DESIGN LANDSCAPE: ONLINE COLLECTION INTERFACES

3

Discovery & User Research Phase

2018

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.

This research is made possible through funding from the AHRC in the UK and additional support by Rhizome.

EST 1892 LSBU
Arts & Humanities Research Council
RHIZOME

Contents

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 a 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 GUI[1]:** 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 a 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 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

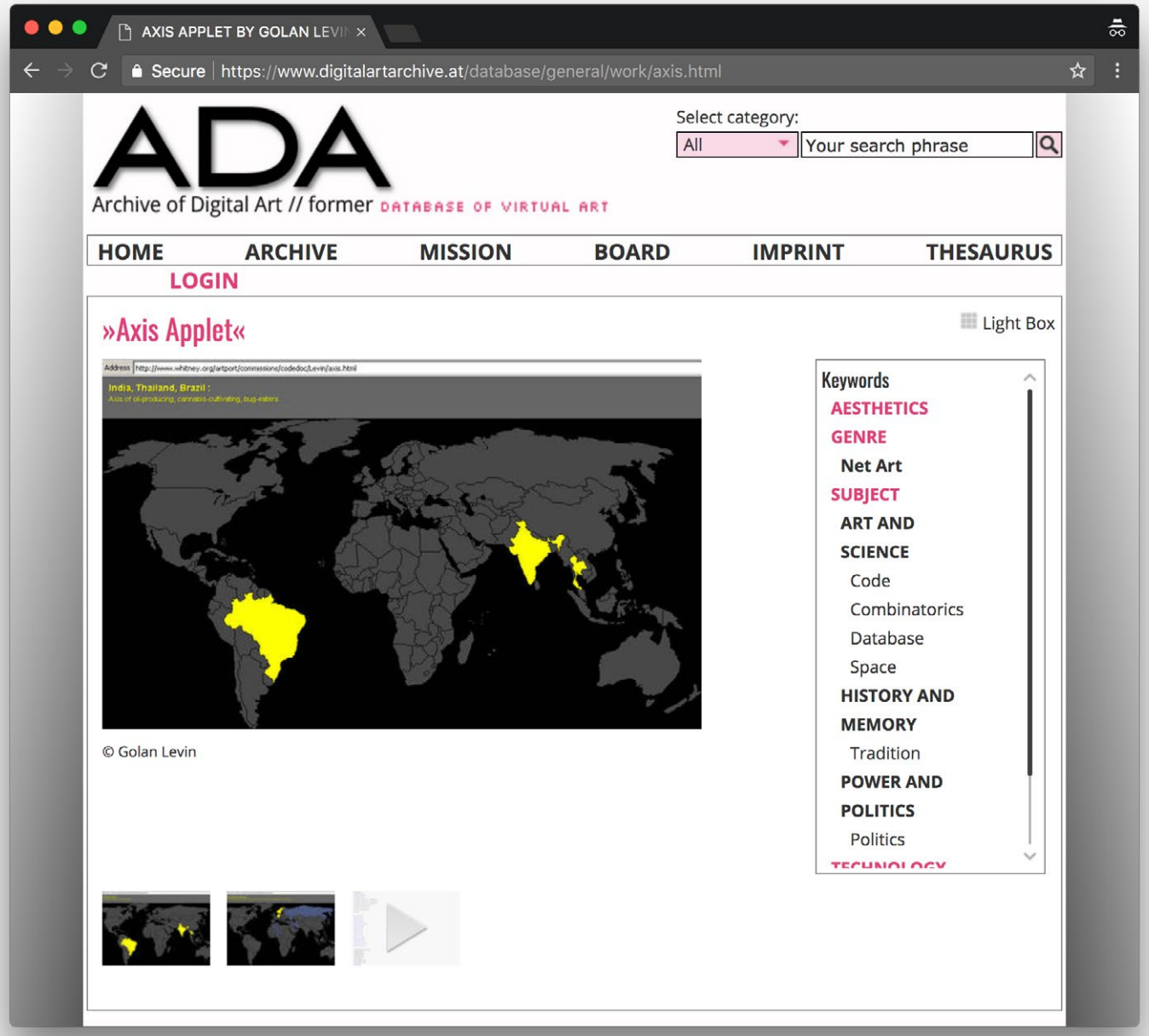
The net art exhibitions referenced in section 6 of this report are available as separate, complete web archive collections, listed under each exhibition's respective title here: https://conifer.rhizome.org/lozana_r/

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

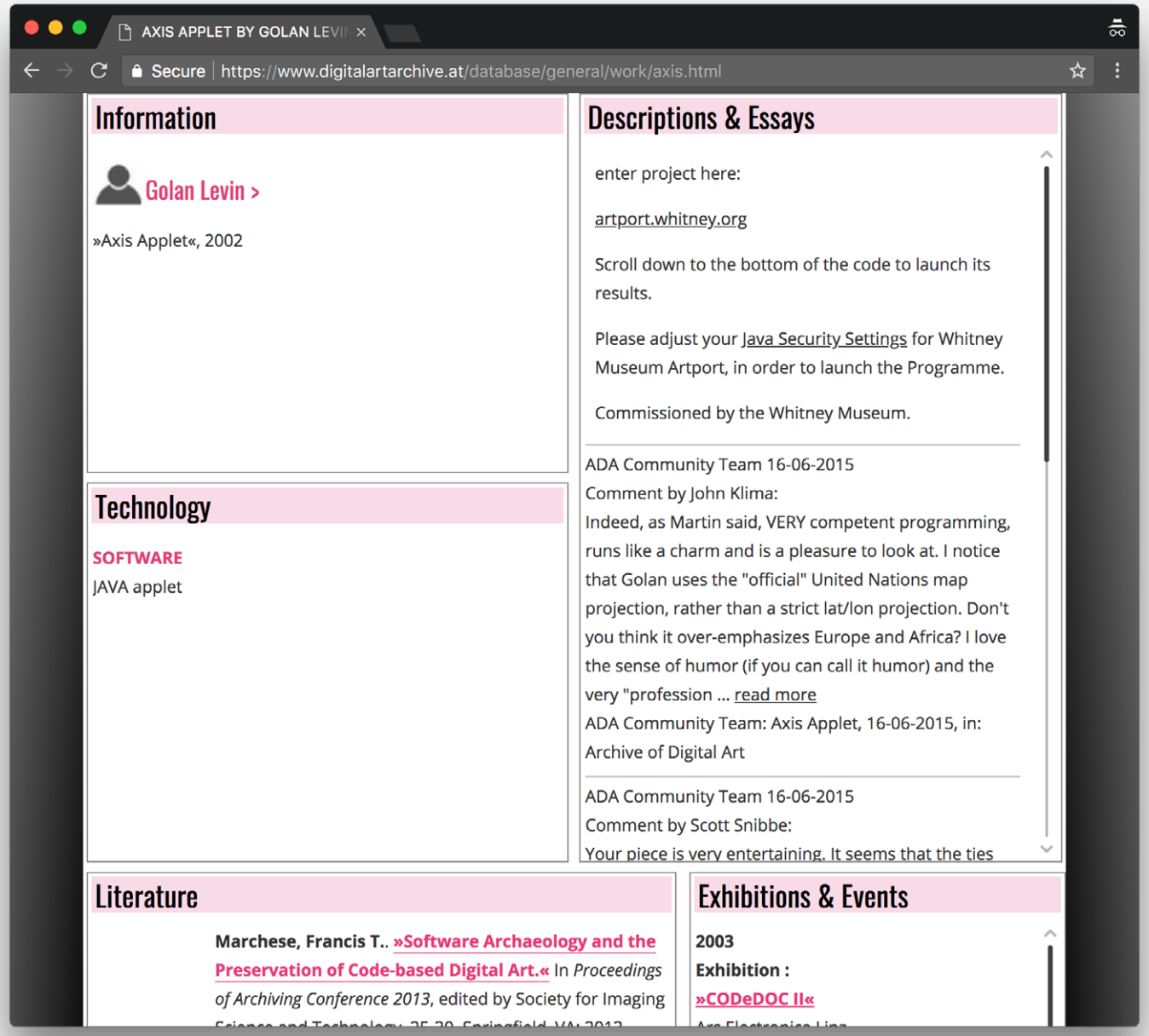
1 Interfaces for net art archives

Archive of Digital Art (active)



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

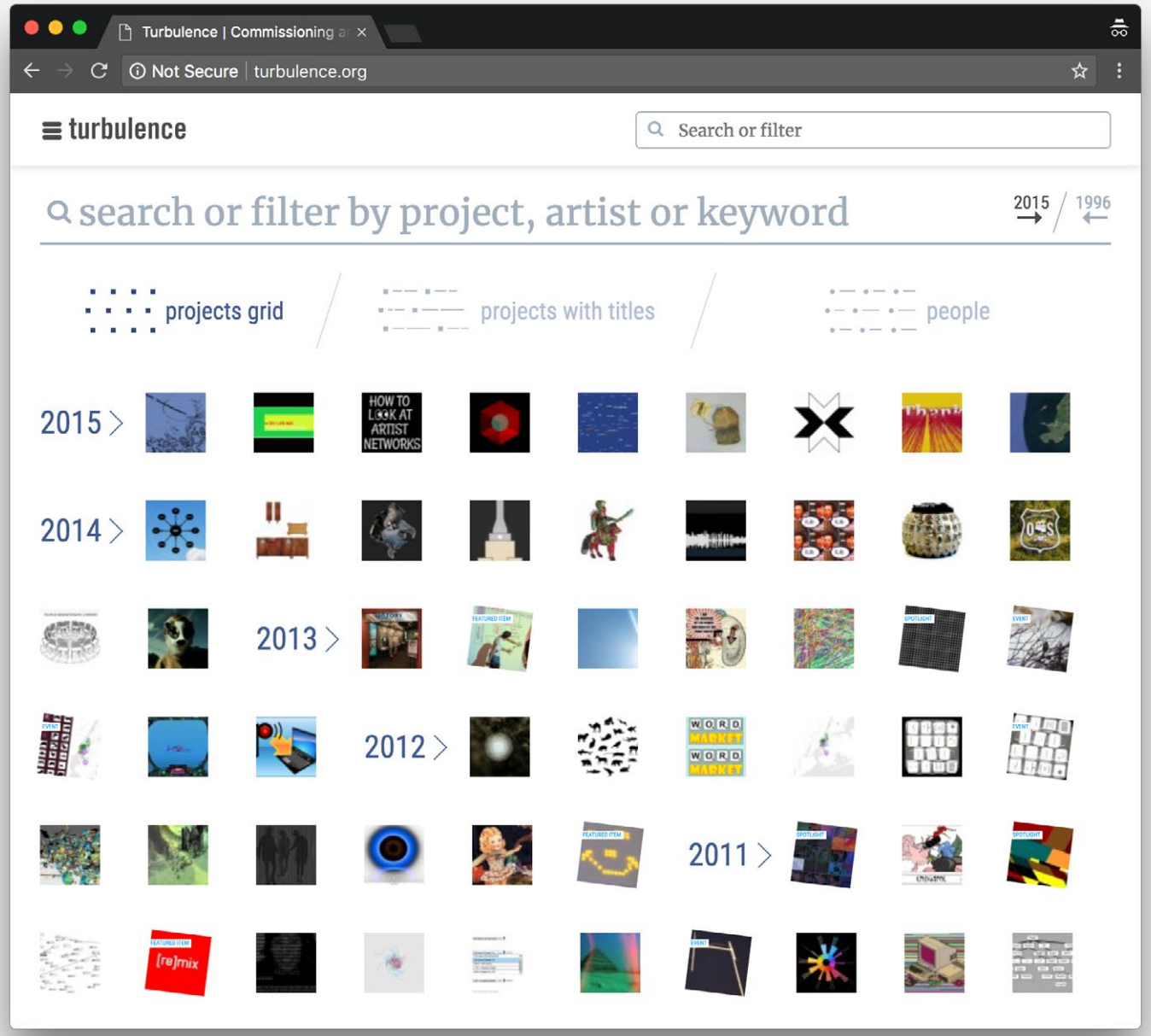
☆ **Metadata clustering**	☆ **Metadata related to literature & events**



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

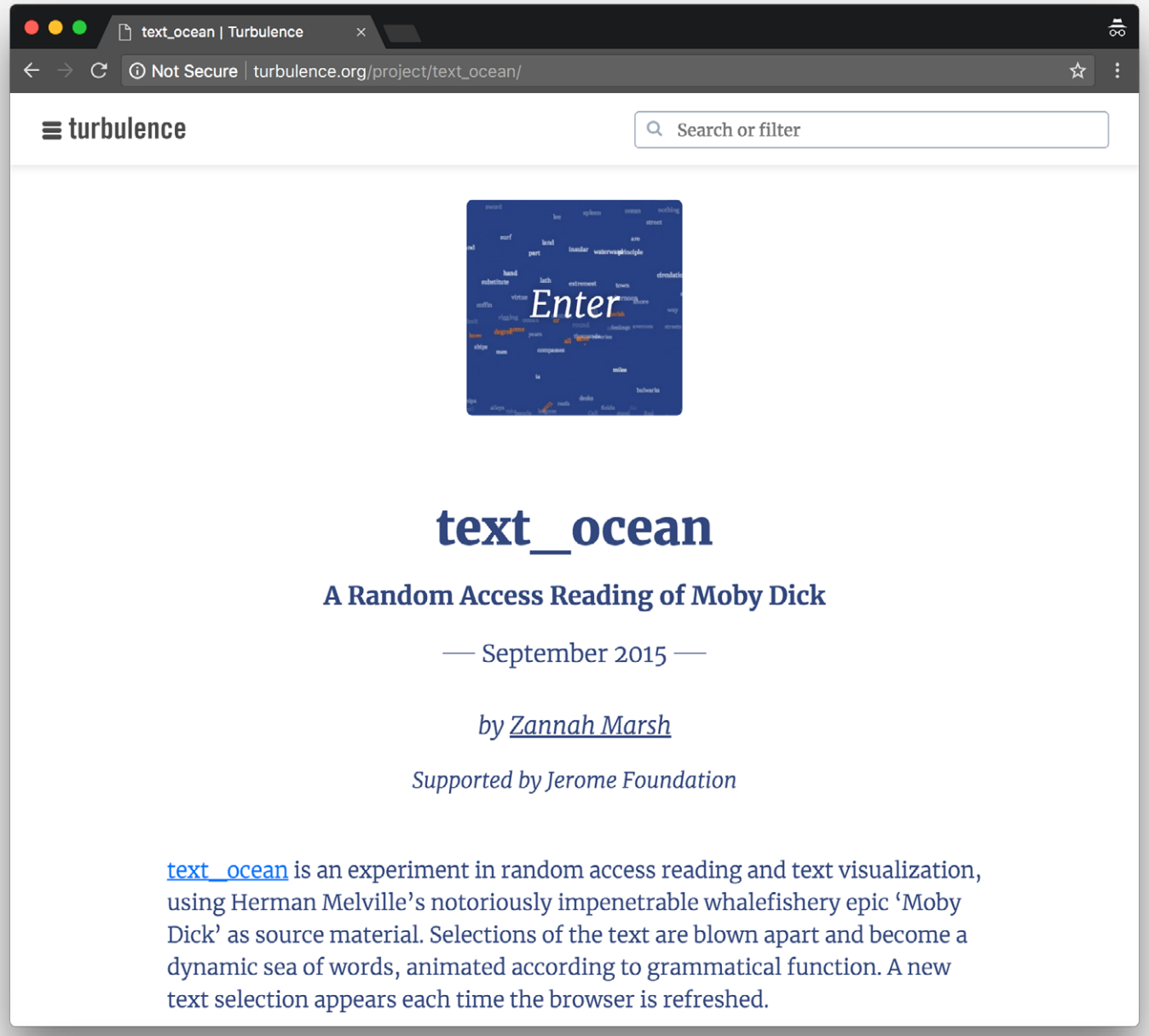
Reference URL: https://www.digitalartarchive.at
Date of screenshots: 2018-05-14
Notes: Participants in some of the user studies found parts of the metadata presented here useful; in particular, elements such as essays, literature, or exhibitions and events related to a specific artworks (where such data was available).

