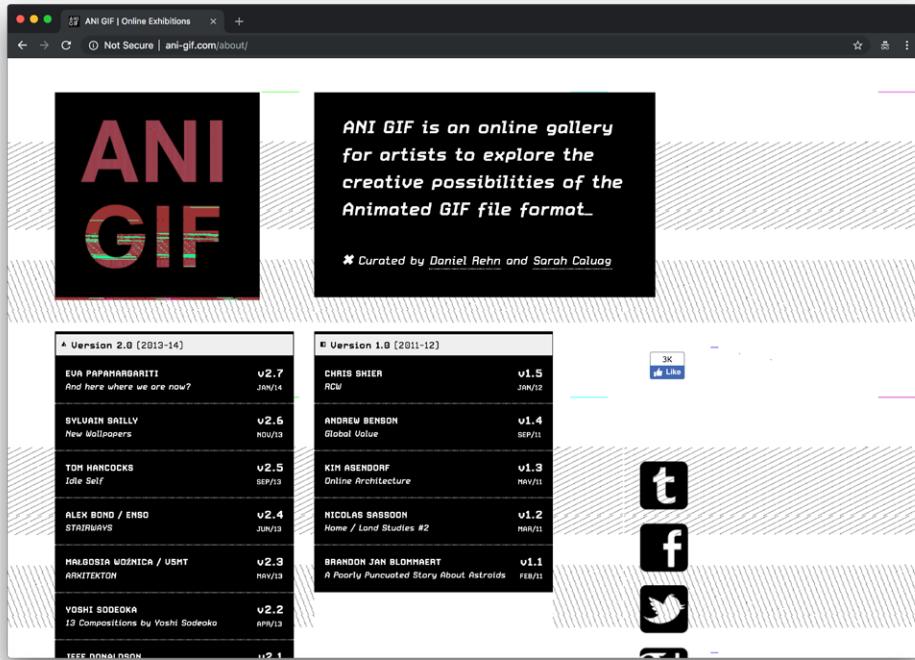
Notes: This online exhibition is organized as a series of individual commissions, developed between 2010–2015. Artwork thumbnails are presented as clickable elements which open new, self-contained pages. The majority of the artworks are hosted on the exhibition site, but some video works are hosted elsewhere. The formula of white background, responsive image grid structure and minimal typography adhere to the portfolio and gallery websites from the late 2010s. The minimal, seemingly 'transparent' interface design adheres to the 'white cube' gallery space paradigm. No further context is provided for individual artworks.



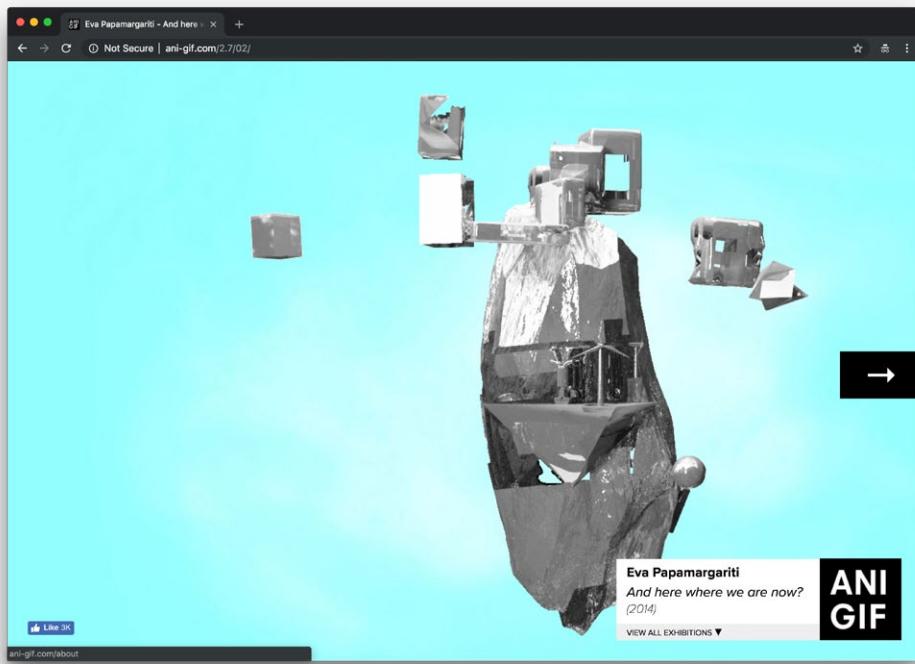
External embedded
media



ANI GIF (2011-2014)



Landing view of the exhibition: A chronological list of artwork titles serve as links to individual commissions. Thumbnail previews are not provided.



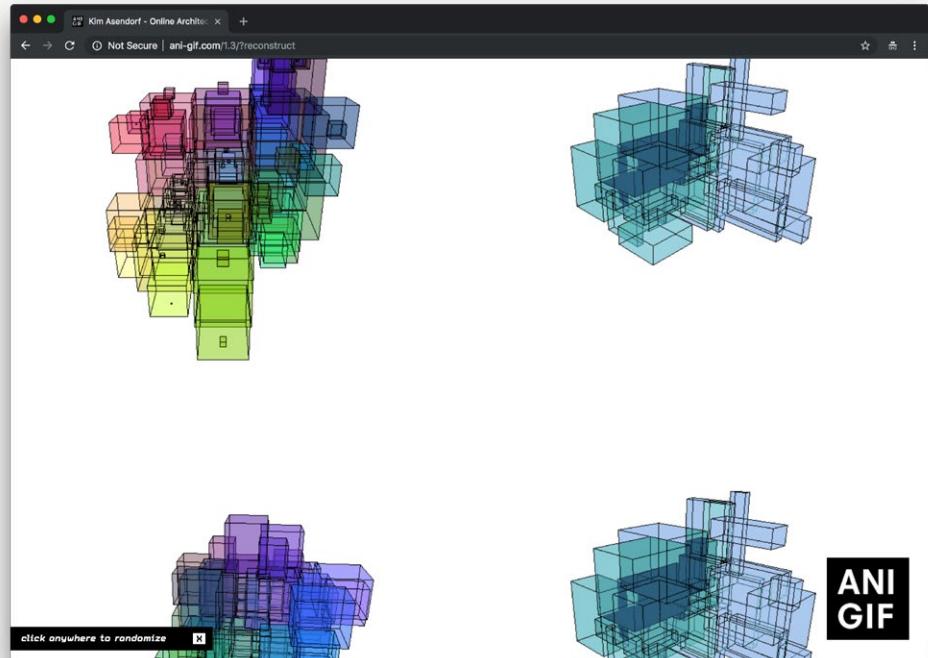
Example artwork view 1:
Each commissioned artwork utilizes the entire space of the browser window. The only fixed page element is the square exhibition logo (lower right), which provides basic information about the artwork and links back to the homepage.

★
Vertical scroll

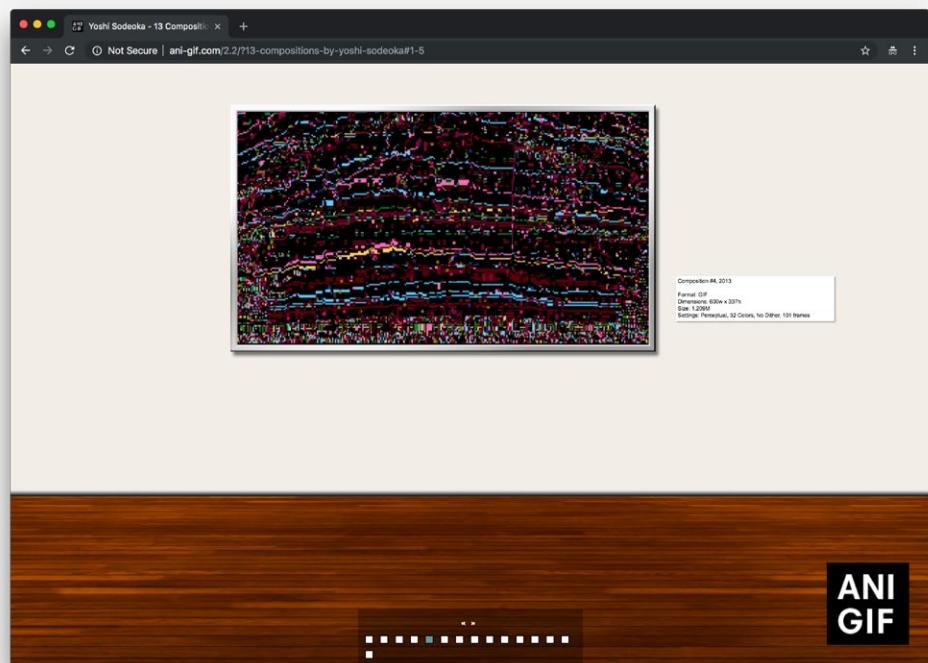
★
Horizontal 'slide'
transition

★
Virtual 3D gallery
environment

*Example artwork view 2:
This piece responds to
vertical scrolling, and a user
click generates alternate
views.*



*Example artwork view 3:
This work utilizes a
metaphorical 3D virtual
gallery space.*



Reference URL: <http://ani-gif.com/>

Date of screenshots: 2018-11-25

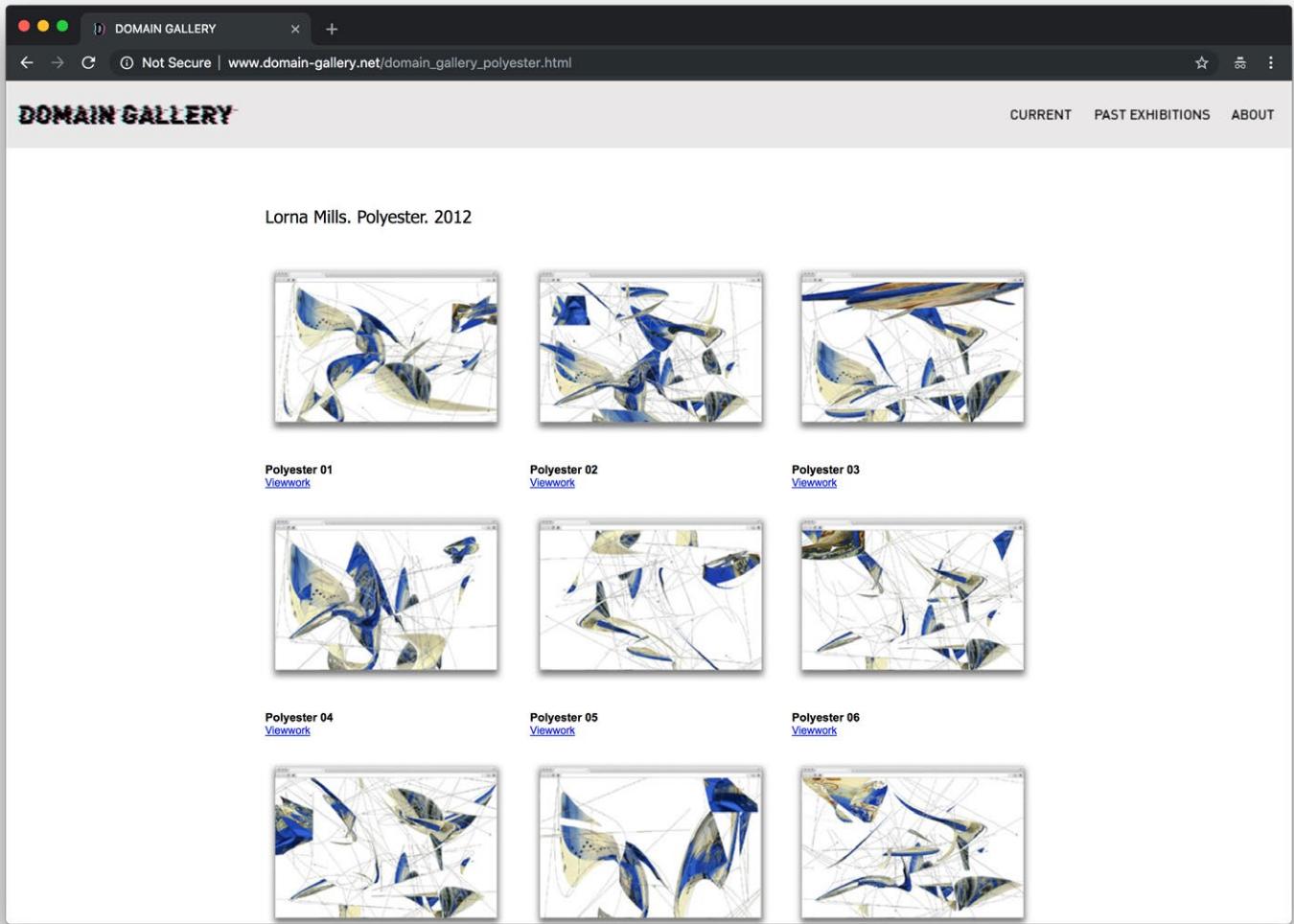
Notes: This online exhibition features multiple commissions by artists (each conceived as a small, stand-alone exhibition), which are all hosted on the main site's infrastructure. Some of the commissions use the vertical space of the browser for display (vertical scroll). Others use the horizontal space—via left/right arrows in a slideshow style. One of the commissions adds a secondary level of navigation and uses the browser window as a virtual 'gallery wall', adding mock frames around the artworks, and allowing horizontal panning of the wall left and right, to navigate between artworks in the 'space'.



**Artworks hosted on
exhibition site**



Domain Gallery—Lorna Mills (2012)



Landing view of the exhibition: The artwork previews are shown in a grid of thumbnails.



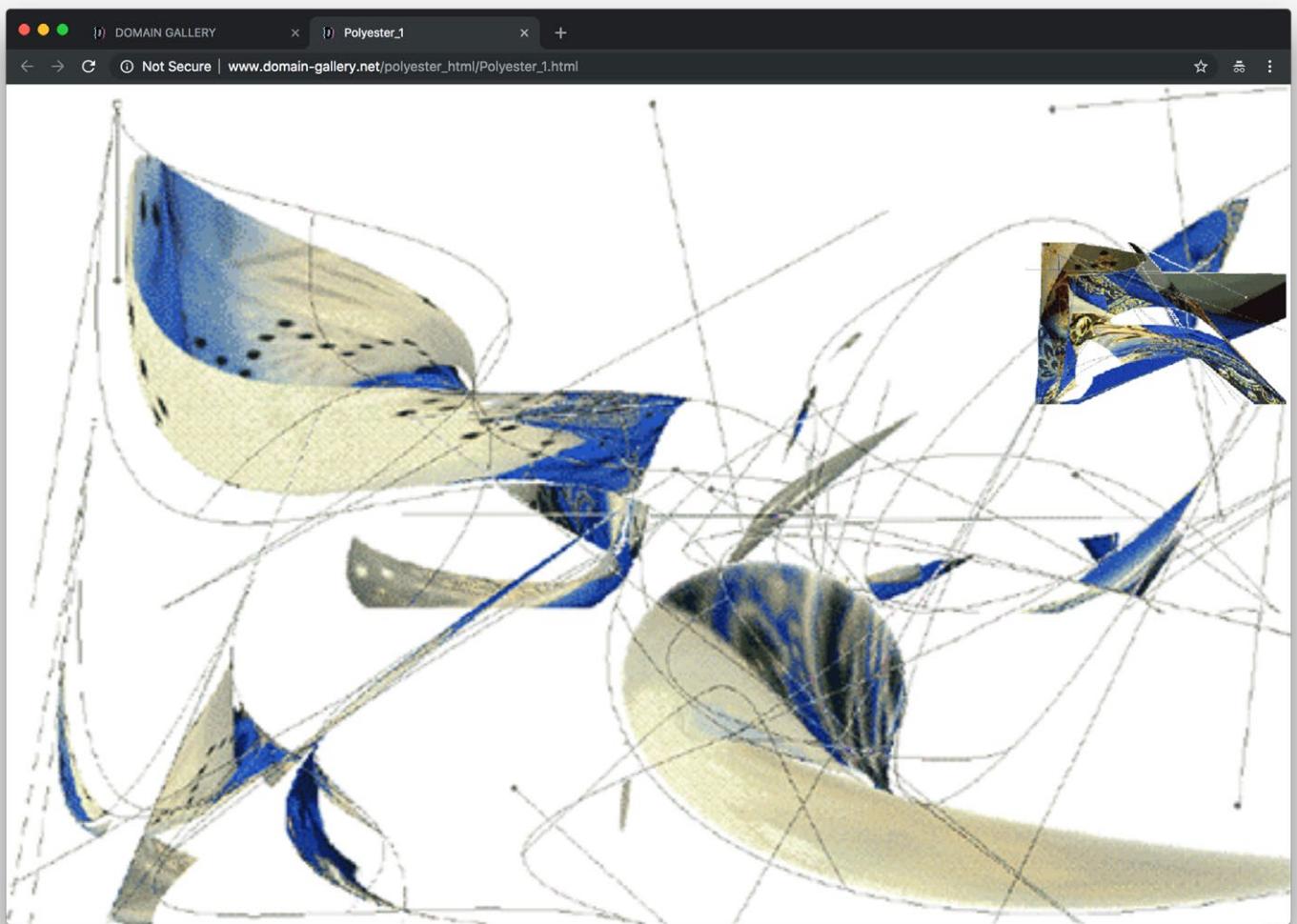
'White cube' exhibition approach



Overviews & previews



Artworks hosted on exhibition site



Example artwork view: The artwork opens up in a new browser tab and fills the entire browser window.



**Browser frame included
in previews**

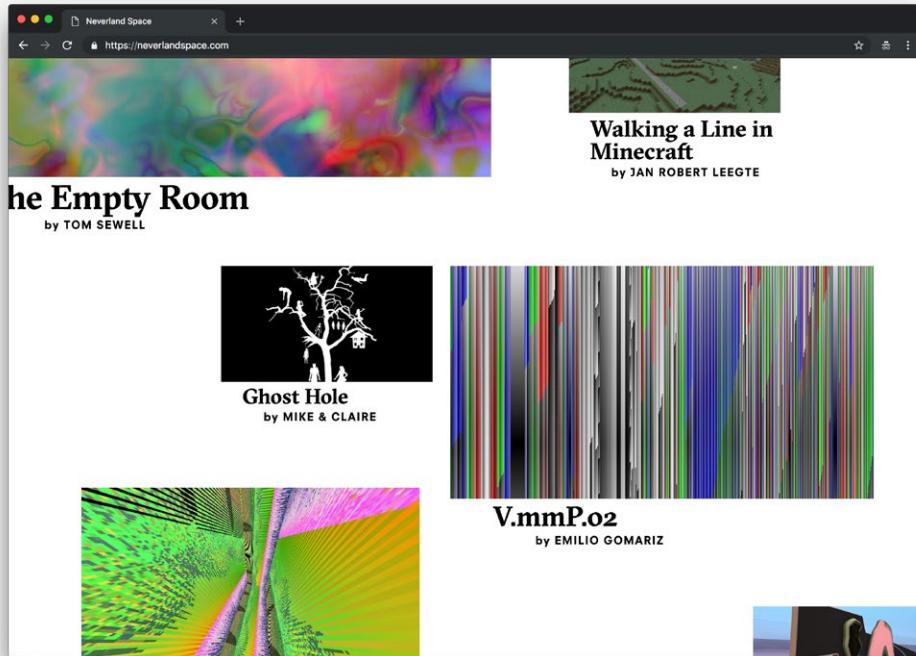
Reference URL: http://www.domain-gallery.net/domain_gallery_polyester.html

Date of screenshots: 2018-11-25

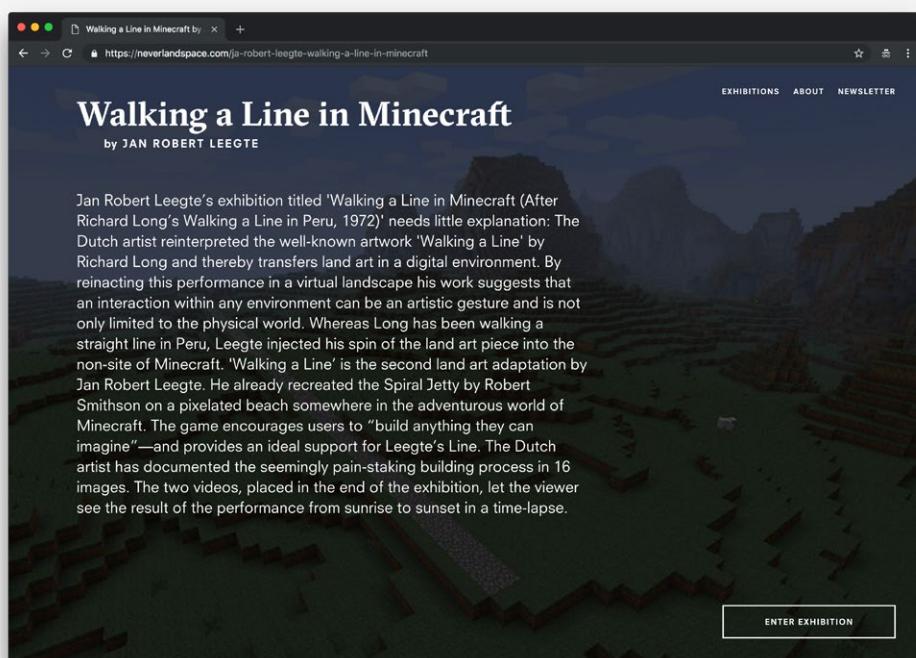
Notes: A solo show of animated GIFs, all hosted on the gallery website. Artworks are accessible via links from the exhibition landing page. The landing page shows the images as a grid of screenshots including the browser window itself, which serves as a framing device and makes the landing page look like a born-digital salon wall. The overall approach is minimal—within the artwork view there is no provision of navigational instructions or additional context.



Neverland Space—Walking a Line in Minecraft (2013)



Landing view of the exhibition website: Multiple exhibitions are featured as preview images.



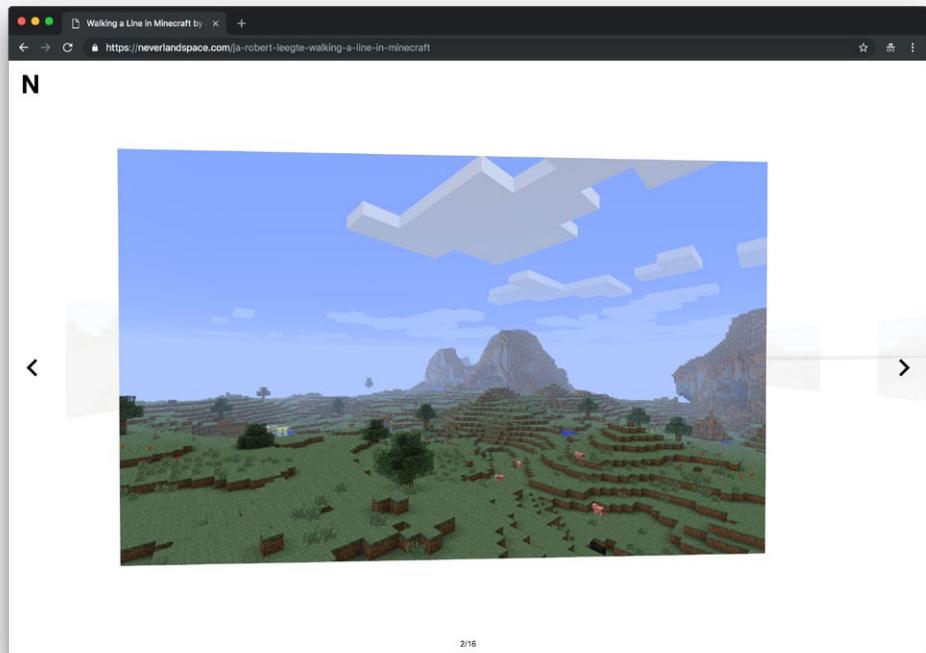
Entry point to a single exhibition.