Turbulence (legacy database)



Collection overview: Thumbnails of the projects are ordered chronologically.

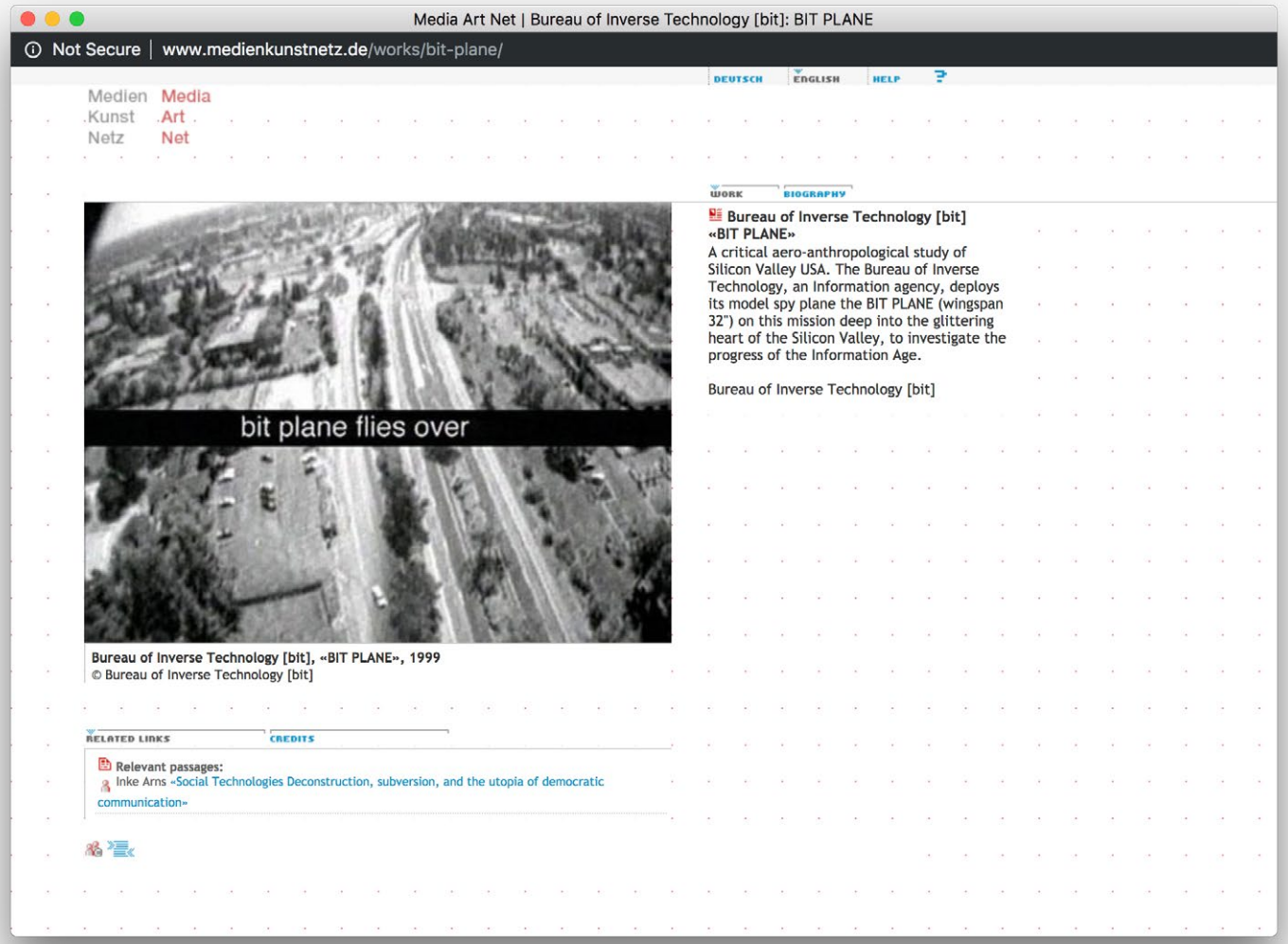
☆
Overviews & previews



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.

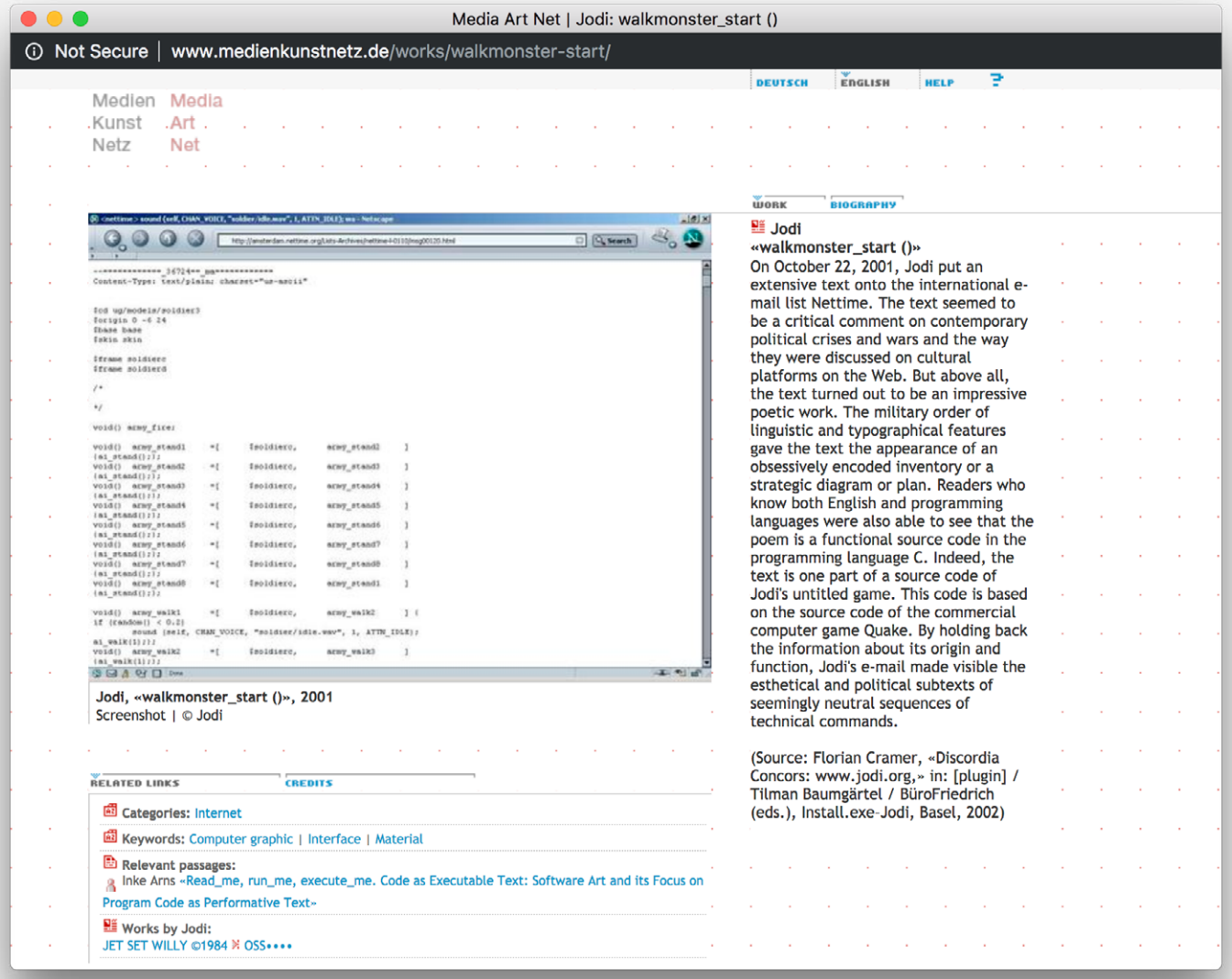
Reference URL: http://turbulence.org
Date of screenshots: 2018-05-14
Notes: Participants in the user studies did not find the collection overview particularly useful, nor the metadata provided with each artwork record sufficient.

Media Kunst Netz (legacy database)



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

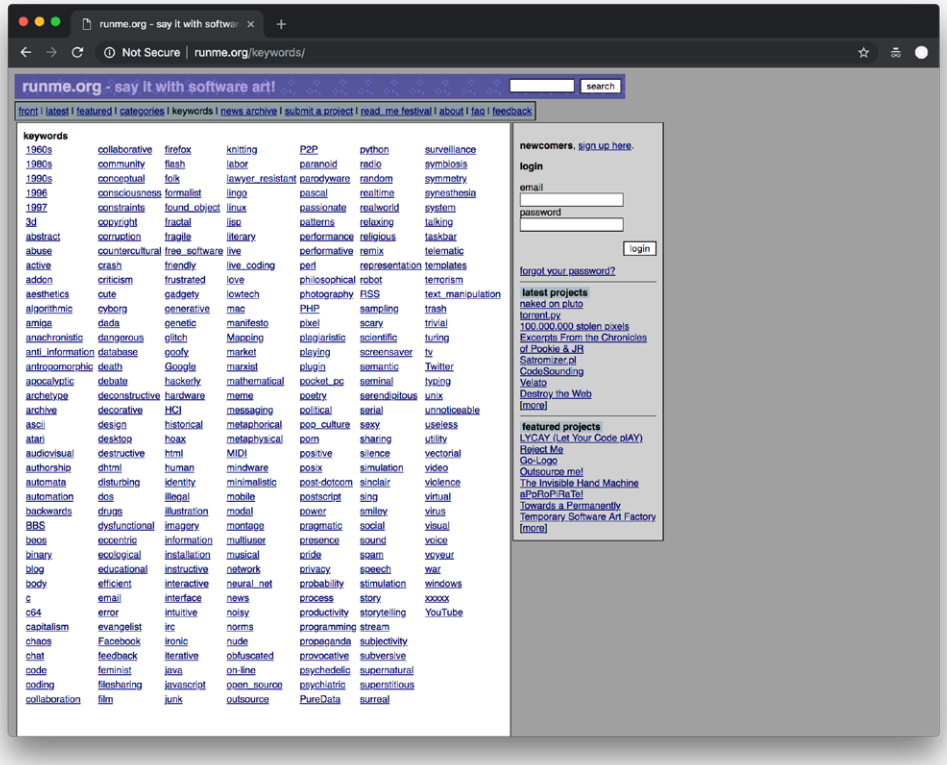
☆ **Metadata related to literature & events**	☆ **Metadata clustering**



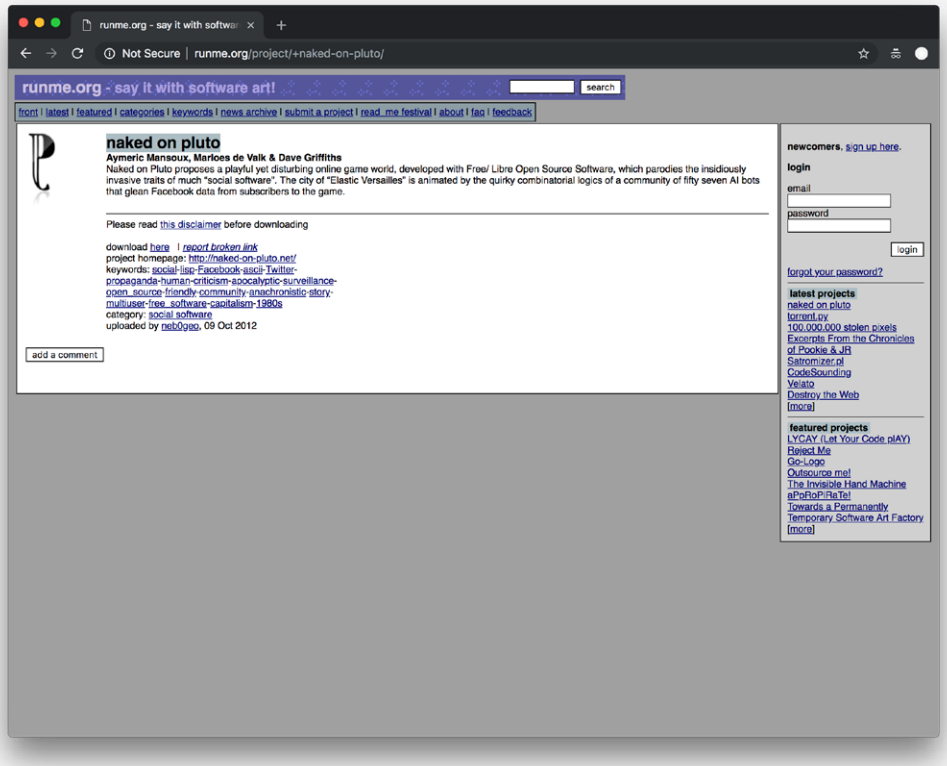
Example view of an artwork record 2: Features include image thumbnail, short description and 'Related links', such as keywords, citations, as well as other works by the same artist.

Reference URL: http://www.mediakunstnetz.de
Date of screenshots: 2018-11-15

runme.org (legacy database)



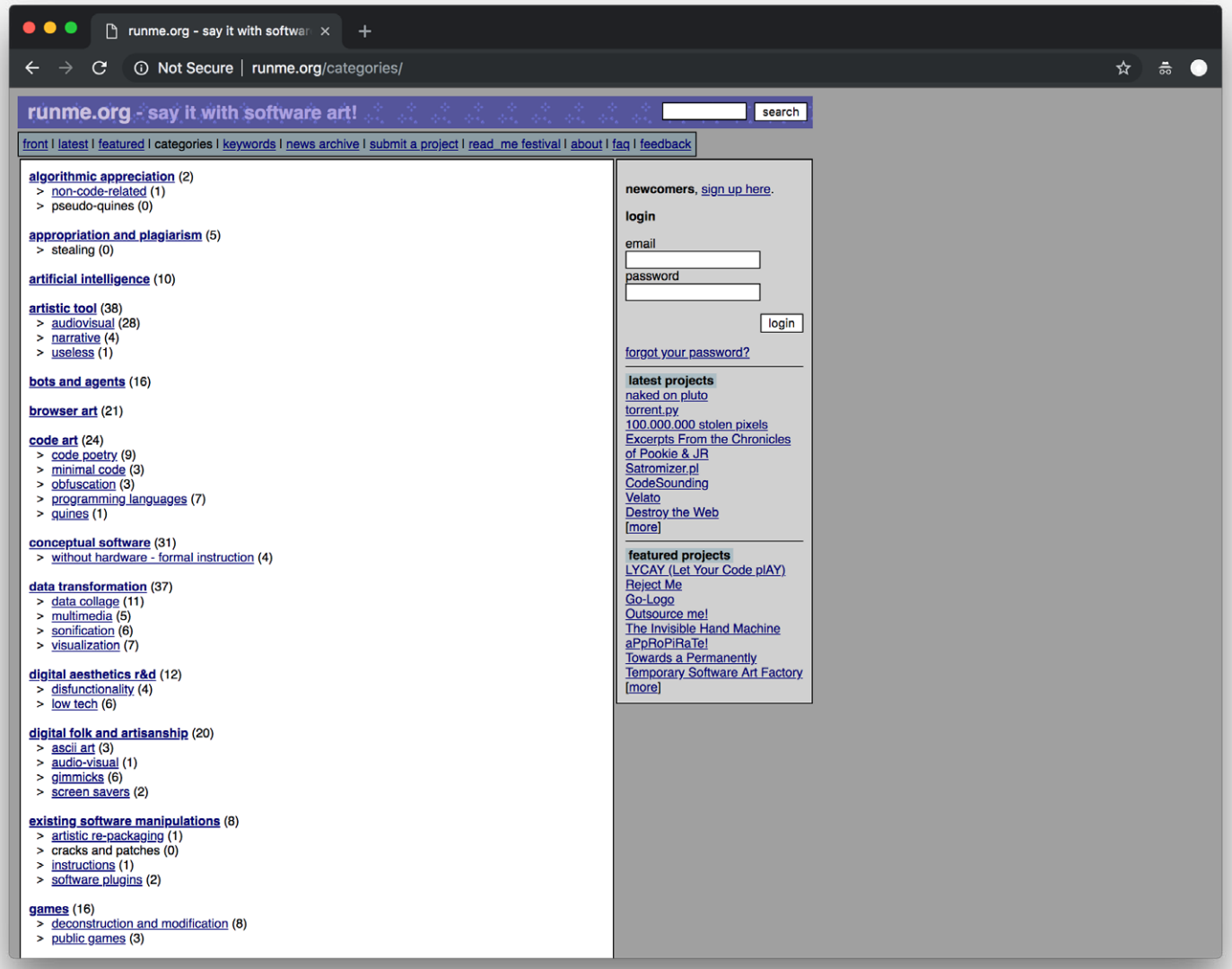
Collection overview by keywords.



Example view of an artwork record.

☆ Invitation to contribute

☆ Expression of relations

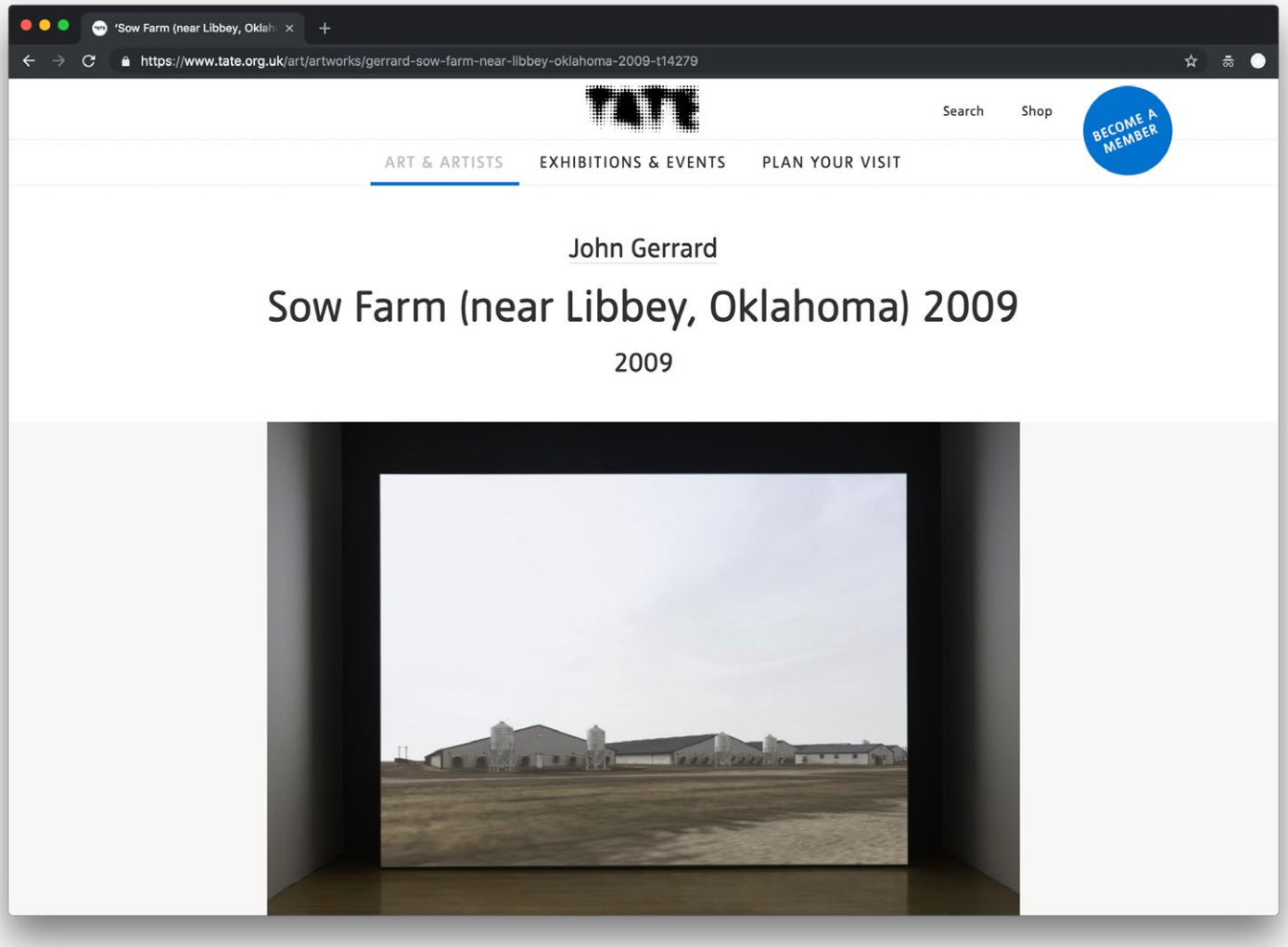


Collection overview by categories.

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.

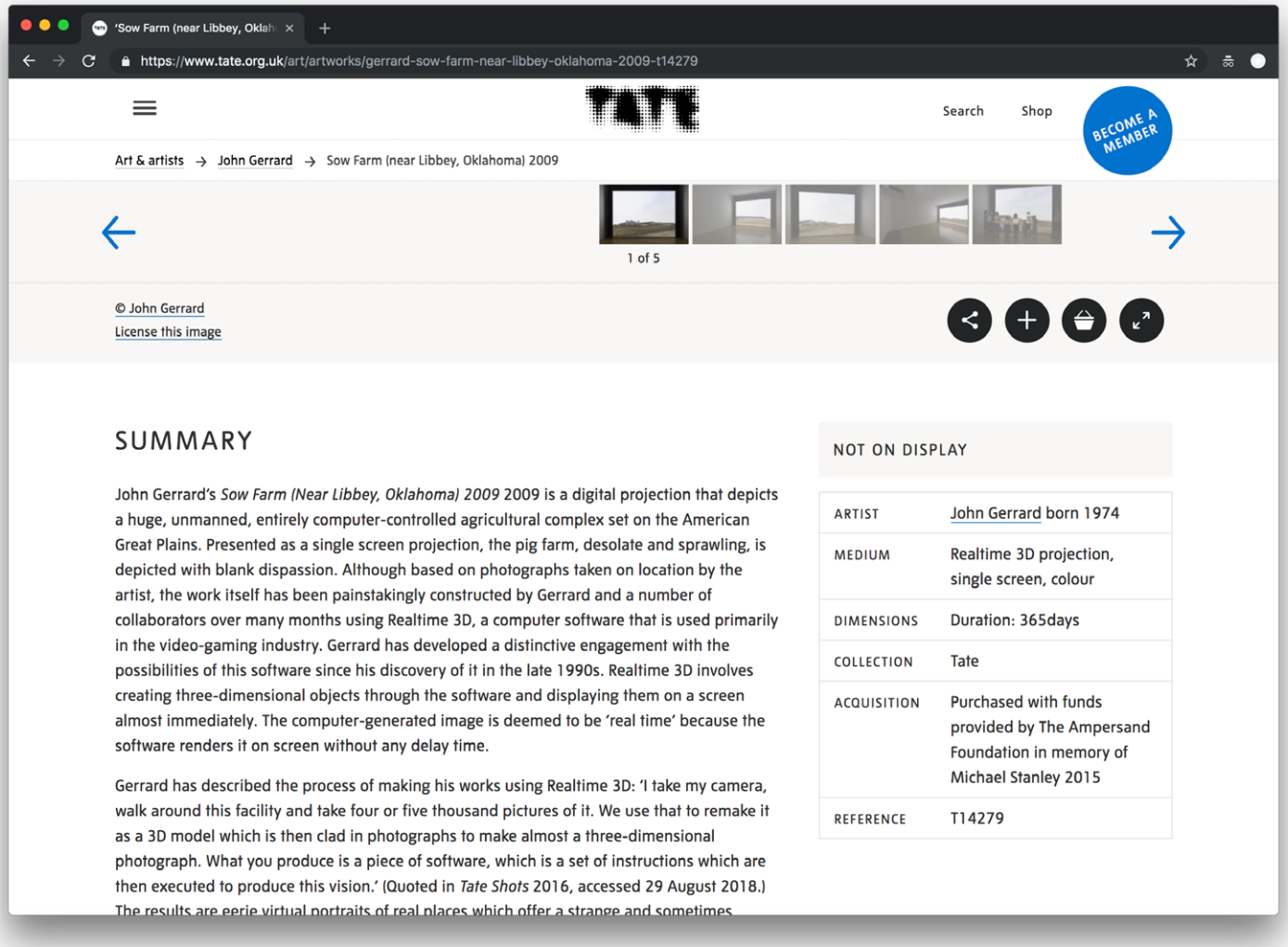
2 Interfaces for artwork records in institutional collections

Tate (UK)



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

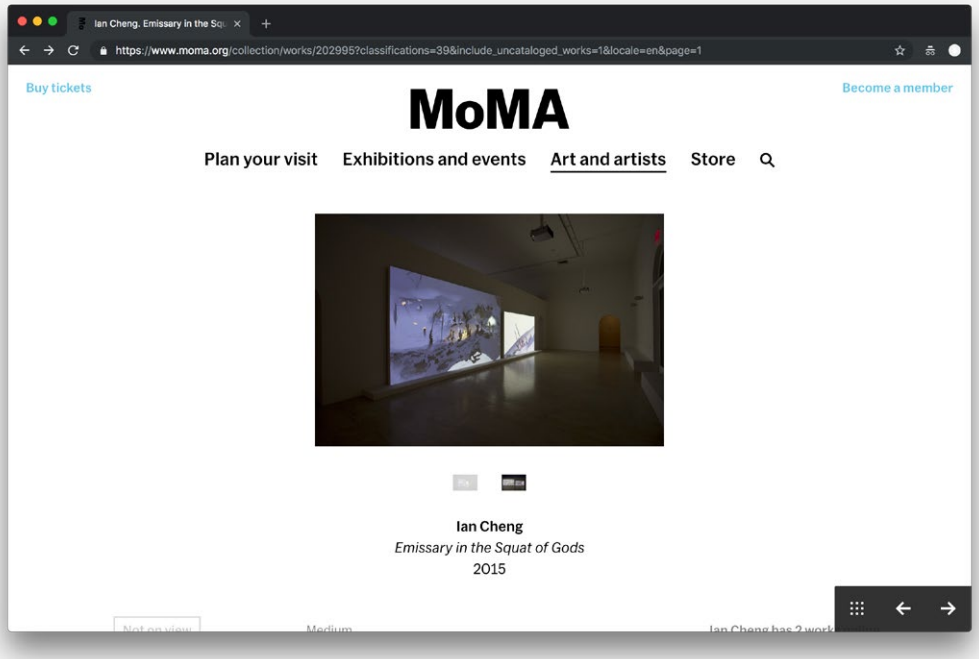
☆
Access statement



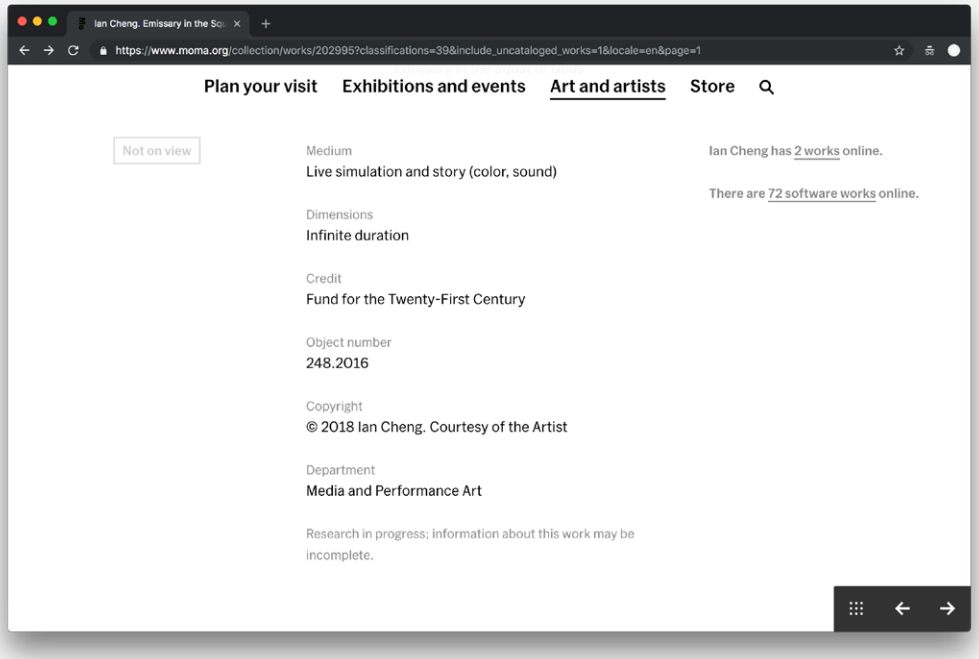
Example view of an artwork record: Descriptive text and other metadata available for the record are featured near the bottom of the page.