★
'White cube' exhibition approach

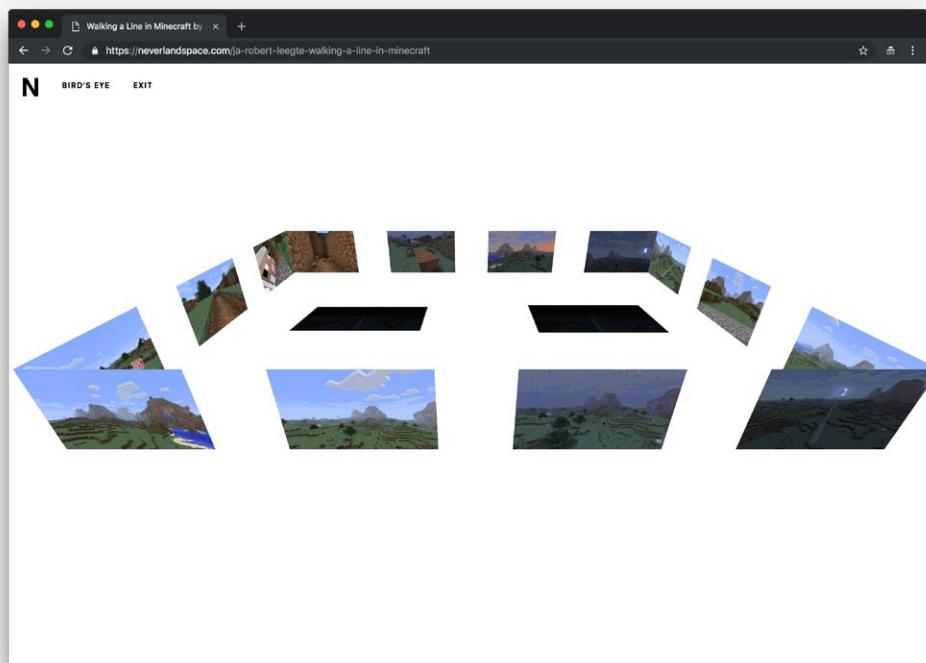
★
Overviews & previews

★
Virtual 3D gallery environment

*Example artwork view:
This screenshot shows a
zoomed-in mode, which
features left/ right navigation
arrows.*



*There is also an alternative
exhibition navigation mode,
which is a bird's eye view of
all artworks.*



Reference URL: <https://neverlandspace.com>

Date of screenshots: 2018-11-25

Notes: This is an online exhibition representative of all shows staged at Neverland Space's website. These shows include still images, videos and GIF files staged as virtual installations within a blank 3D space. Offering multiple viewing modes within an otherwise empty virtual space gestures towards Metaverse tropes and strategies utilized in multiplayer online computer games, yet the overall aesthetic of the space remains within the 'transparent'/ 'white cube' paradigm. Some context is provided on each exhibition's entry page.



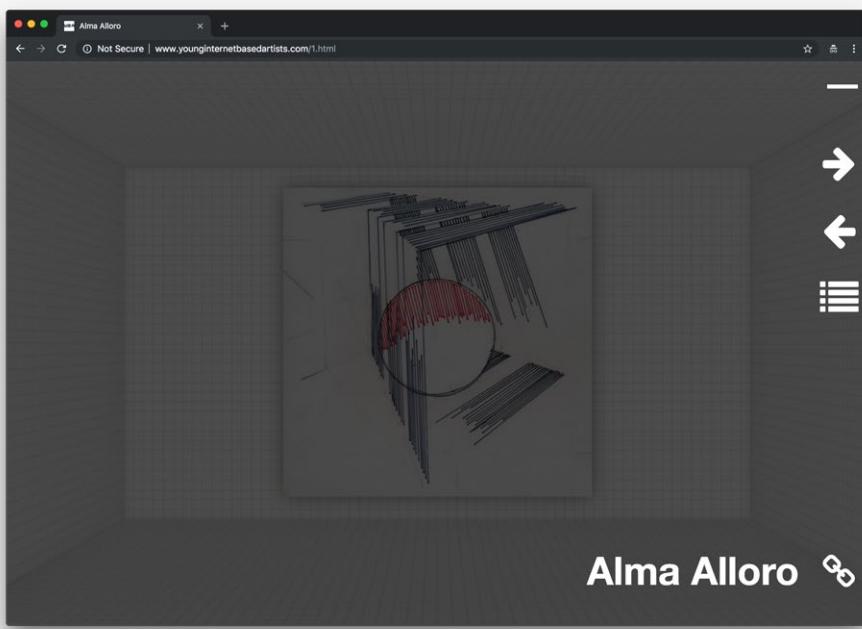
Artworks hosted on
exhibition site



Young Internet Based Artists (2013)



Landing view of the exhibition:
In this screenshot the
optional information overlay is
switched on.

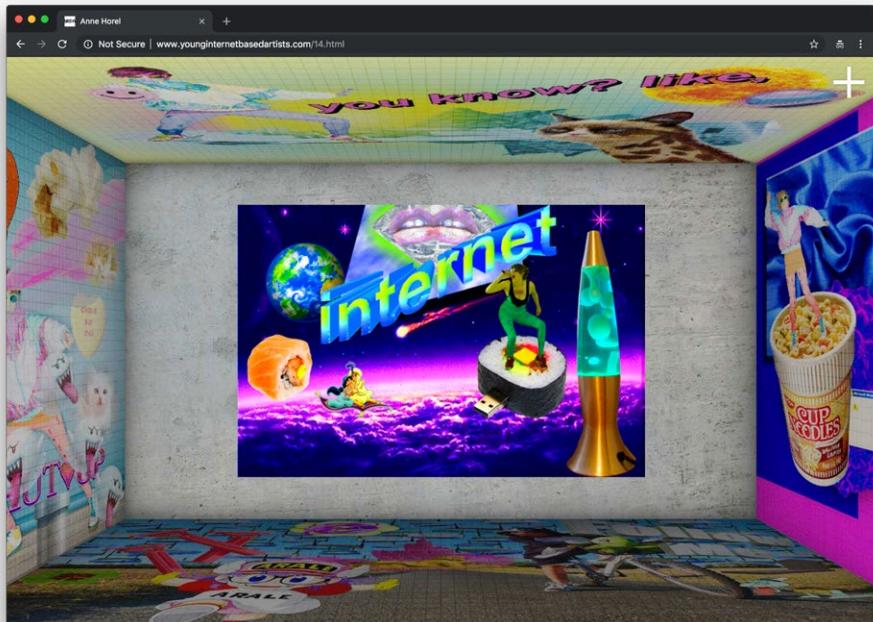


Example artwork view 1:
In this screenshot the
optional information
overlay is switched on.

- ★
Virtual 3D gallery environment
- ★
Horizontal 'slide' transition
- ★
Overlay state for contextual information
- ★
External embedded media
- ★
Artworks hosted on exhibition site

Example artwork view 2:

In this screenshot the optional information overlay is switched off.



Example artwork view 3:

This view features embedded video.



Reference URL: <http://www.younginternetbasedartists.com/>

Date of screenshots: 2018-11-25

Notes: This online exhibition utilizes Gallery 404—an open-source, browser-based 3D exhibition space tool—offering a virtual gallery wall for artists to display their work and to modify the surrounding wall surfaces. The look and feel of the 3D space resembles Metaverse tropes, and other computer game virtual worlds, but it is not an immersive environment. More conventional web-based navigation tools allow the user to either experience the exhibition as a linear slide show—with left/ right arrow controls, or to jump between artworks via a list of artists' names. All navigation controls are accessible in an overlay state from an expandable menu button. While some artworks are hosted on the site itself, others rely on external sources being embedded in the virtual gallery space.

Body Anxiety (2015)

Landing view of the exhibition: A static sidebar on the left displays a list of all the exhibiting artists' names and functions as an index/navigation menu.

BODY ANXIETY

ABOUT

- Jen Thinks...
- Leah Says...
- Bios

Andrea Crespo
Saoirse Wall
Victoria Campbell
Endam Nihan
Aurorae Parker
Mary Bond
RAFIA Santana
Ann Hirsch
Nancy Leticia
Georges Jacotey
Erika Alexander
Hannah Black
Randon Rosenbom
Rachel Rabbit White
Faith Holland
Kate Durbin
Angela Washko
Leah Schrager
Marie Karlberg
Alexandra Marzella
May Waver

Body Anxiety

"Whenever you put your body online, in some way you are in conversation with porn..."
Ann Hirsch

"This is painful: no matter how many levels of consciousness one reaches, the problem always goes deeper. It is everywhere."
Shulamith Firestone

Click down to view next, click right to view within, click info in lower right hand corner for details.

Landing
[View show statement.](#)

[close info](#)

Example artwork view 1.

BODY ANXIETY

ABOUT

- Jen Thinks...
- Leah Says...
- Bios

Andrea Crespo
Saoirse Wall
Victoria Campbell
Endam Nihan
Aurorae Parker
Mary Bond
RAFIA Santana
Ann Hirsch
Nancy Leticia
Georges Jacotey
Erika Alexander
Hannah Black
Randon Rosenbom
Rachel Rabbit White
Faith Holland
Kate Durbin
Angela Washko
Leah Schrager
Marie Karlberg
Alexandra Marzella
May Waver

Celinde

General Information

- Age: variable
- Sex: transsexual
- Gender: variable
- Sexuality: asexual
- Current residence: human/host

Tendencies

- depressive
- empathic
- quiet
- denude
- monroe
- reclined
- relaxed
- systematic
- hyperfocused
- thoughtful
- persistent
- slimy
- secure

Prefers...

- calmude
- calming activities
- repetition
- reality
- neutrality
- listening
- reciting
- suspicion
- sensory deprivation
- absorption

Special Abilities

- clairvoyance
- systematizing
- hypnosis
- hyperlexia
- pattern-recognition
- transference

Cynthia

General Information

- Age: variable
- Sex: transsexual
- Gender: variable
- Sexuality: variable
- Current residence: human/host

Tendencies

- hyperactive
- caregiving
- talkative
- exhibitionistic
- irritable
- excitable
- executive functioning
- expanded attention
- impulsive
- negligent
- playful
- narcissistic

Prefers...

- occasional company
- energetic activities
- variation
- fun
- extreme
- talking
- singing
- laughing
- sensory overload
- scattering

Special Abilities

- prostitution
- elusion
- coaxing
- seduction
- camouflage
- memory

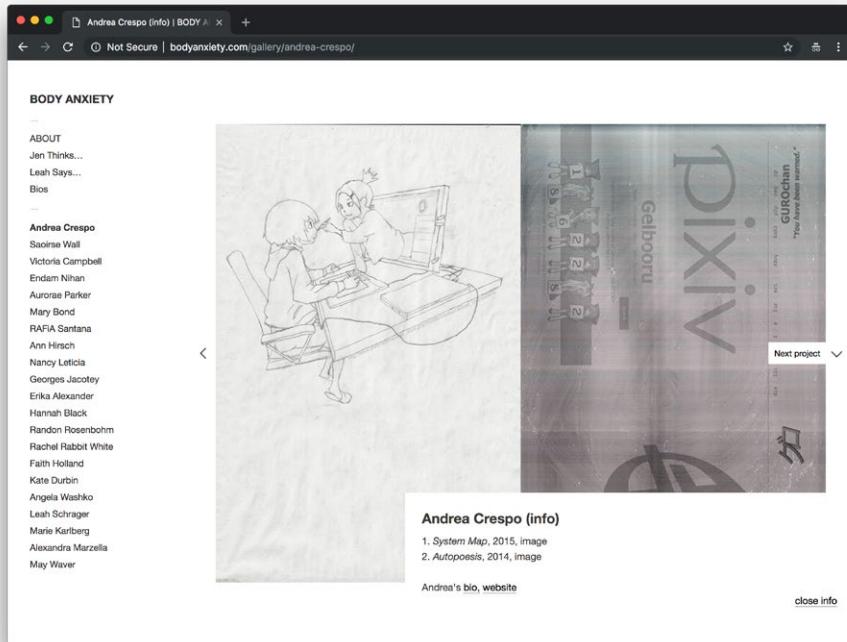
[Andrea Crespo \[info\]](#) 1 of 2

★
‘White cube’ exhibition approach

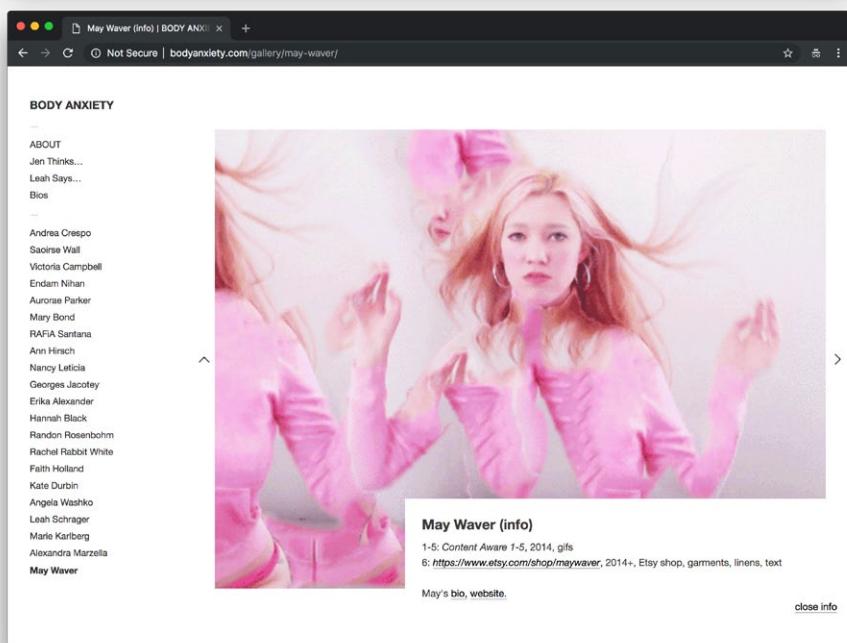
★
Horizontal ‘slide’ transition

★
Overlay state for contextual information

Example artwork view 2:
In this screenshot, the information overlay panel is switched on. Navigation within projects is horizontal, and users are able to flip through a slideshow of images left to right. Navigation between projects is vertical. Users can click on the 'Next project' button (centre right) to auto-scroll down the page and reach the next project.



Example artwork view 3.



Reference URL: <http://bodyanxiety.com/>

Date of screenshots: 2018-11-25

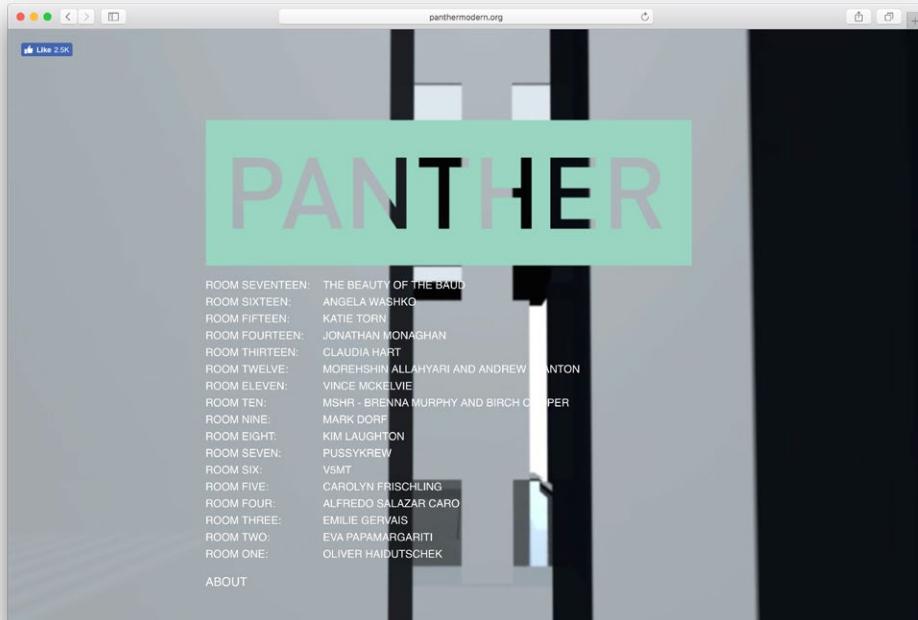
Notes: The white space and the straightforward navigation style adhere to the portfolio and gallery websites from the late 2010s. The overall layout follows the established “index + exhibit format” popularised by the Indexhibit platform, still widely used by artists and designers to date. An ‘invisible’ / ‘transparent’ approach to the interface design adheres to the ‘white cube’ gallery space paradigm. Limited contextual information is provided via the ‘info’ button (lower right) which opens an overlay panel. The medium labels suggest where the artworks are hosted—images and animated GIFs are hosted on the exhibition site; videos are embedded from external platforms; websites are added as links only.



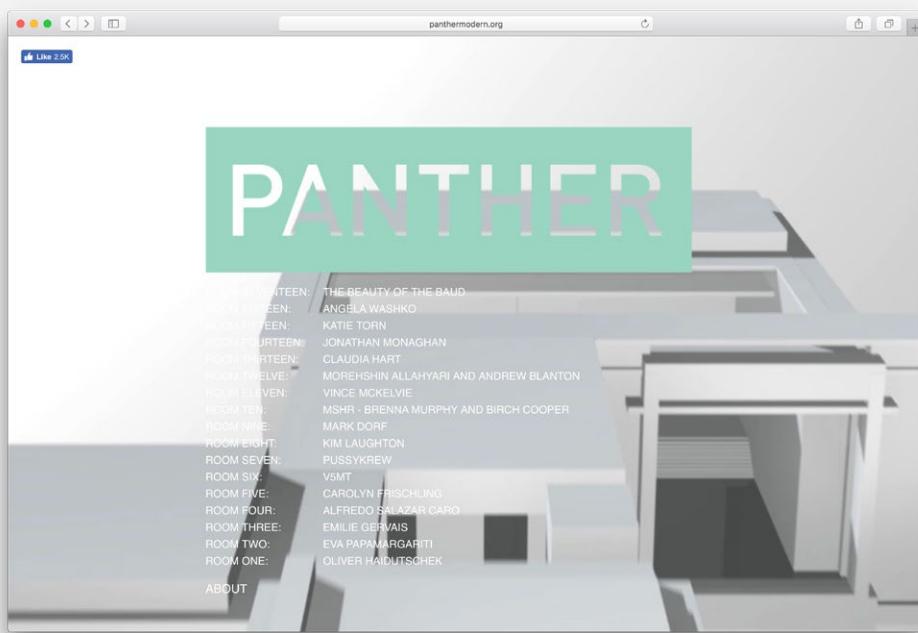
External embedded media



Panther Modern (2014–2016)



Landing view of the exhibition 1:
Artists/ exhibition areas are listed
in an index list format.



Landing view of the exhibition 2:
A video pans around the 3D
virtual space in the background
(not available in all browsers).



Virtual 3D gallery
environment

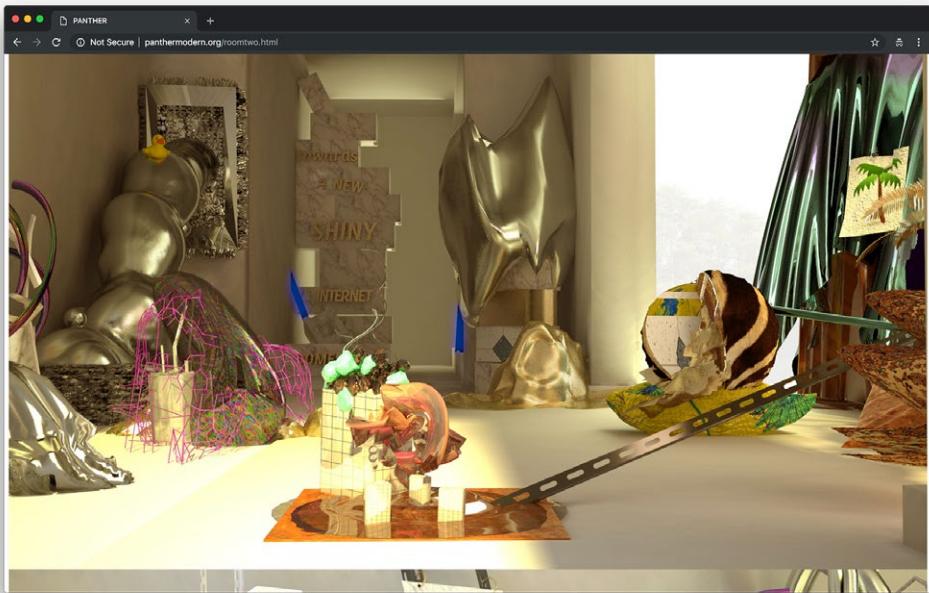


Artworks hosted on
exhibition site

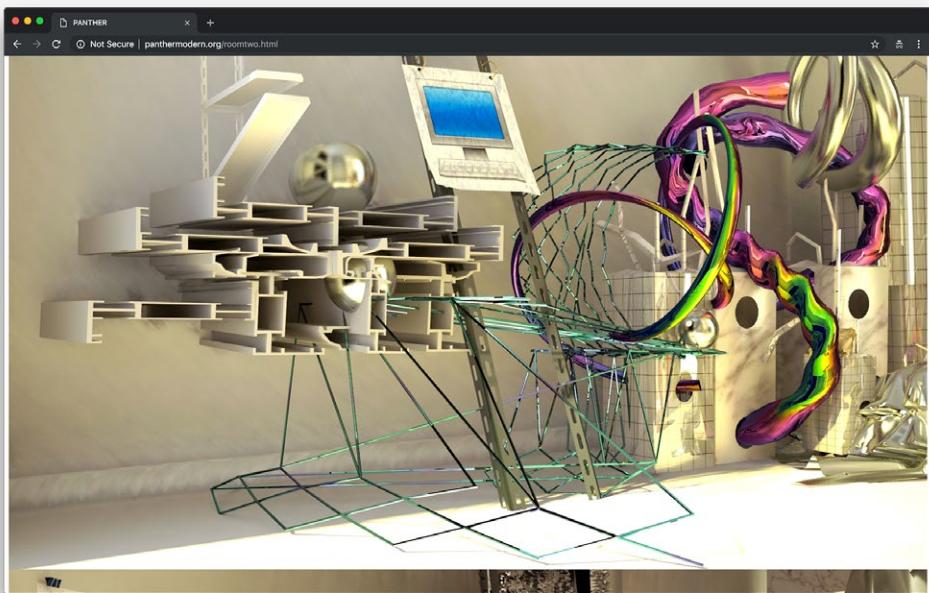


External embedded
media

*Example artwork view 1:
A series of images are
stacked vertically on the
page.*



Example artwork view 2.