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)



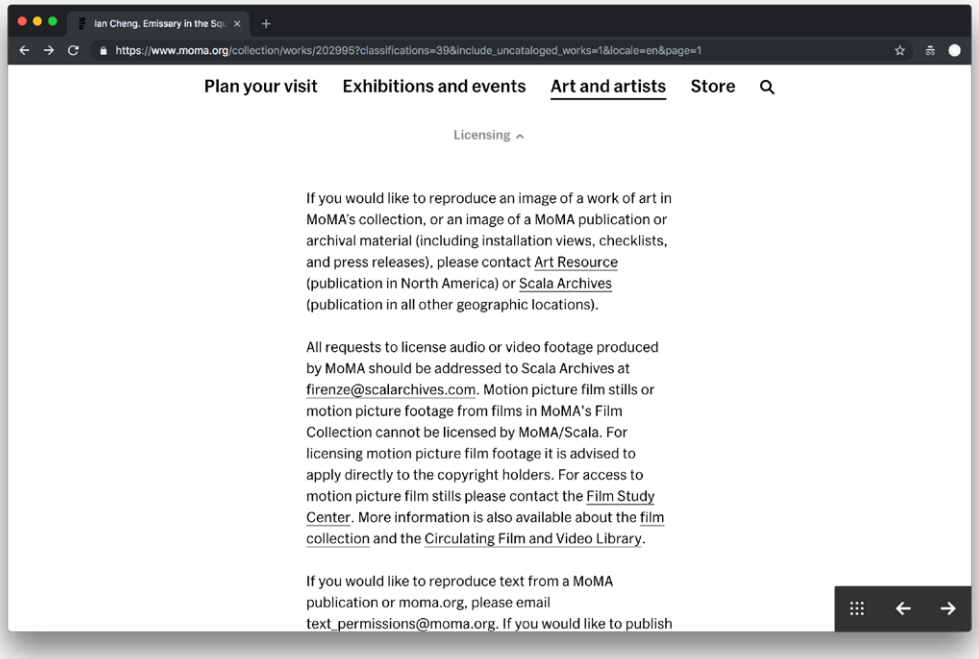
Example view of an artwork record 1: An image slideshow is featured near the top of the page.



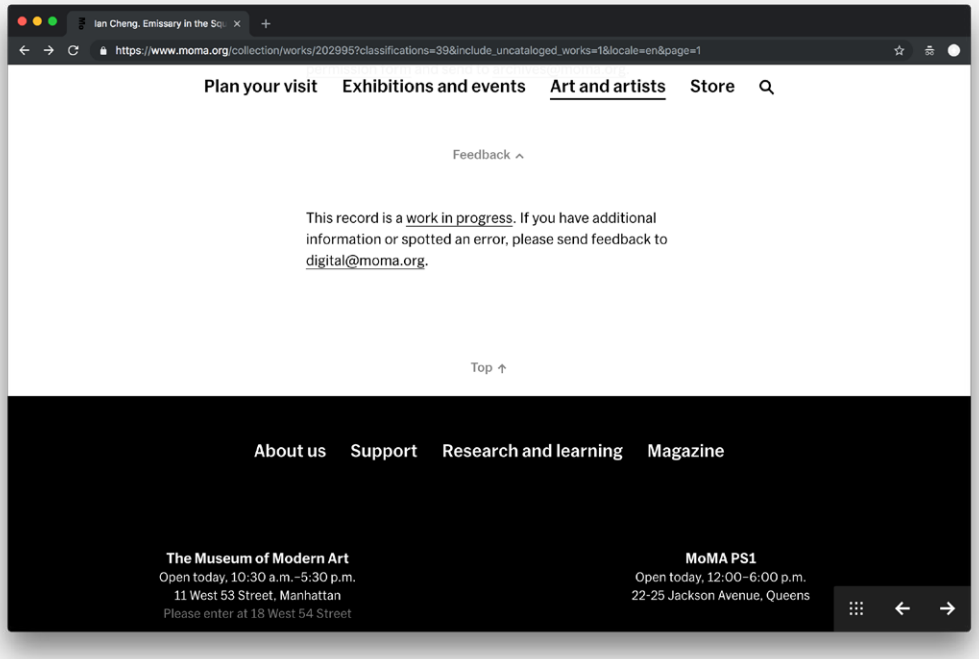
Example view of an artwork record 1: Structured metadata is featured near the bottom of the page. There are also links to suggested query results for related works at the right hand side of the page.

☆	☆	☆
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.

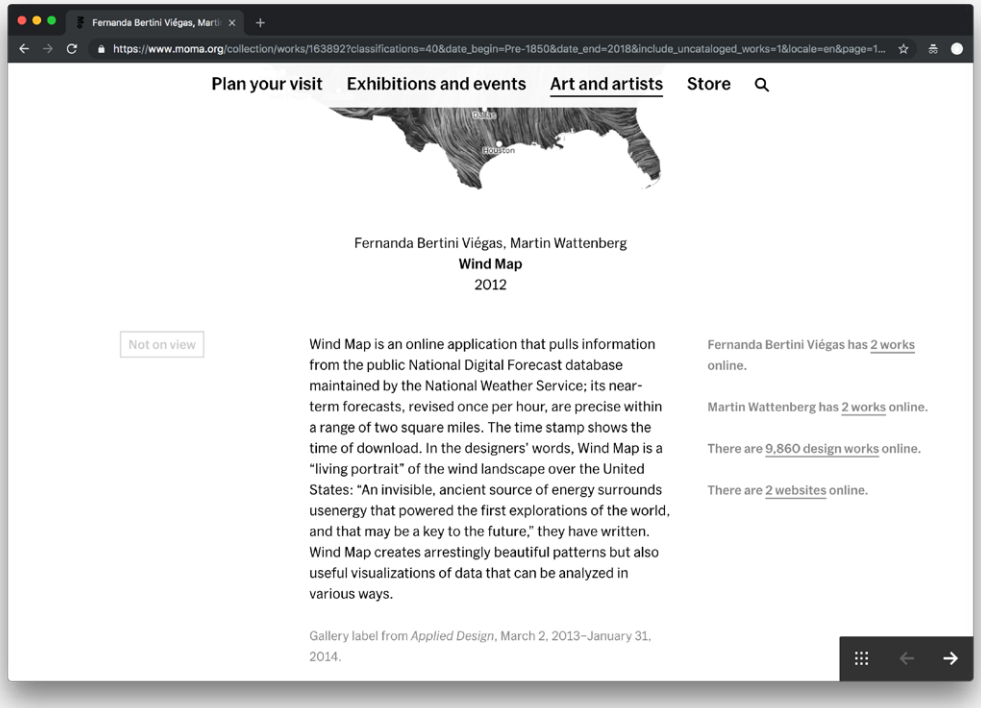


Example view of an artwork record 1: There is also an option to contribute metadata or suggest corrections.

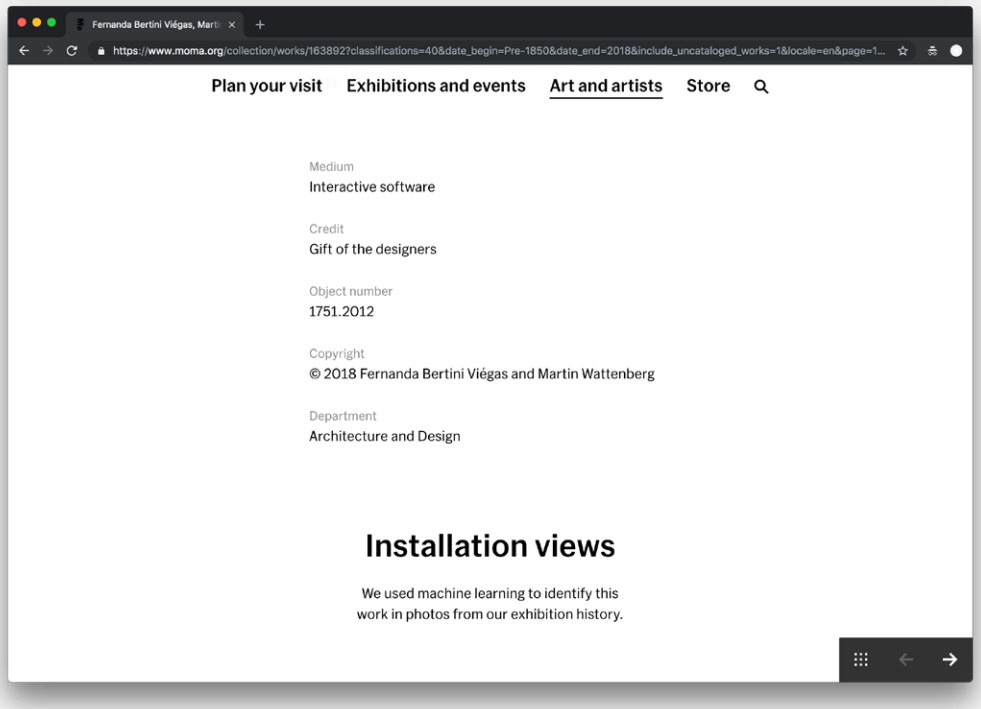


Reference URL: https://www.moma.org
Date of screenshots: 2018-11-15
Notes: MoMA group their born-digital artworks in categories such as “website” and “software”. Information on “medium” varies widely across these artwork categories without an apparent consistent pattern of application. It appears to 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



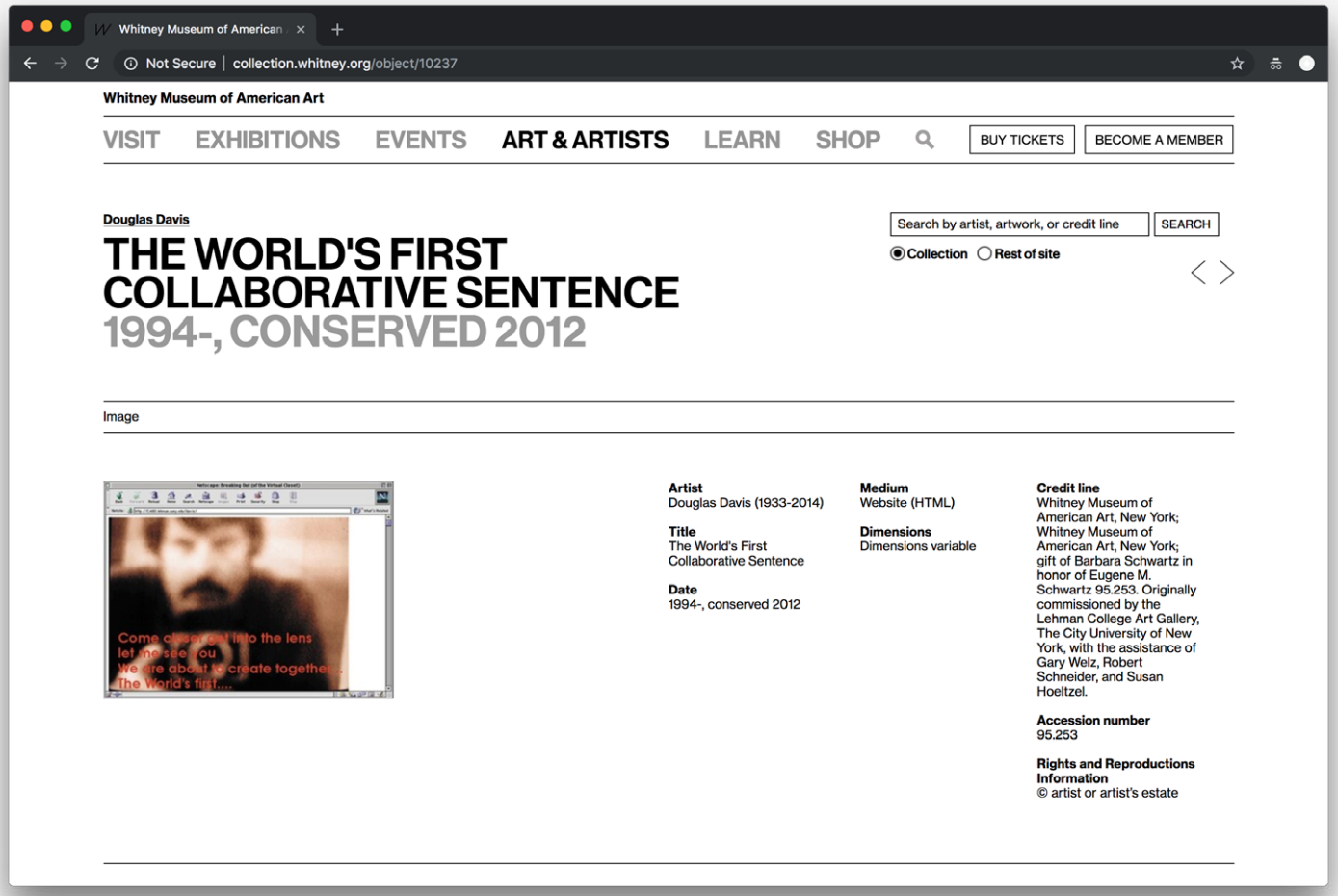
Example view of an artwork record 2: Image, text description and links to related queries are featured near the top of the page.



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)

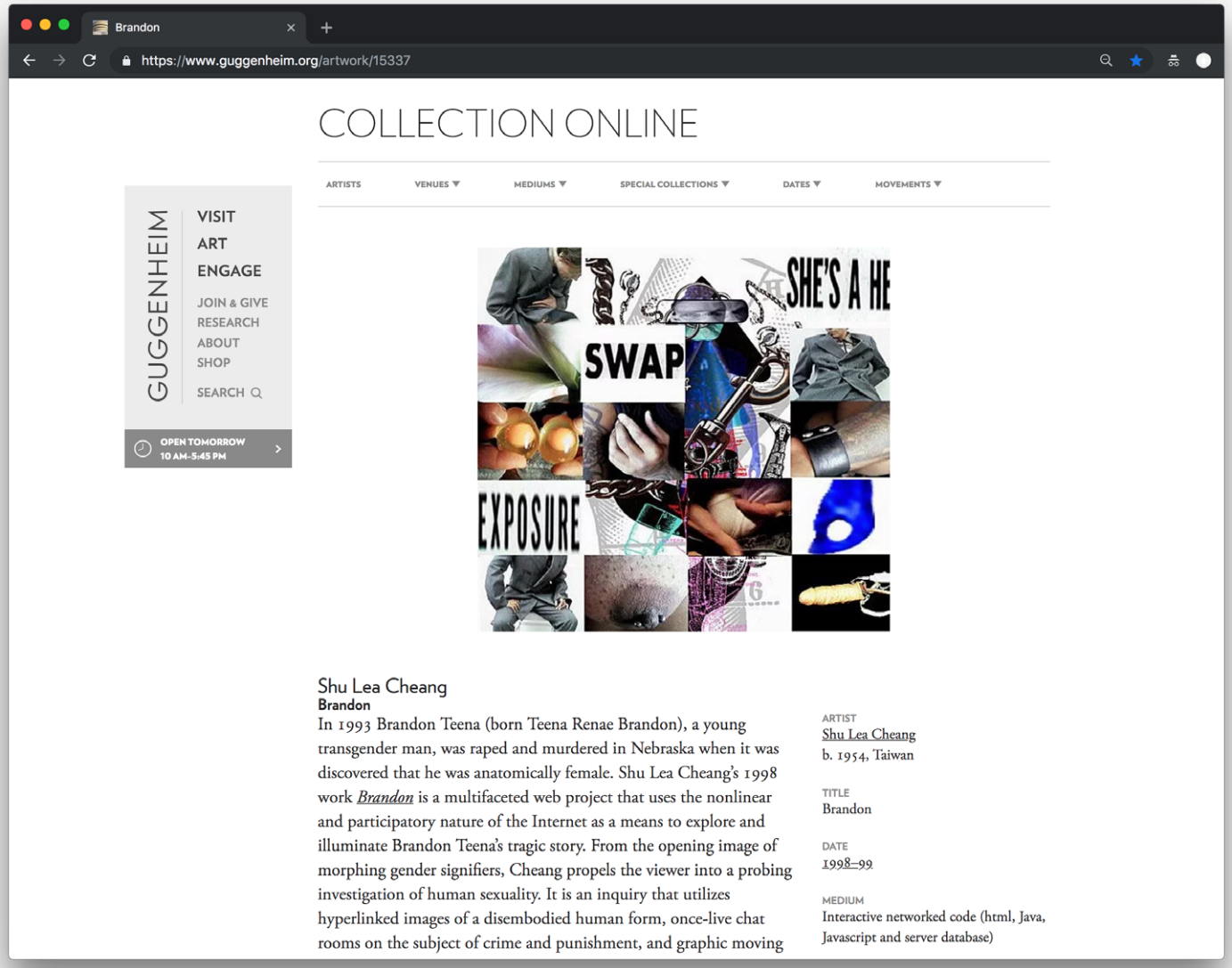


Example view of an artwork record: Only an image thumbnail and minimal amount of metadata for the record are provided.