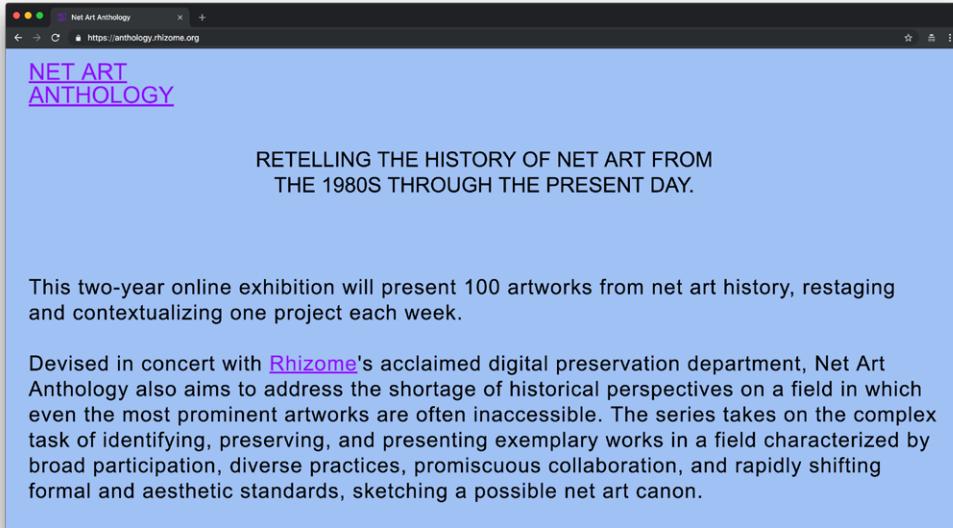


Reference URL: <http://panthermodern.org/>

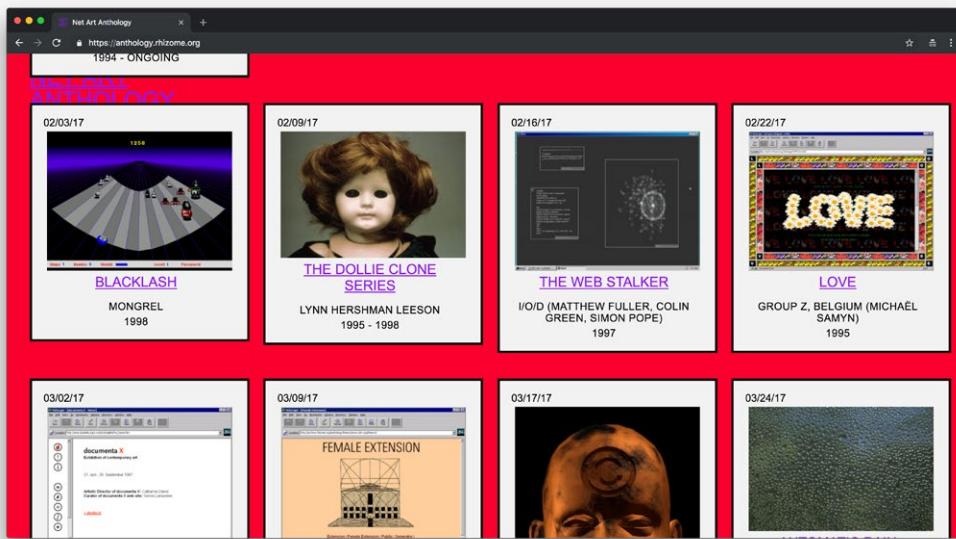
Date of screenshots: 2018-11-25

Notes: Panther Modern is a file-based exhibition space. Each artist is allocated a 'room' to create a site-specific work. Rooms are linked visually in the images rendering the 3D-modelled space, but not structurally: i.e. users cannot navigate across the 3D modelled space or from one room page to another. The works are presented mostly as a series of .jpg images stacked in a vertical scroll. Some pages (but not all) require the no longer supported Unity-3D web player browser plug-in, and in its absence load only the static .jpg images. This indicates that the exhibition was originally conceived as a fully immersive environment, borrowing paradigms from computer game virtual worlds, but due to the Unity-3D plug-in's obsolescence this level of interaction is no longer available to the user.

Net Art Anthology (2016–2018)



Landing view of the exhibition 1:
A short text introduces the exhibition context.



Landing view of the exhibition 2:
An overview of the exhibition is provided via chapter divisions and previews of the artworks as thumbnail images.

★
Overviews & previews

★
Vertical scroll

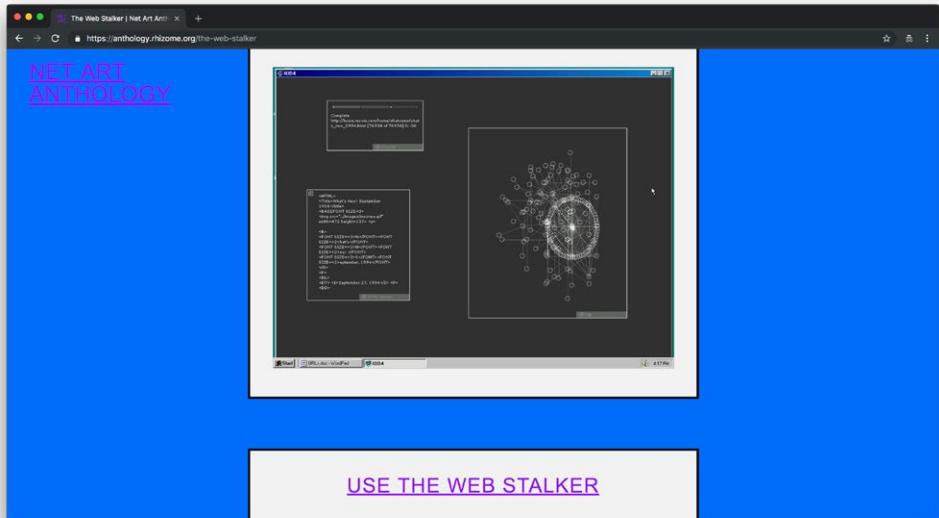
★
Browser frame included in previews

★
Rich context

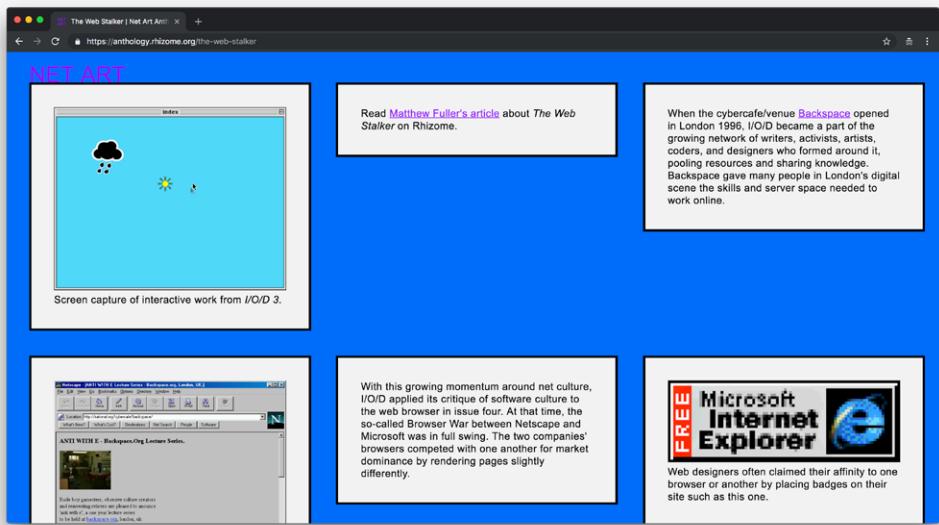
★
Artworks hosted on exhibition site

★
Emulated environments

Example artwork view 1:
A representation screenshot and entry point button are constant features across all artwork presentations.



Example artwork view 2:
Further contextual supplements are presented in bite-sized 'chunks' of visual/ textual information.



Reference URL: <https://anthology.rhizome.org/>

Date of screenshots: 2018-11-25

Notes: The Net Art Anthology is Rhizome's most recent exhibition of net art. During user research sessions, users were asked to comment on the interface design. Stand-out features were: the generous size of artwork previews, which provide an at-a-glance overview of the exhibition; the rich contextual information around artworks (including supplementary literature and published texts); as well as the emulated representations of artworks in their native environments.

Summary and recommendations

Summary of the review

This report has reviewed 46 different interfaces ranging from institutional to experimental projects. The review identified key features from these interfaces into ‘feature cards’ visible in the bottom of the page below each respective project. These features do not aim to describe all possible interactions with the interface in detail, but rather describe only key concepts or interaction paradigms which have relevance to the redesign of the ArtBase archive.

The feature cards have been organized into categories (below). Categories are informed by: archives’ general data structure and software development; the various methods of entry and discovery offered to users; how object-level records are presented alongside their metadata; and finally, the different strategies employed to exhibit net art online. The cards’ order is determined by the number of occurrences registered during the review. This ordering system does not aim to suggest that certain features are more important because they are included in interfaces more widely, but rather to draw out which features are already well-established, and which features are only now beginning to gain popularity. Furthermore, some features may be present in multiple examples from the review, but if all of these examples are experimental projects, those features may not always be appropriate for other contexts, such as institutional collections. In any case, the ‘popularity’ of features would have some impact on whether they are recommended in the ArtBase redesign or not. Features that are utilized often are most likely to be interaction paradigms which have already been tested with users and proven to be useful. However, the primary criteria for selecting which features would be developed in the ArtBase redesign, is not general ‘popularity’ or common use. Instead, features selected for recommendation respond to some of the user stories, and reflect the user needs expressed during previous user testing sessions. These must also be compatible with the infrastructure setup already in place at Rhizome.

The following pages first organize the feature cards into categories (pp.116–7), and then match the feature cards to user story cards established in Report #2, through a series of diagrams (pp.118–123).

The concluding pages, provide a list of recommendations and detail some of the features proposed for further development in the prototyping stage of the redesign process.



Features related to database setup and data structure

★ x 13

Linked data

★ x 4

Explorable terminology

★ x 4

Capacity for contradiction

★ x 5

Invitation to contribute

★ x 4

Open source

Features related to entry points and discovery

★ x 18

Overviews & previews

★ x 10

Generous interfaces

★ x 7

Data viz

★ x 6

Multi-object timeline

★ x 7

Expression of relations

★ x 5

Sort by color

★ x 3

Links to related queries

★ x 3

Network diagram

★ x 3

Randomization

★ x 4

Curated selections

★ x 3

SPARQL query GUI

Features related to single-record-level pages

★ x 5 Single-object timeline	★ x 4 Metadata clustering	★ x 2 Metadata richness indicator
★ x 2 Metadata related to literature & events	★ x 2 Natural language summary generated from structured data	★ x 2 Metadata in collapsible element
★ x 1 Metadata in collapsed sidepanel	★ x 1 Metadata checklist	★ x 3 Access statement

Features related to net art presentation

★ x 7 Artworks hosted on exhibition site	★ x 4 'White cube' exhibition approach	★ x 4 Virtual 3D gallery environment
★ x 4 External embedded media	★ x 3 Horizontal 'slide' transition	★ x 2 Vertical scroll
★ x 2 Overlay state for contextual information	★ x 2 Browser frame included in previews	★ x 1 Rich context

★ x 1 Emulated environments

Matching feature cards to user story cards

Features related to database setup and data structure

Invitation to contribute

“
As an artist, I want to see the archive as a wiki that is open rather than closed and where people can have accounts, so that they may contribute data that they might not normally disclose.

Features related to entry points and discovery

Overviews & previews

“
As an ArtBase user, I want to have multiple entry points to browsing the works, such as sort-by-color, curated lists or a random button, so that I can discover new works in serendipitous ways.

“
As an ArtBase user, I want to filter artworks by keywords or categories, so that I can gain an overview of what types of things are present in the collection.

“
As an ArtBase user, I want to see a list of all tags used in the archive, so that I can gain an overview of what types of things are present in the collection.

Diagram key



User story from study 2: general users



User story featured as key insight



User story from study 3: researchers

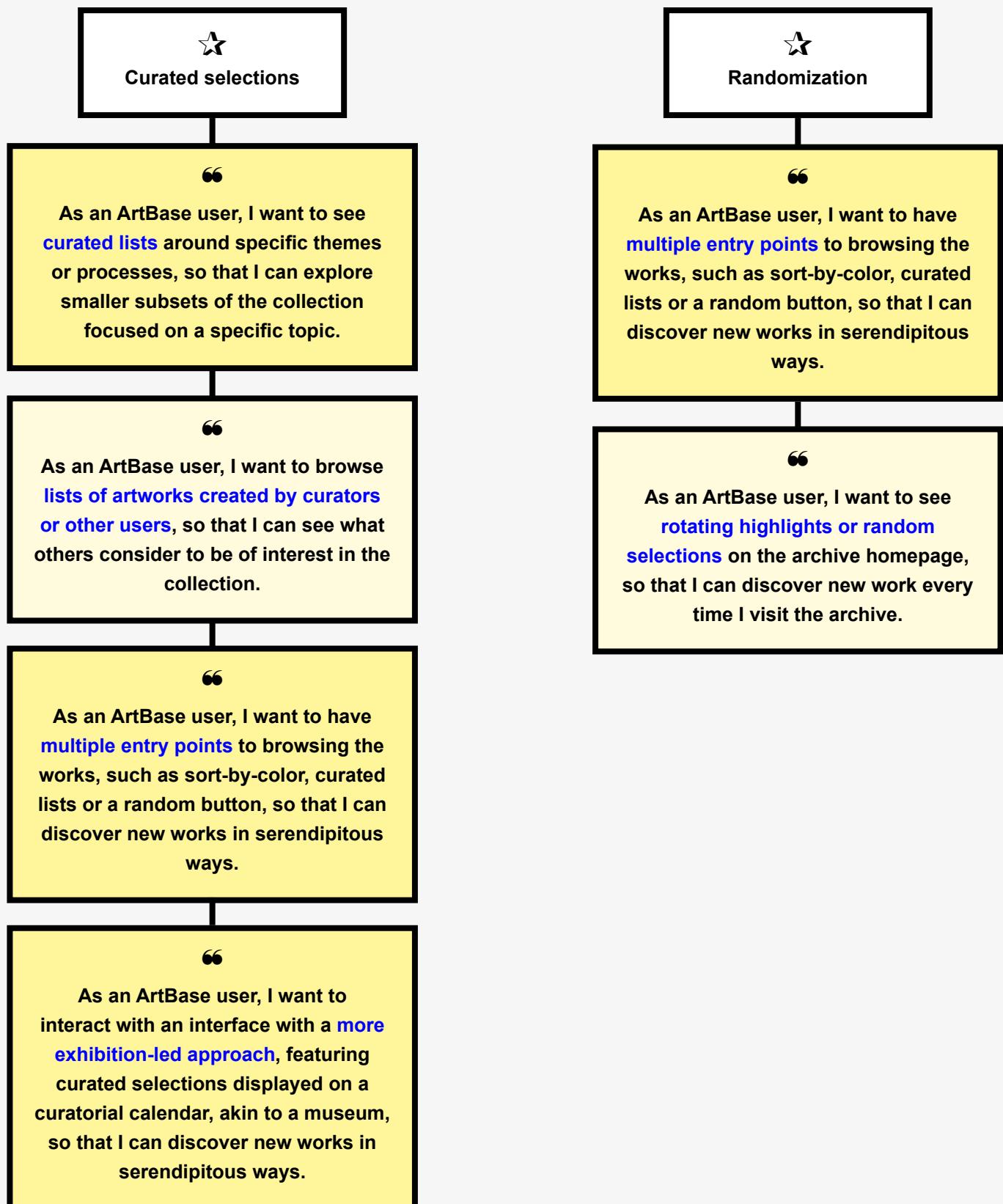


User story featured as key insight

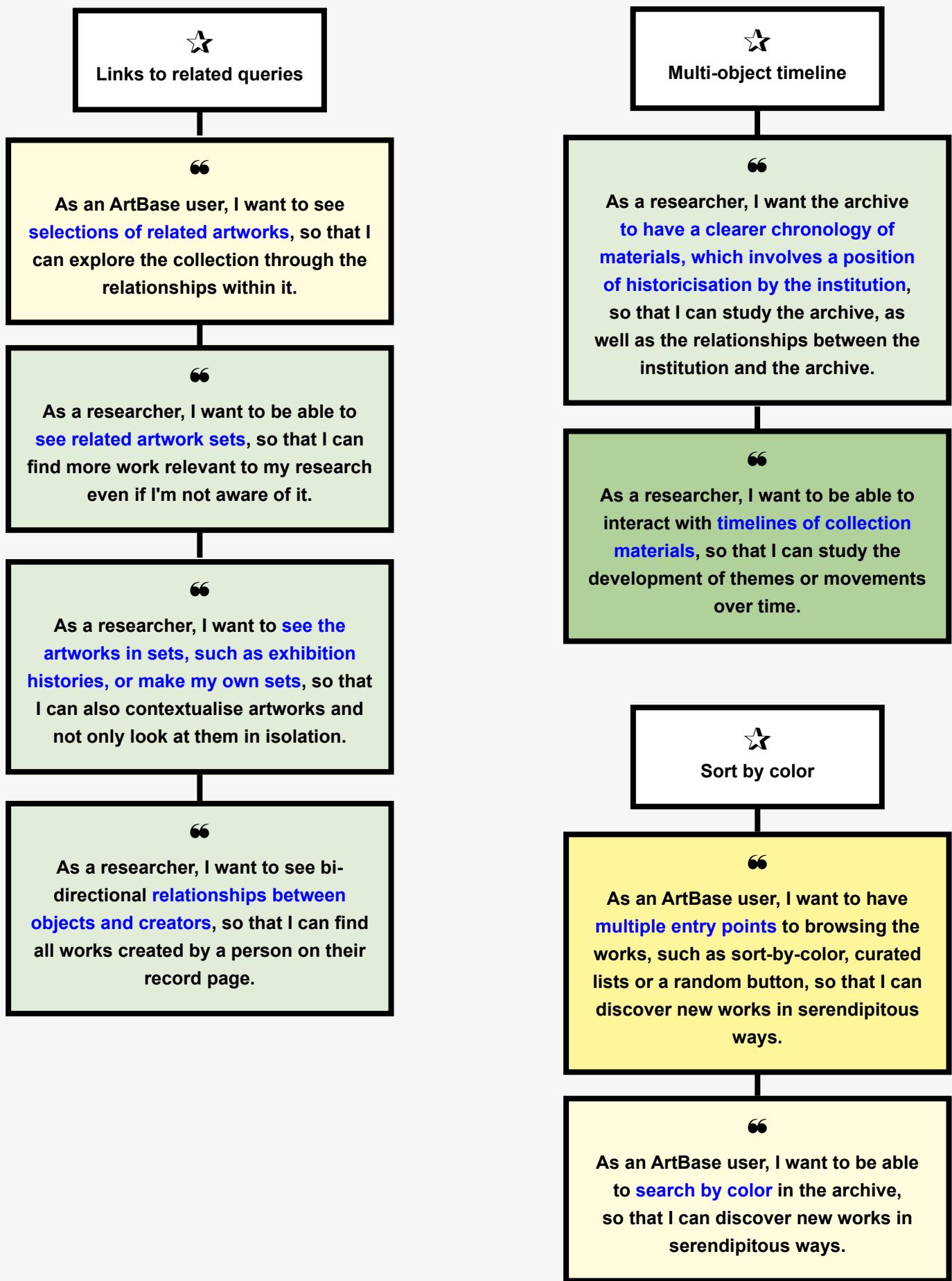


User story from study 4: artists

Features related to entry points
and discovery



Features related to entry points
and discovery



Features related to entry points
and discovery

Features related to single
record-level pages



SPARQL query GUI

“
As an ArtBase user, I want to interact with a **search query interface**, so that I can do research into very specific elements of the collection.



Single-object timeline

“
As a researcher, I want to use more **sophisticated search tools** with facets or filters similar to academic journal databases, so that I can create more precise search queries.

“
As an ArtBase user, I want to see more **temporal contextual information** around each artwork, so that I have to do less research in other sources.

“
As a researcher, I want to have an **expanded search capability**, including keywords, subject, media, form, etc, so that I can find works in the archive relevant to my research interests.

“
As a researcher, I want to be able to see a **form of versioning in the archive**, so that I can study how artworks change over time, which actors are involved in changes over time, the relationship to authorship, and also the role of the audience.

“
As a researcher, I want to see a **clear temporal dimension in the presentation**, so that I know what timeframe I am looking at in an emulated presentation when the emulator is pointing to an archival copy of the work.

“
As a researcher, I want to be able to see more **provenance or preservation metadata**, so that I can better understand the history of this work within Rhizome's collection and how it has been cared for over time.

Features related to single record-level pages

★
Metadata related to literature & events

“

As a researcher, I want to see information about **exhibition history** and **publications** featuring the work, so that I can get an idea of how the work has been shown and received over time.

★
Metadata clustering

“

As a researcher, I want the **metadata for the artwork records presented in a more granular way**, so that I can choose how much metadata to see if/when I need it.

★
Metadata richness indicator

“

As a researcher, I want to see artwork **metadata, even if it's incomplete or inconsistent**, so that I can assess the work within my understanding of the archive as a collaborative, evolving and imperfect space.

★
Access statement

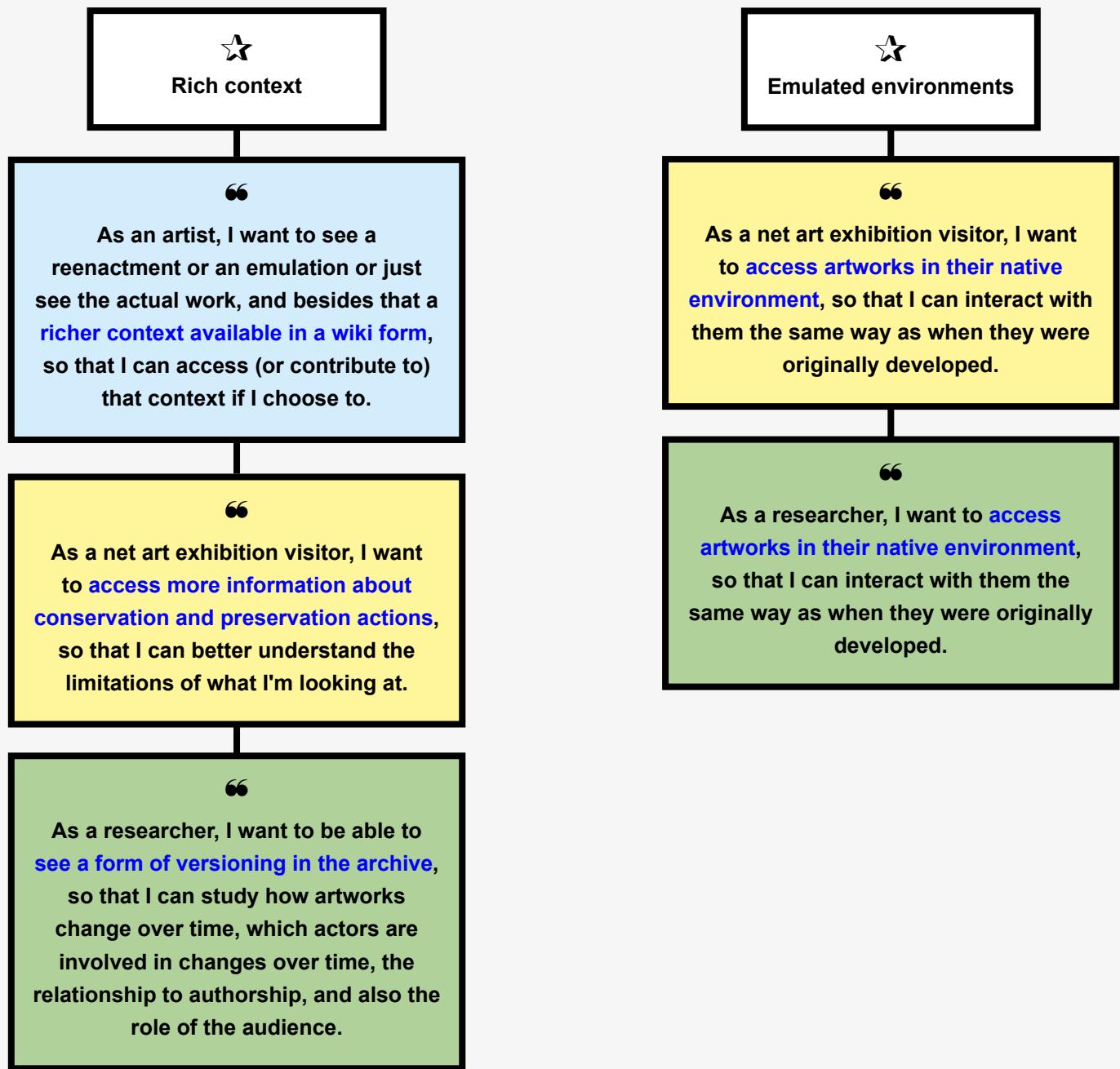
“

As an ArtBase user, I want to see functional and informative **artwork entry points**, so that I know what to expect when I try to access the artwork.