☆
N/A

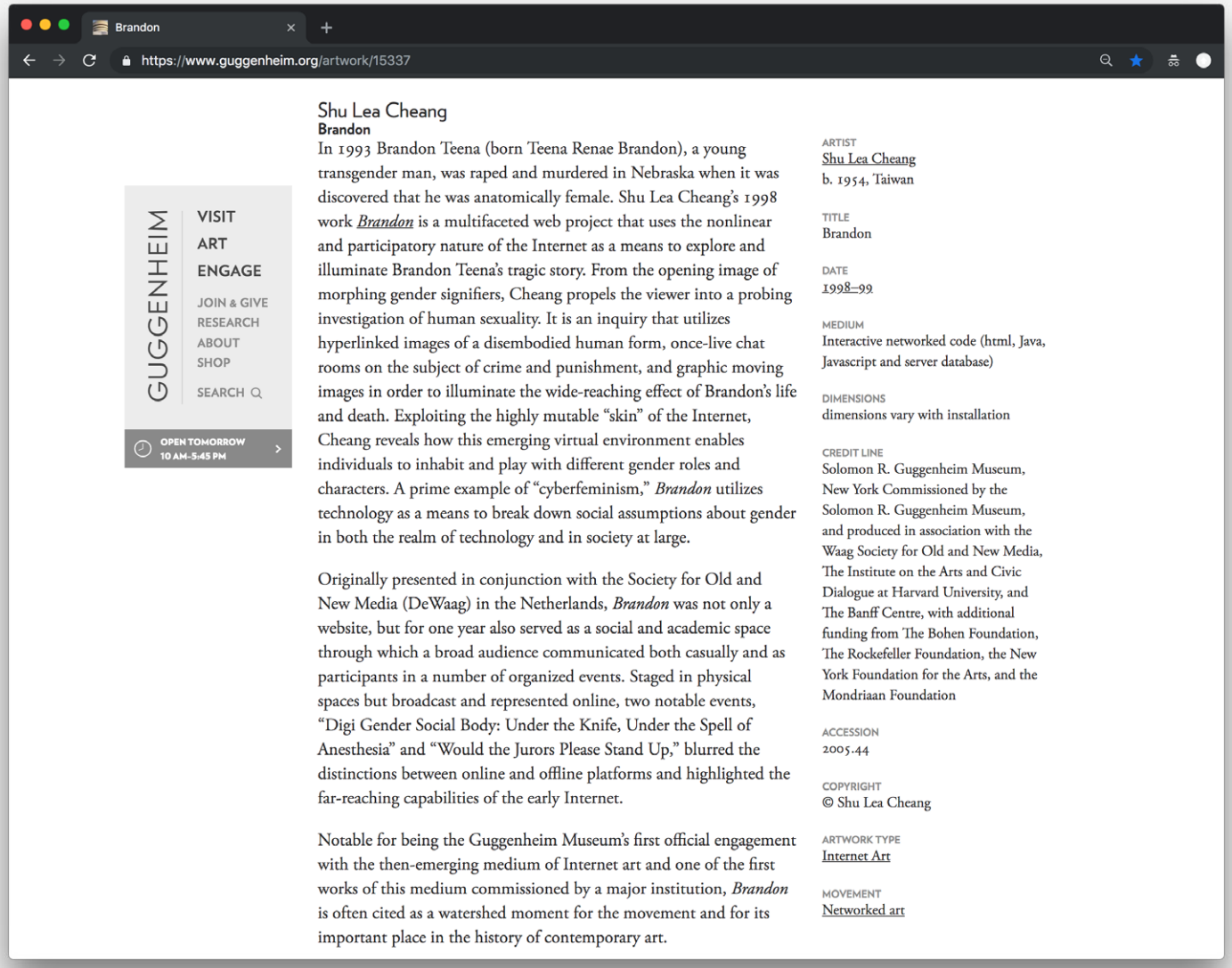
Reference URL: http://collection.whitney.org
Date of screenshots: 2018-11-15
Notes: The medium is given as “website (HTML)”, but there are no other fields where more detailed preservation or performance-related information can be provided. The dimensions field here, once again, reveals the limits of the CMS in use in the museum, which serves traditional items in the collection better.

Guggenheim (US)



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

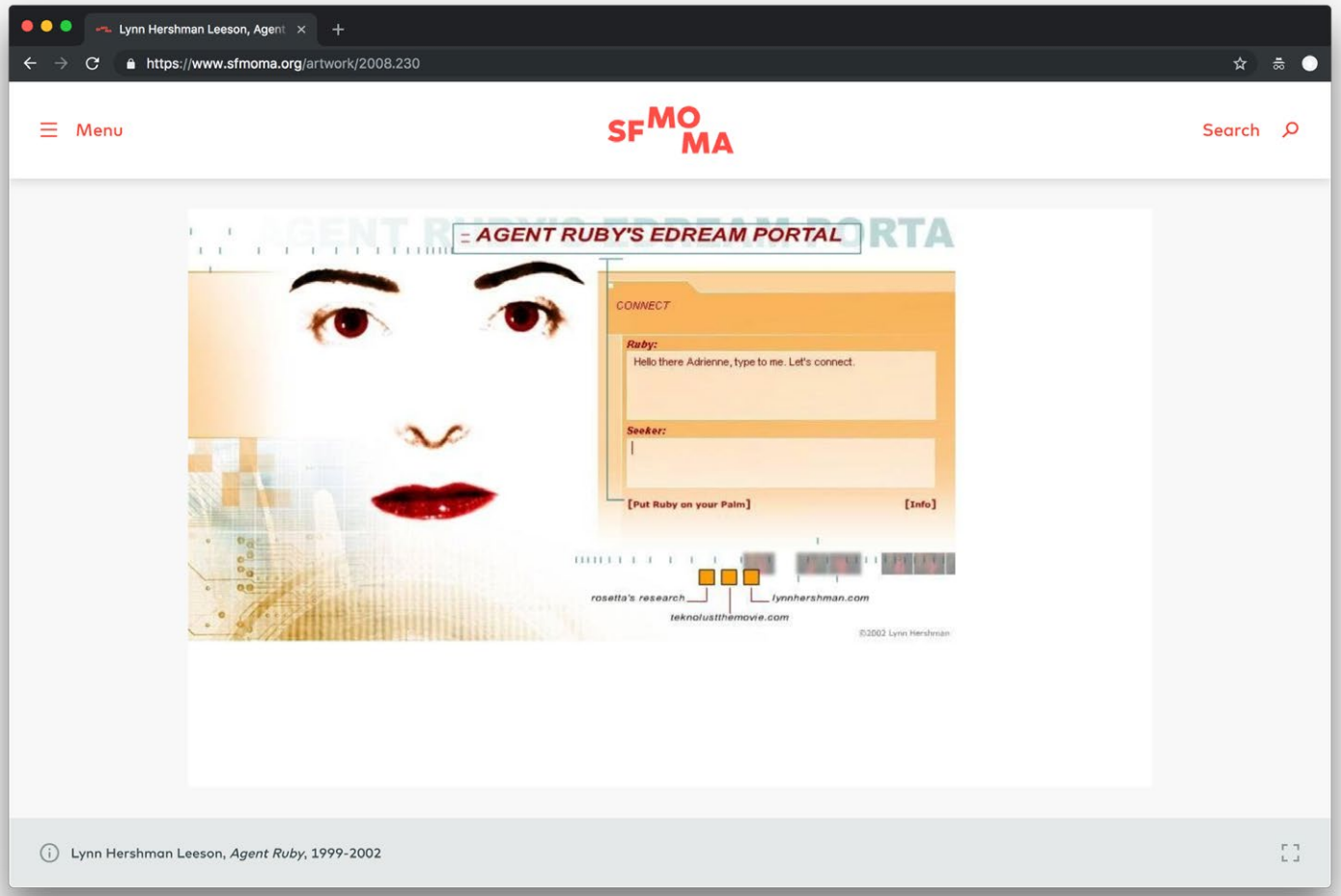
☆
N/A



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

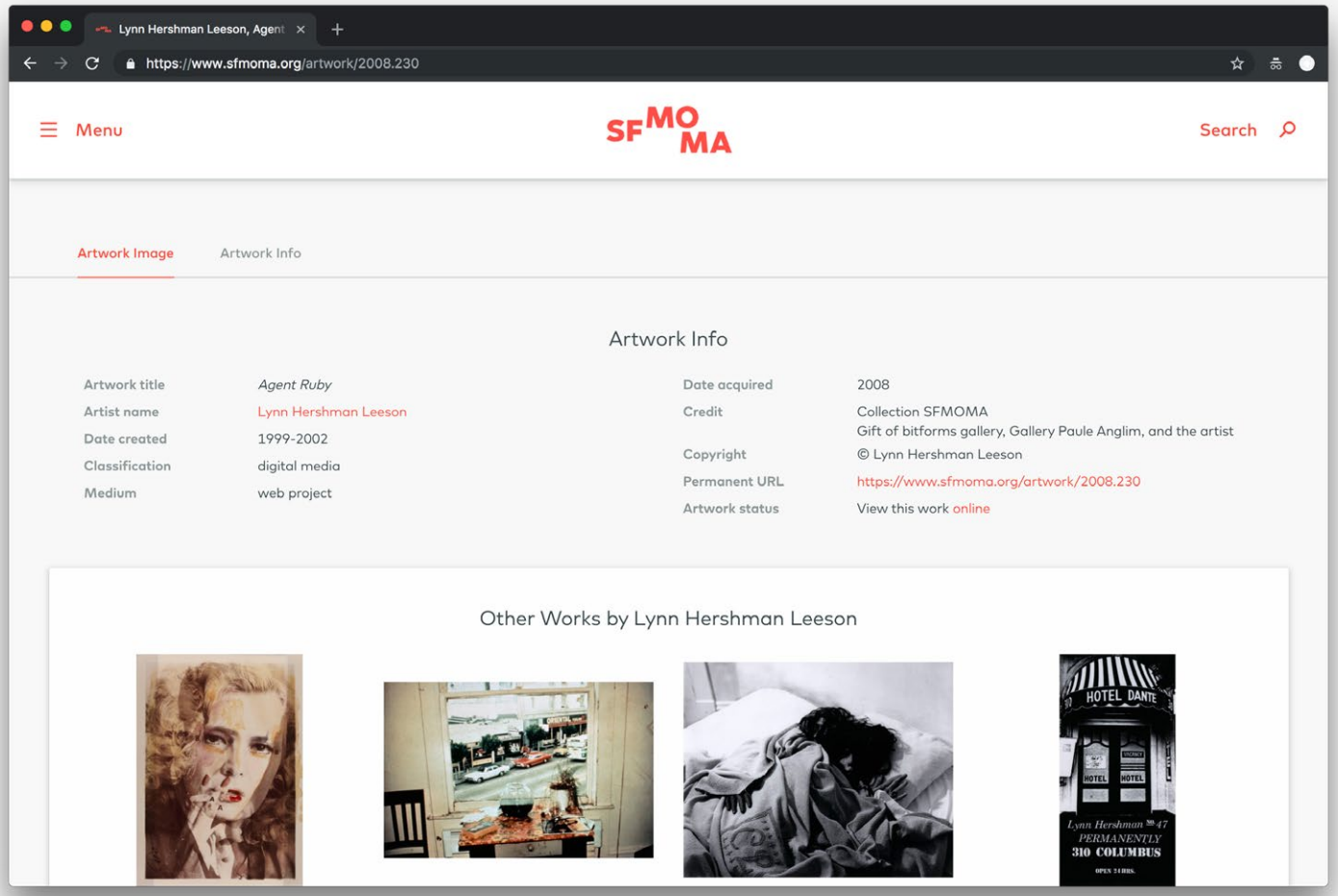
Reference URL: https://www.guggenheim.org
Date of screenshots: 2018-11-15
Notes: As with other museum interfaces, the "dimensions" metadata field here once again is of no use. The metadata field "medium" here is used to provide some high level of technical information, but as noted in discussion with 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)



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

Access statement



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.