“

As an artist, I want to be able to **access the artworks quickly and easily**, so that I don't have to go through a lot of text or other context before I can look at the art.

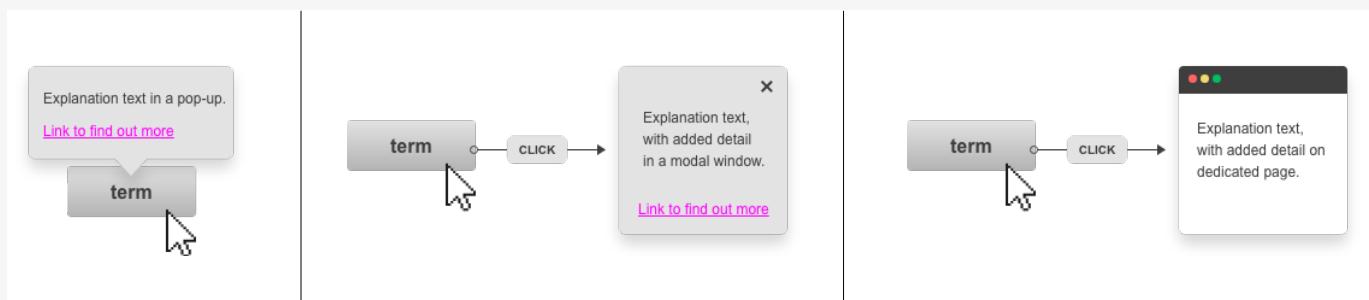
Features related to net art presentation



Recommended features

 Linked data	Features related to database setup and data structure The following features are recommended for implementation in the design prototype not because they directly map to user stories, but because they can facilitate many of the requirements identified throughout the Discovery and User Research Phase. Linked data is growing in popularity among GLAM organizations due to its capacity to handle increasingly complex relationships between database items and across heterogeneous databases. In addition, the search queries which can be performed within the database are key to transforming many of the user stories related to archive navigation and discovery into functional user interactions in the prototype interface.
 Explorable terminology	 Explorable terminology can be particularly useful to providing richer metadata pertaining to conservation procedures or technical dependencies, which has been requested by users.
 Capacity for contradiction	 Capacity for contradiction , inherent in the Wikibase/ Wikidata data models, is a further useful feature for users who want to see more metadata rather than less, and want to know the origin of metadata elements throughout the history of the archive. When new metadata is added to the database, instead of supplanting older information, it can be recorded alongside it, providing that a differentiating source and date/time stamp are also added.
 Invitation to contribute	 The capacity for recording multiple and potentially contradictory pieces of information is a valuable feature of the archive design, especially if the archive is opened once again for contributions from external users. Contributions from the public can be collected via dedicated online forms or other communication channels, or by directly contributing data as logged-in users of the database.
 Open source	 inviting users to collaborate with archivists in archival systems is evident in the examples reviewed in this report and was also raised by some of the user stories. The Wikibase system currently in place at Rhizome can facilitate either direct user contributions via user login, or can include a prompt for users to get in touch if they want their contribution recorded in the database. It remains beyond the scope of this report to advise why using open source software is the right choice for an organization, such as Rhizome, to use as a base for their archival infrastructure. This report's recommendation is based upon evidence gathered from a number of other GLAM research projects (detailed in the Bibliography), and is informed by the interface design reviews, as well as Rhizome staff interviews conducted for this study.

Wireframe mock-ups



Explorable terminology

A wireframe showing a "Metadata statement" interface. It consists of two sections separated by a horizontal line.

- Top Section:** Labeled "Metadata value A". It contains a text input field and a link "Source A".
- Bottom Section:** Labeled "Metadata value B". It contains a text input field and a link "Source B".

Capacity for contradiction

The diagram shows two separate wireframe components, each featuring a button and a modal window.

- Top Component:** A button labeled "Contribute" is shown with a mouse cursor hovering over it. An arrow points to a modal window titled "E-mail". Inside the modal, there are fields for "E-mail" (containing "example@mail.com") and "Password" (containing masked text). A "Log in" button at the bottom of the modal is also highlighted with a mouse cursor.
- Bottom Component:** A button labeled "Report issue?" is shown with a mouse cursor hovering over it. An arrow points to a modal window containing the text "Special form for reporting on missing or erroneous data." and a "Submit" button.

Invitation to contribute



Recommended features



Overviews & previews

Features related to entry points and discovery



Multi-object timeline

The concept of **overviews and previews** in digital collection interfaces has been developed over a long period of time (see Green, et al, 2000) and is well-established as a standard user interaction pattern. All interfaces reviewed in this report implement variations on this pattern. The pattern also matches a number of user stories, which focused on different methods for navigation and filtering a collection in order to gain a sense of its scope. Closely related to the concept of the overview, is the **multi-object timeline** featuring object previews. The timeline is another well-established user interaction pattern present in many of the interfaces reviewed here. It was frequently brought up in the user stories, too, and will be a useful addition to the ArtBase interface.



Expression of relations

While the timeline can indicate relationships between collection items based on a temporal dimension, other formats for **expressing relations** between items will also be useful in a linked data archive, where various forms of relationships can emerge organically. The idea of seeing items as “sets” was raised numerous times in the user stories.



Links to related queries

A design pattern which can express relations, such as common exhibition histories or common technical dependencies, will match closely the requirements discussed with ArtBase users. Also related to this concept, is the possibility of adding **links to pre-set queries** that serve both as a navigational tool and as a tool for understanding context and relationality in the archive. This is already a common interaction pattern in interfaces using linked data infrastructure. **Curated and random features** are also common interaction patterns in digital collection interfaces (whether these are standard relational or linked data databases).



Curated selections

Unsurprisingly, considering the familiarity of such patterns (which can take the form of featured lists, curated special collections, or ‘random’ sort buttons), these also featured heavily in the user stories generated during the User Research Phase.

Finally, several user stories featured requirements for more sophisticated search tools. While almost all the interfaces reviewed in this report feature some form of search facility, those facilities are rarely capable of meeting the complex search needs of users, particularly academic researchers. However, running search queries within a linked data database with SPARQL could facilitate such search needs. But mastering SPARQL and, crucially, understanding the database model sufficiently to be able to query it, presents a steep learning curve that not everyone will be able to overcome. The development of a functional GUI to run the queries is an important goal for GLAMs who want to use linked data. So far, such efforts have been few and remain underresearched. Therefore, while developing a custom **SPARQL query GUI** for the ArtBase is highly recommended, such development will likely remain a long-term goal.

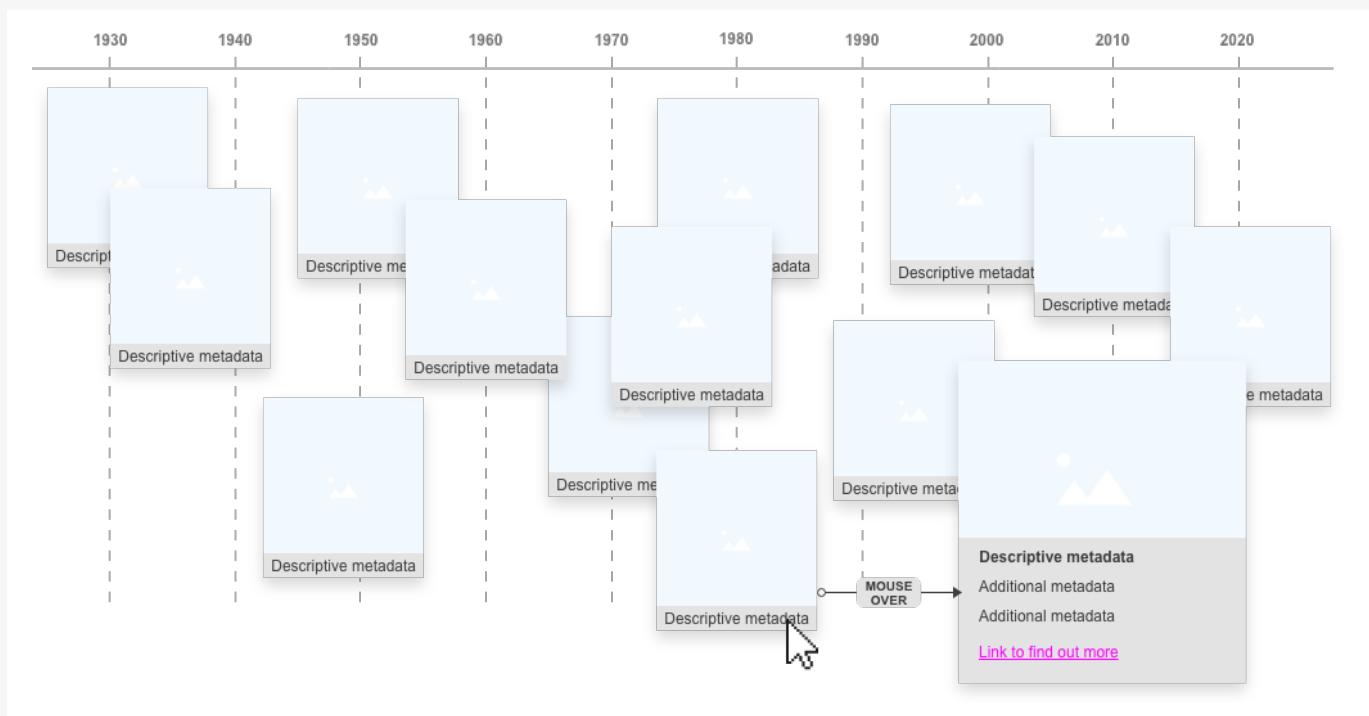


Randomization



SPARQL query GUI

Wireframe mock-ups



Overviews & previews / Multi-object timeline

This wireframe shows a 'Related works' section. It is organized into three horizontal rows, each labeled 'Common quality A', 'Common quality B', and 'Common quality C'. Each row contains four rectangular cards, each with a small thumbnail image and a 'Descriptive metadata' label. Row C includes a downward arrow icon, suggesting a scrollable list.