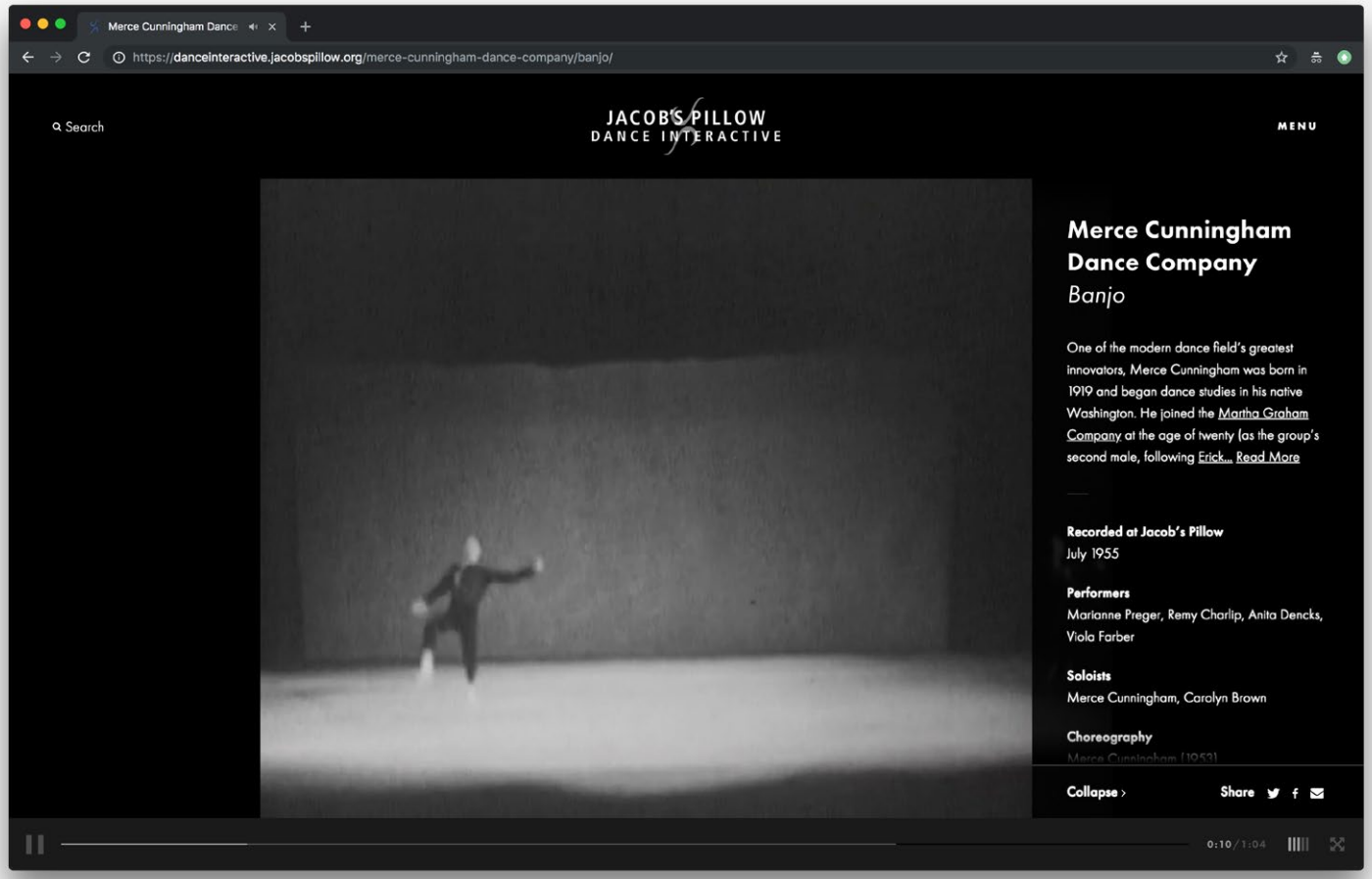
Reference URL: https://www.sfmoma.org
Date of screenshots: 2018-11-15
Notes: The work here is classified as “digital media”. The metadata field “medium” is used only to imply the work is web-based—“web project”. The “permanent URL” is a new element not present in other museum interfaces, but is crucial 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.

☆

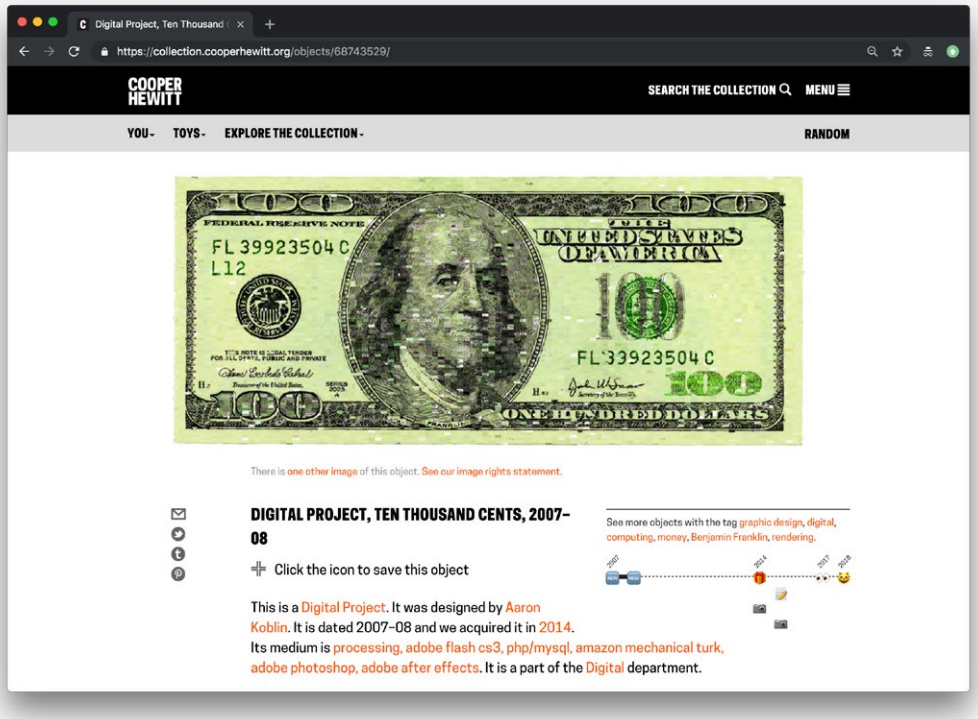
Metadata in collapsed sidepanel



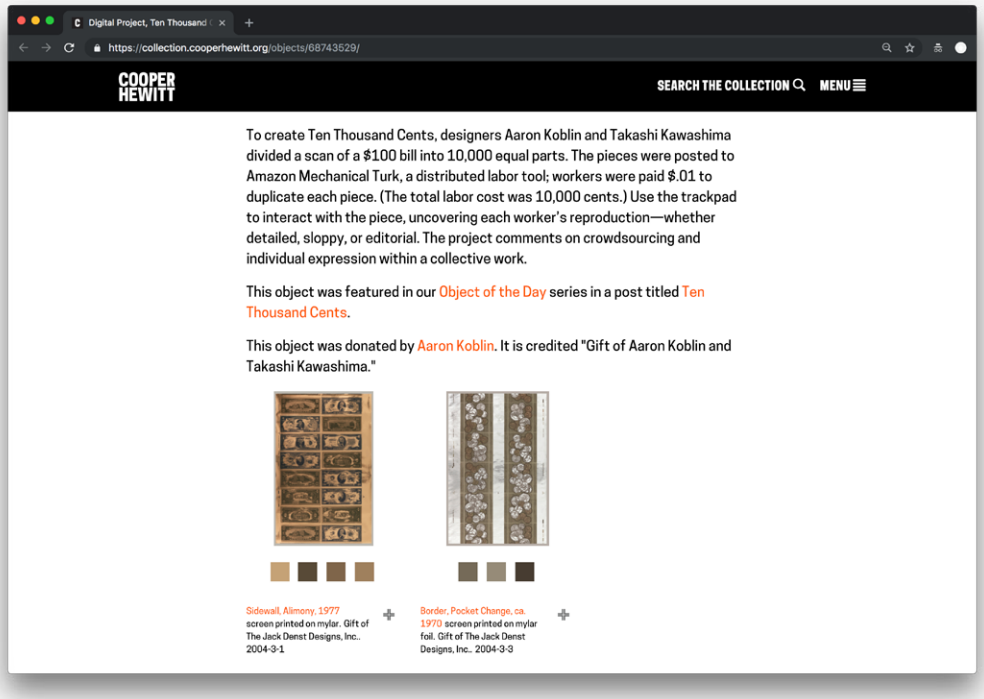
Example view of an artwork record: Relevant metadata elements are available as an expandable/ collapsible sidepanel on the right side of the browser window.

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)



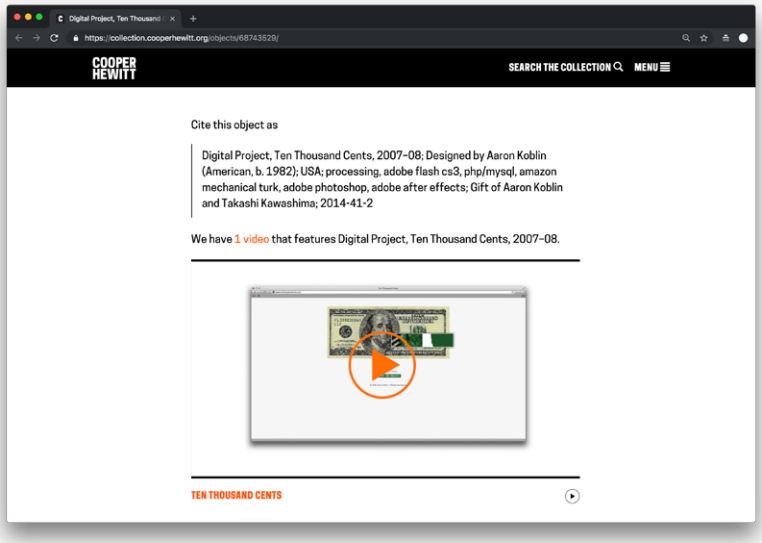
Example view of an artwork record: Image representation, followed by title, timeline, and a description compiled as natural language from structured data statements, are all featured near the top of the page.



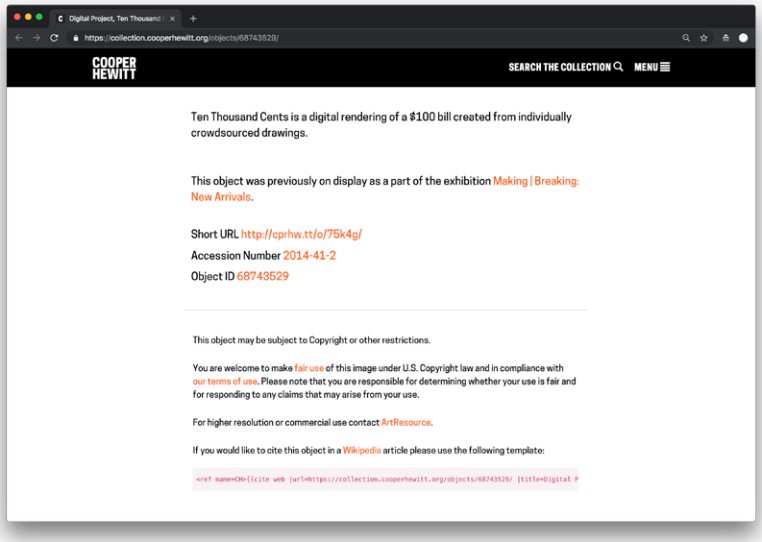
Example view of an artwork record: Links to suggested related works are featured further down the page.

☆ 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.

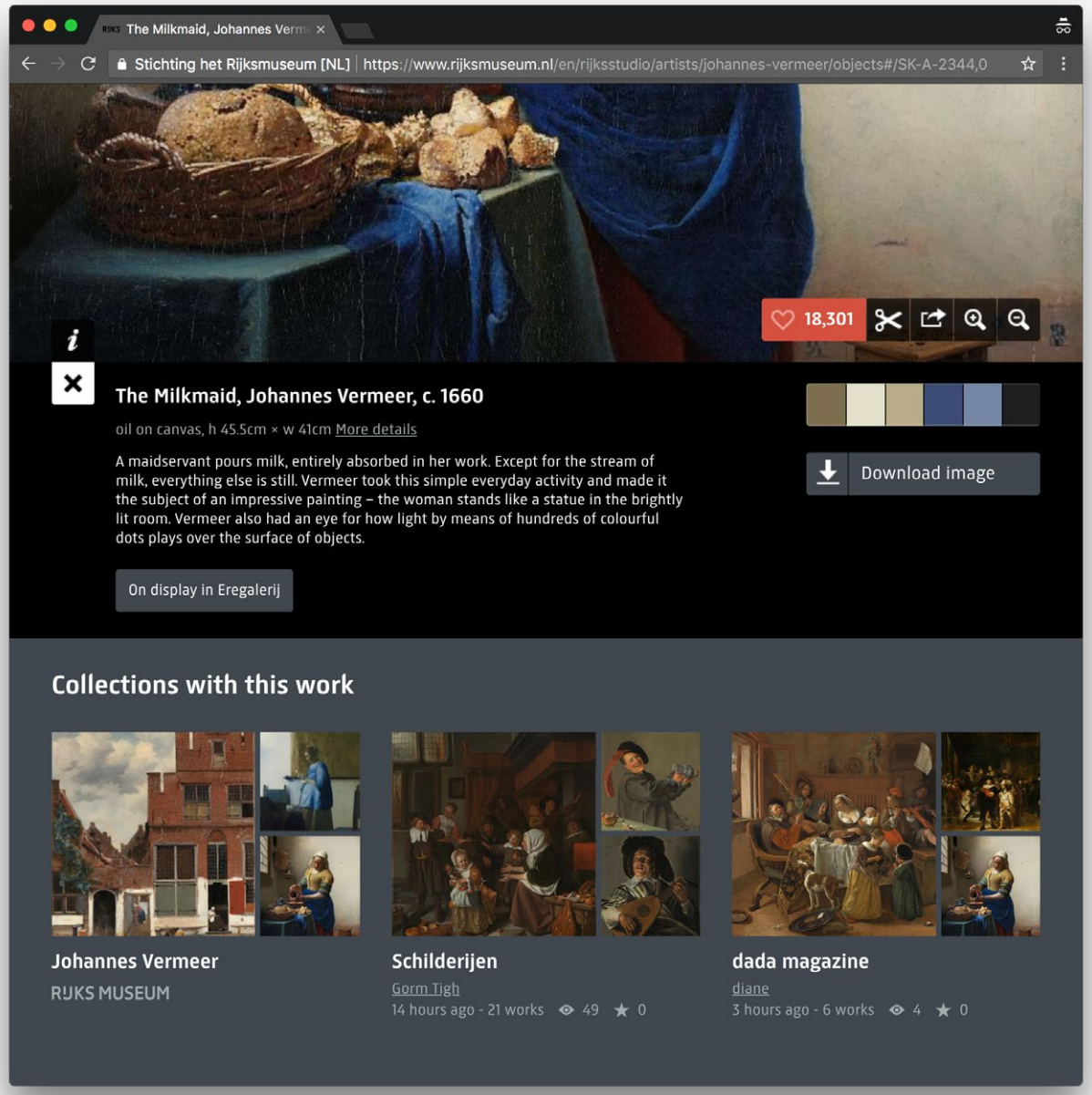


Example view of an artwork record: Additional administrative metadata (identifiers and licensing) is also provided at the end of the record page.



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).

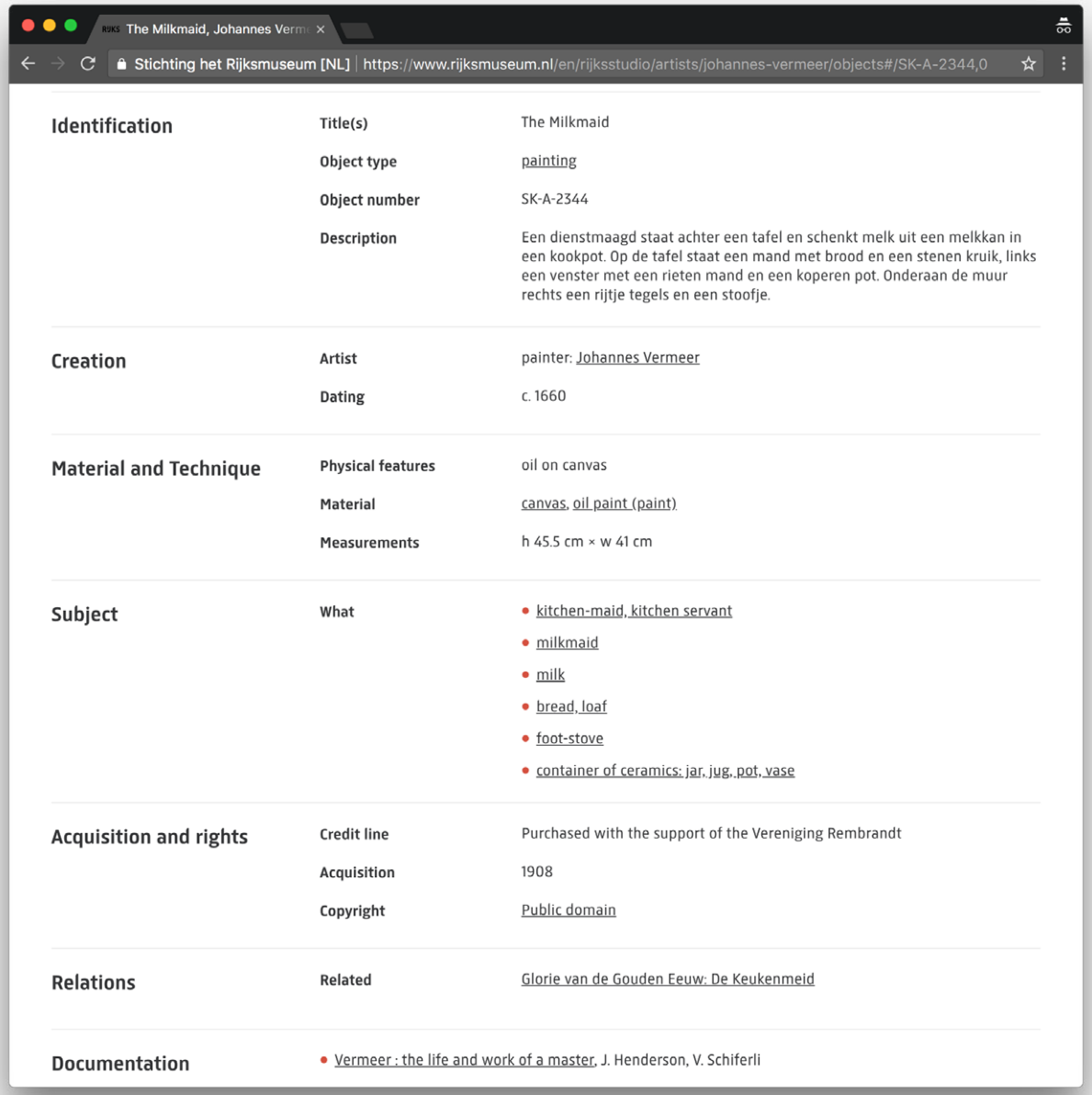
Rijksmuseum (NL)



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**

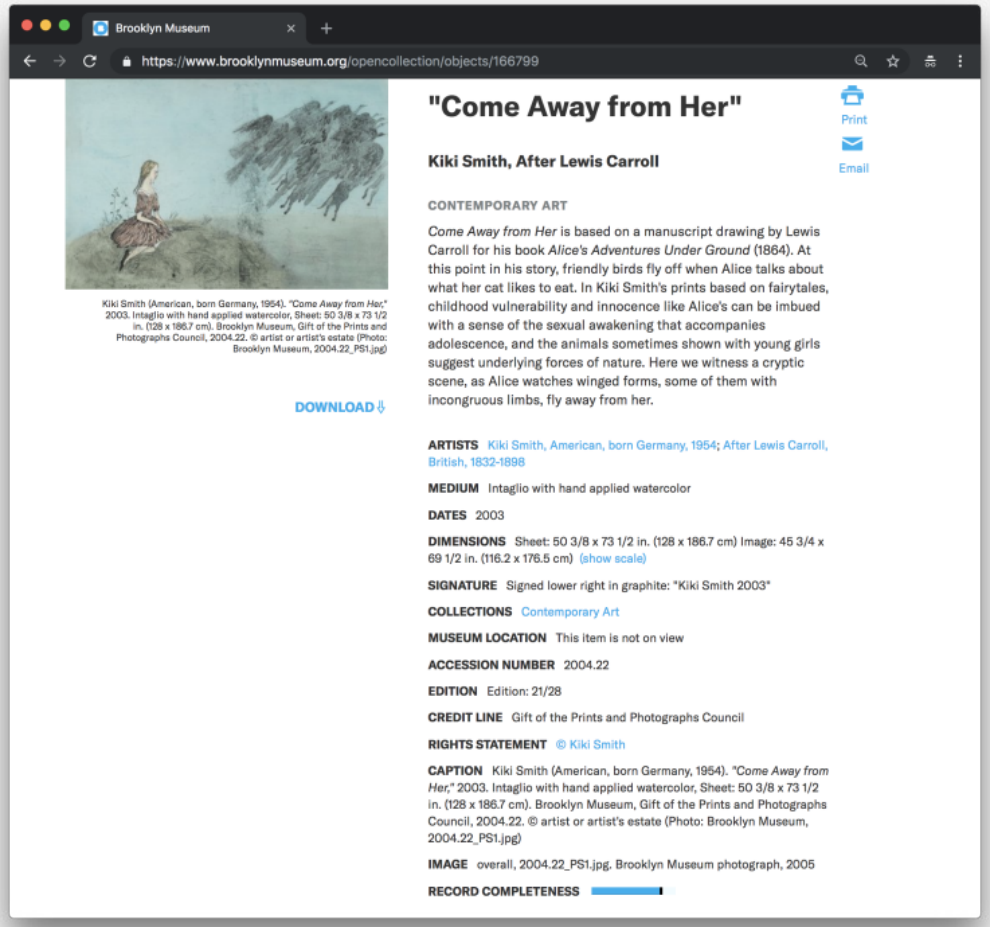
2 Interfaces for artwork records in institutional collections



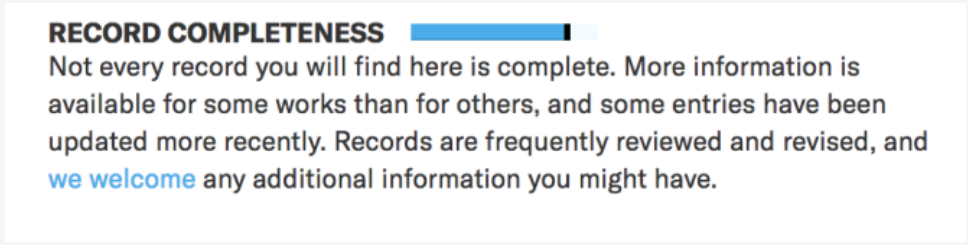
Example view of an artwork record: Relevant metadata elements are available as a long list of clusters, which are collapsed by default, but the user can expand by clicking an "Object data" button.

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)



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 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.

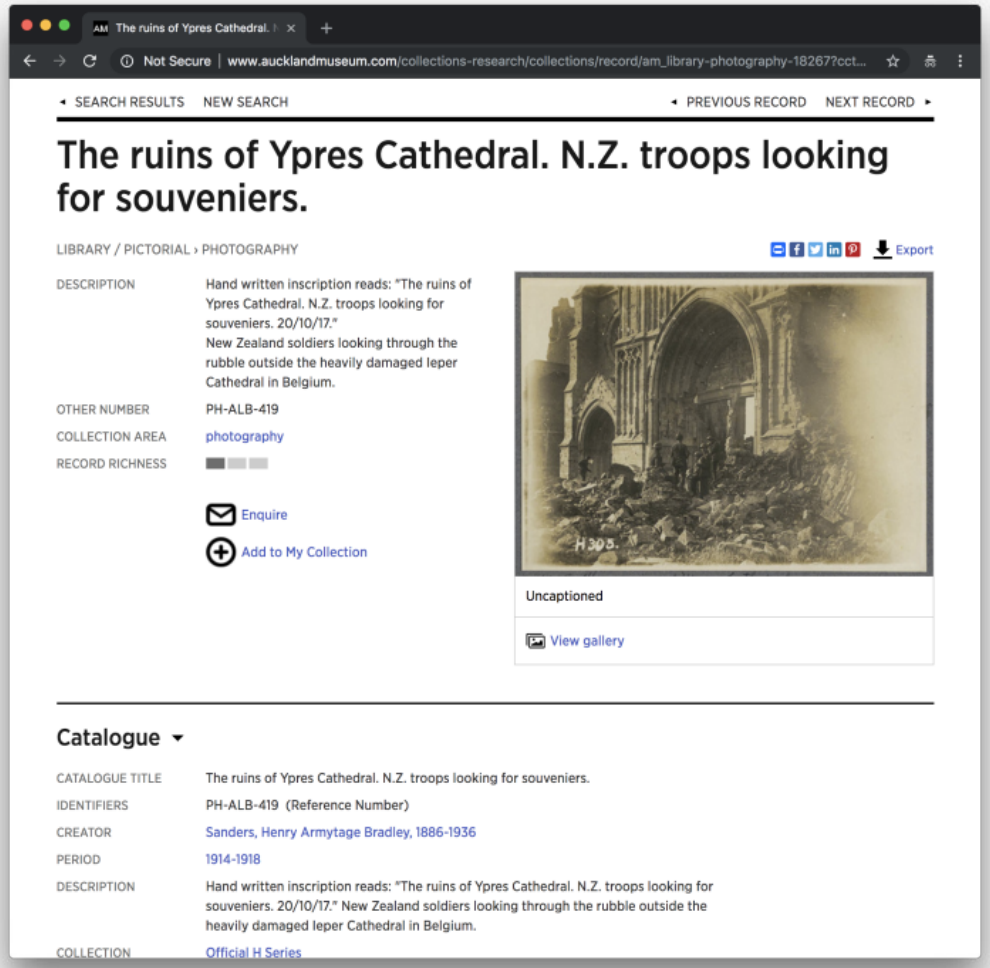
☆
Metadata richness indicator

☆
Invitation to contribute

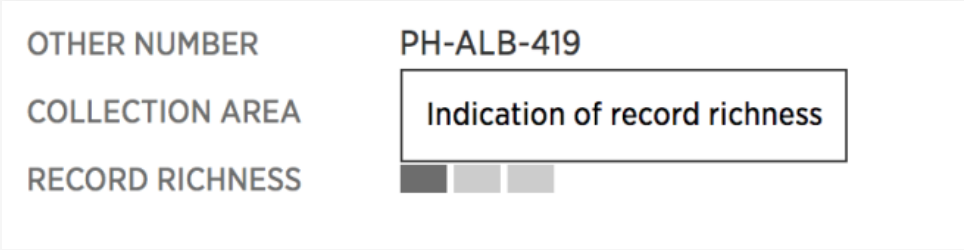
Reference URL: https://www.brooklynmuseum.org
Date of screenshots: 2018-05-14
Notes: This museum interface is included in this review for its use of the concept of record compleness, or richness. This makes the explicit statement that the museum doesn't try to present an absolute truth, but rather that 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 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.

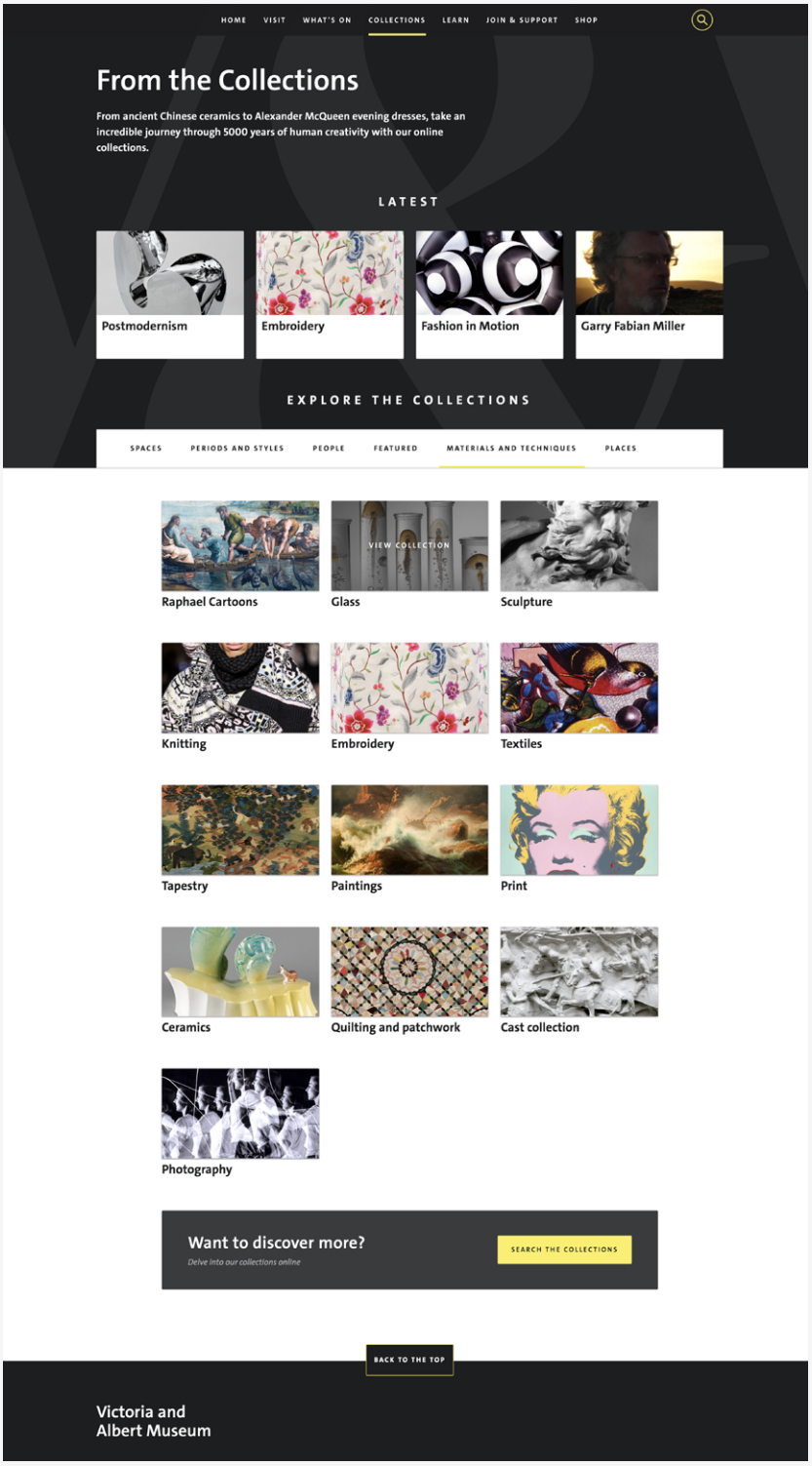


☆
Metadata richness indicator

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 compleness, or richness.