Expression of relation / Related queries



Recommended features



Single-object timeline

Features related to single record-level pages



Metadata related to literature & events

Of all the features present in the reviewed interfaces, the **single-object timeline** is the one which could address multiple user needs referred to in a range of user stories relating to temporal context, versioning of artworks, and preservation history. Yet, it is used strikingly infrequently for these purposes in existing collection interfaces. The timeline examples reviewed here tend to relate to records about people, and offer a way to view a person's lifetime in the context of historical events. For digital cultural heritage objects which undergo various changes throughout their lifecycle in archives and collections, the single-object timeline could also be a concise and impactful visual tool to represent those events. The concept of featuring **metadata related to literature and events**, such as exhibitions and reviews, on the artwork record page is also related to the need to position artworks in specific temporal and historical contexts.



Metadata clustering

This kind of contextual metadata is already supplied by some of the interfaces reviewed, and goes some way towards meeting several of the needs outlined in the user stories. It is worth noting that implementation is also relatively straightforward if a linked data database is in use. It follows that the richer the metadata provided on the record-level page, the greater the need for this data to be visually organized. That way users can navigate and access the data they are interested in more quickly. This is where the concept of **metadata clustering** can be useful in meeting user needs for granular access to data. The examples where metadata is presented in **collapsible elements or sidepanels** were not directly referenced by users in the user stories. Nevertheless such features are well-established interaction patterns widely in use in archival interfaces and can be useful in implementing the concept of metadata clustering, too.



Metadata in collapsible element

Connected to this question of how much metadata is available per artwork record and how that is made visible to users, is the question of how to represent incomplete or 'less rich' records without compromising reliability or trust. The strategy of using visual **metadata 'richness' indicators** in collection interfaces is a useful interaction pattern in such cases. A clear indicator tool will respond to the user requirement for representing as much data as possible, even if that is deemed incomplete or inadequately referenced by the internal standards of the organization. Finally, the concept of the **access statement**, which has been implemented to some extent in the reviewed interfaces, will need to be developed even further if it is to serve the needs of ArtBase users and address their concerns about access provision to different variants of the artworks. An access statement will be a crucial feature of the redesigned ArtBase and it will need to consider questions related to functional state and variant origin, as opposed to simply stating whether an artwork is 'on display' or not.



Metadata in collapsed sidepanel

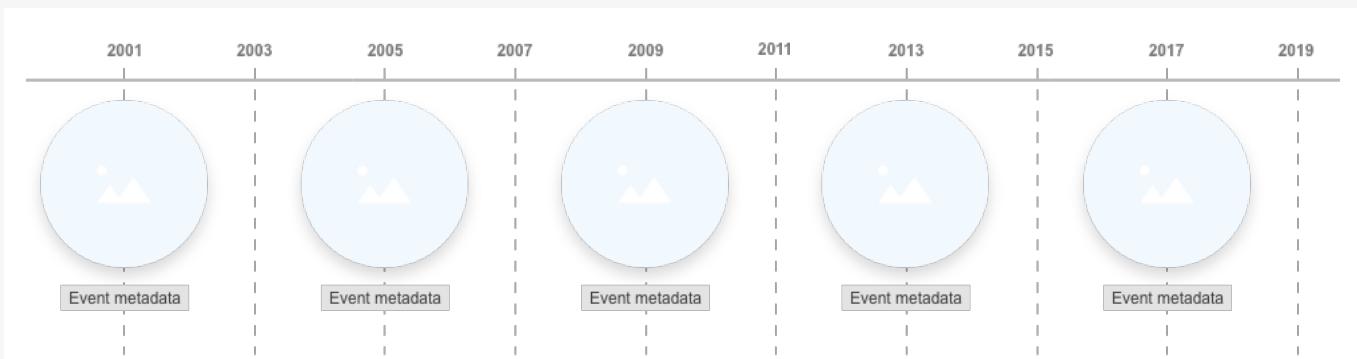


Metadata richness indicator

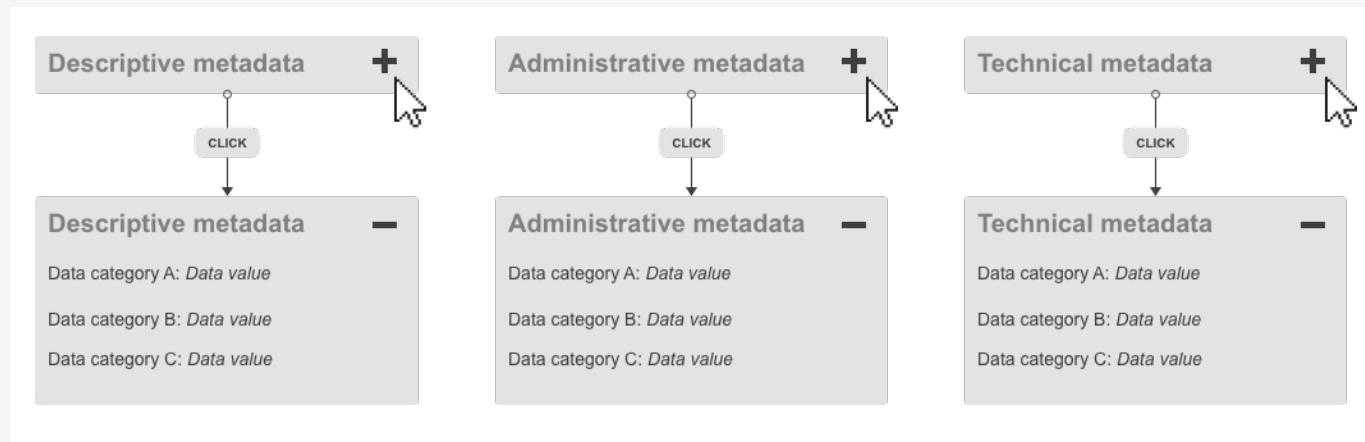


Access statement

Wireframe mock-ups



Single-object timeline



Metadata clustering / Metadata in collapsible element



Metadata richness indicator

Access statement



Recommended features



Emulated environments

Features related to net art presentation



Rich context



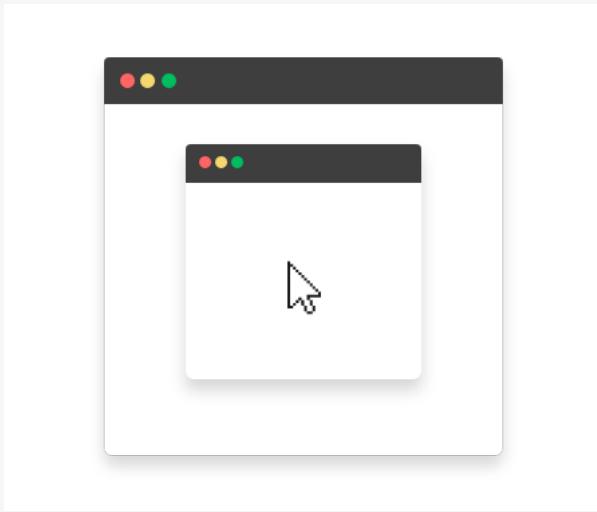
Overlay state for contextual information



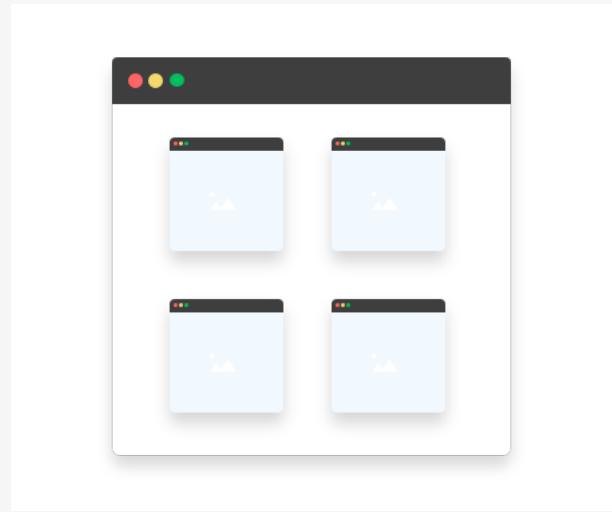
Browser frame included in previews

The ArtBase will not only be an archival repository for metadata, but also an archive which enables its users to access functional versions of the artworks. Therefore, its redesign must also be informed by interaction patterns relating to exhibiting net art online. The primary feedback in connection to net art's presentation raised in the user stories was an appreciation for the access to **emulated environments**, facilitated by Rhizome's Net Art Anthology exhibition. Users universally enjoyed interacting with the emulators and experiencing the artworks in their historical contexts. Other user stories noted the additional context (usually in the form of text) provided alongside the artwork reperformance. The concept of "**rich context**" alongside an artwork presentation is a feature only partially employed by the other online exhibition interfaces reviewed in this report, but can nevertheless facilitate user requirements reflected by several user stories. The question of how that context is presented in the ArtBase interface remains unresolved. One possible interaction pattern to consider is the **overlay state for contextual information**, a well-established device in existing interfaces, which provides some of the benefits associated with collapsible elements or sidebars in terms of facilitating a granular approach to data presentation. Finally, while the matter of representing net art in the form of screenshots was not mentioned as problematic in the user stories, it remains an important aspect to consider in the redesign, which needs to feature previews and overviews of artworks in the collection. A visual paradigm adopted by two of the exhibition examples here is a useful cue to consider. **Including the browser frame** in thumbnail or static screenshot representations of net art works provides visual representation of a specific temporal context, which has emerged as an important element in multiple user stories. Furthermore, in many instances the specificity of the browser is integral to the user experience of net art, and the browser is not just a frame for the artwork, but a critical part of it. Hence, screenshots of artworks in the ArtBase should include a browser frame, too.

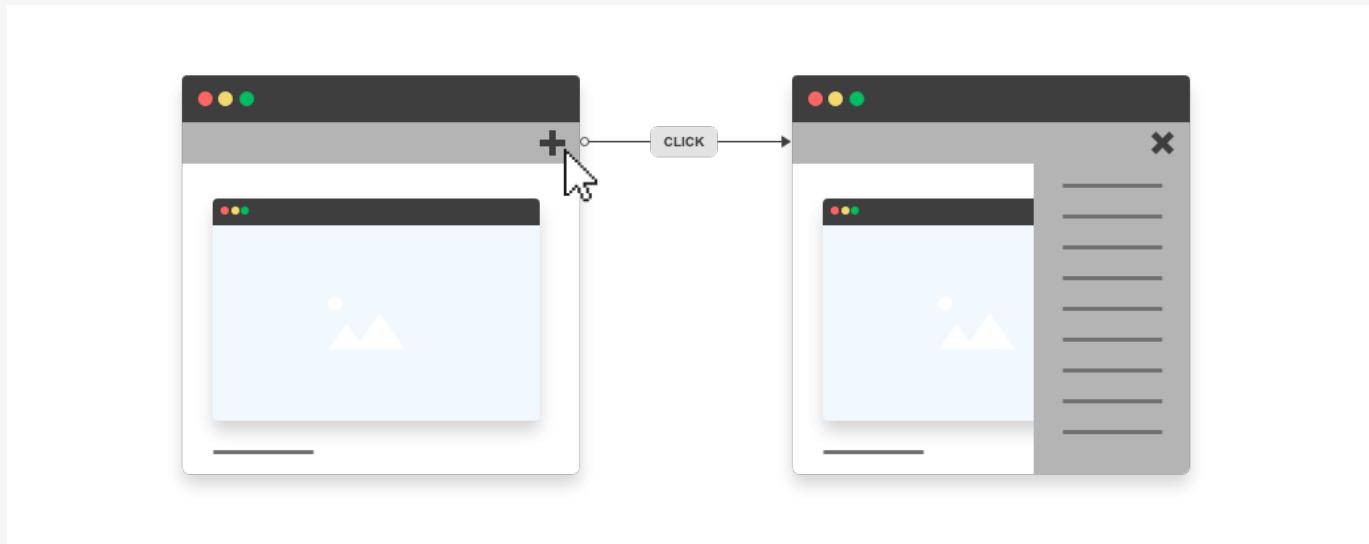
Wireframe mock-ups



Emulated environments



Browser frame included in previews



Overlay state for contextual information

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