3 Interfaces for collection entry points

Victoria & Albert Museum (UK)



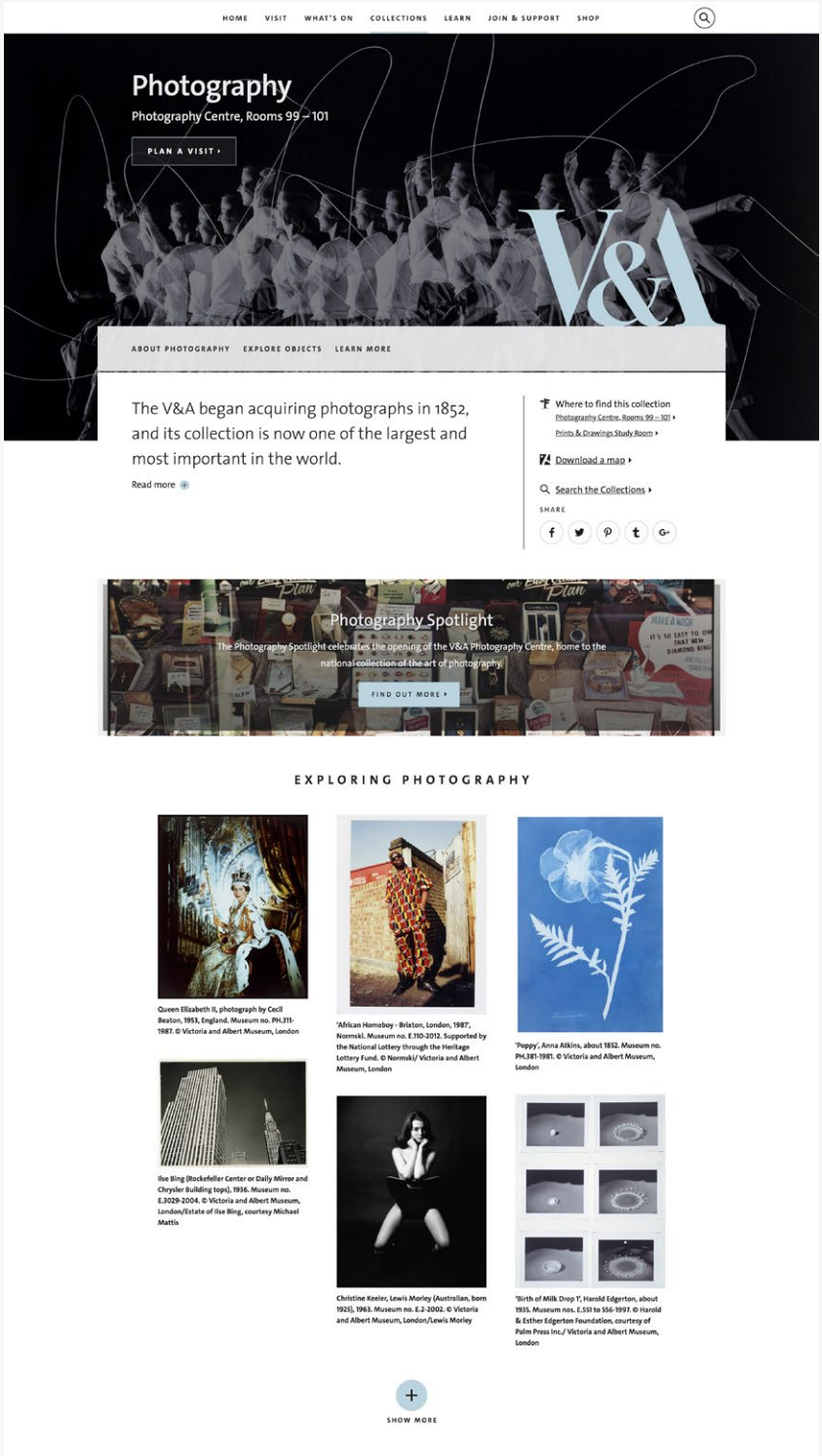
Entry point to all collections: Various collection categories, represented via image thumbnail surrogates give a broad overview of collection holdings.

☆ **Overviews & previews**

☆ **Curated selections**

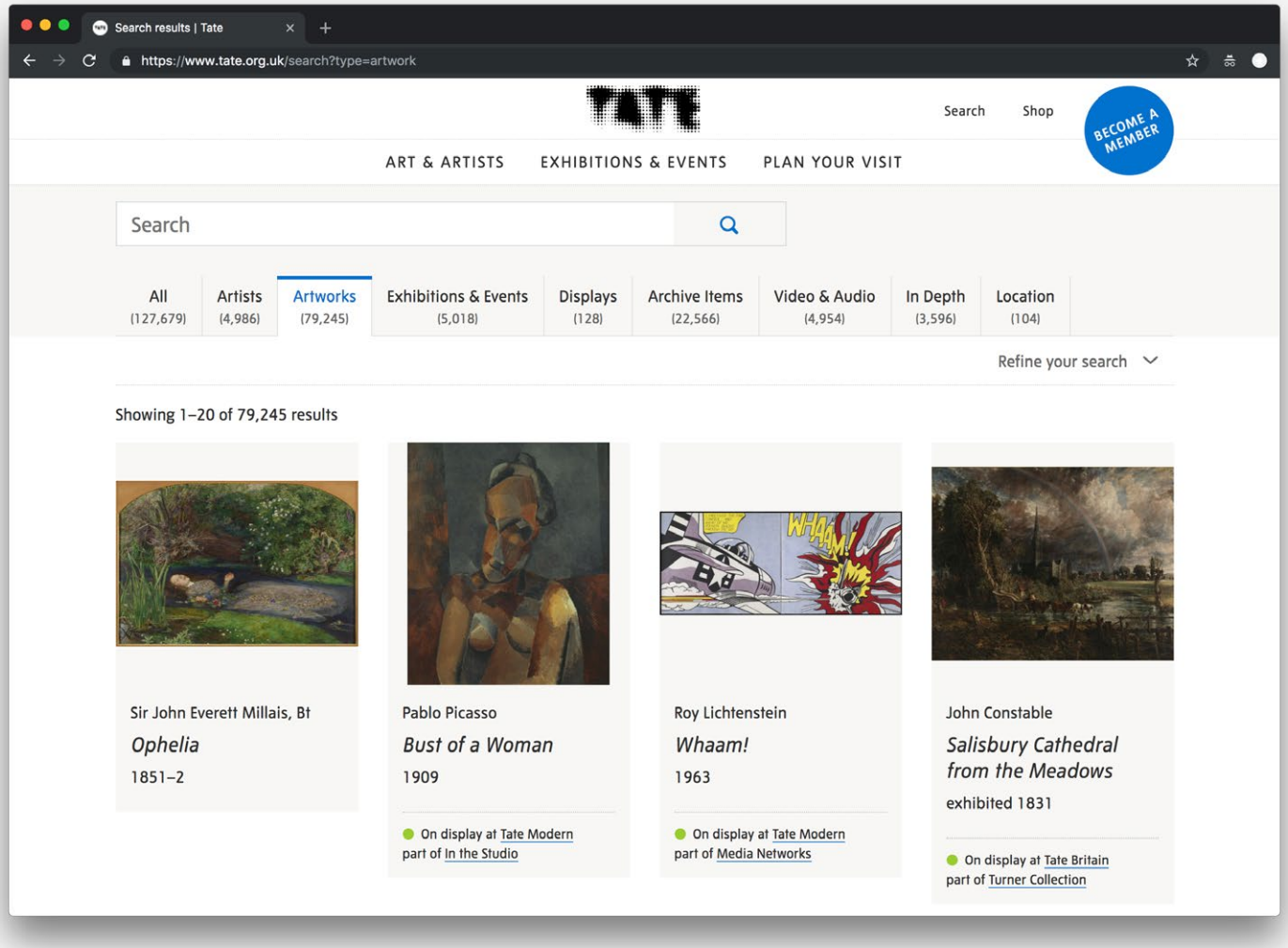
3 Interfaces for collection entry points

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".



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)

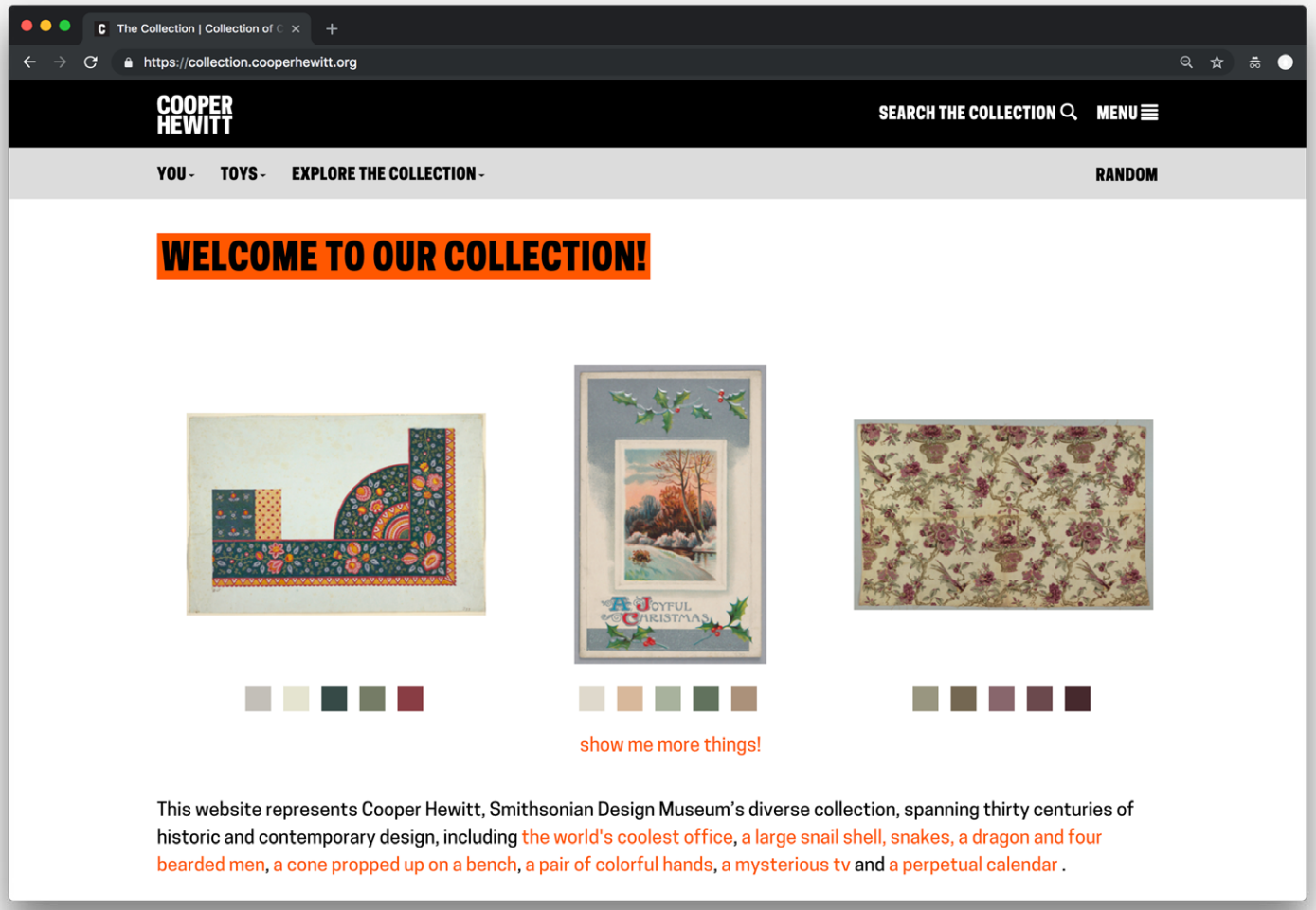


Entry point to the collection: The interface offers overviews (in the form of categories) and previews (via image thumbnail surrogates).

☆
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)



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.

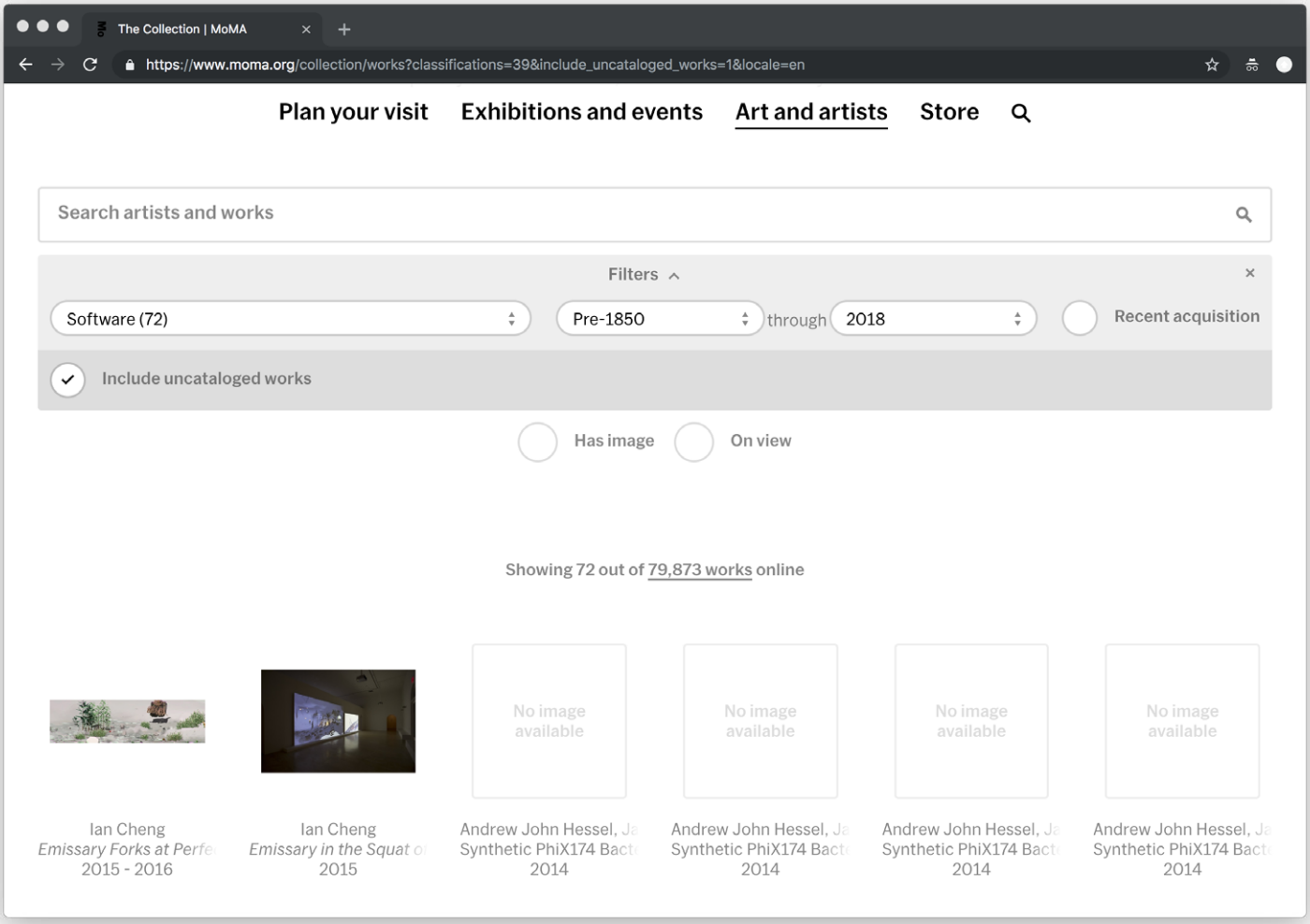
☆ **Generous interfaces**

☆ **Randomization**

☆ **SPARQL query GUI**

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.

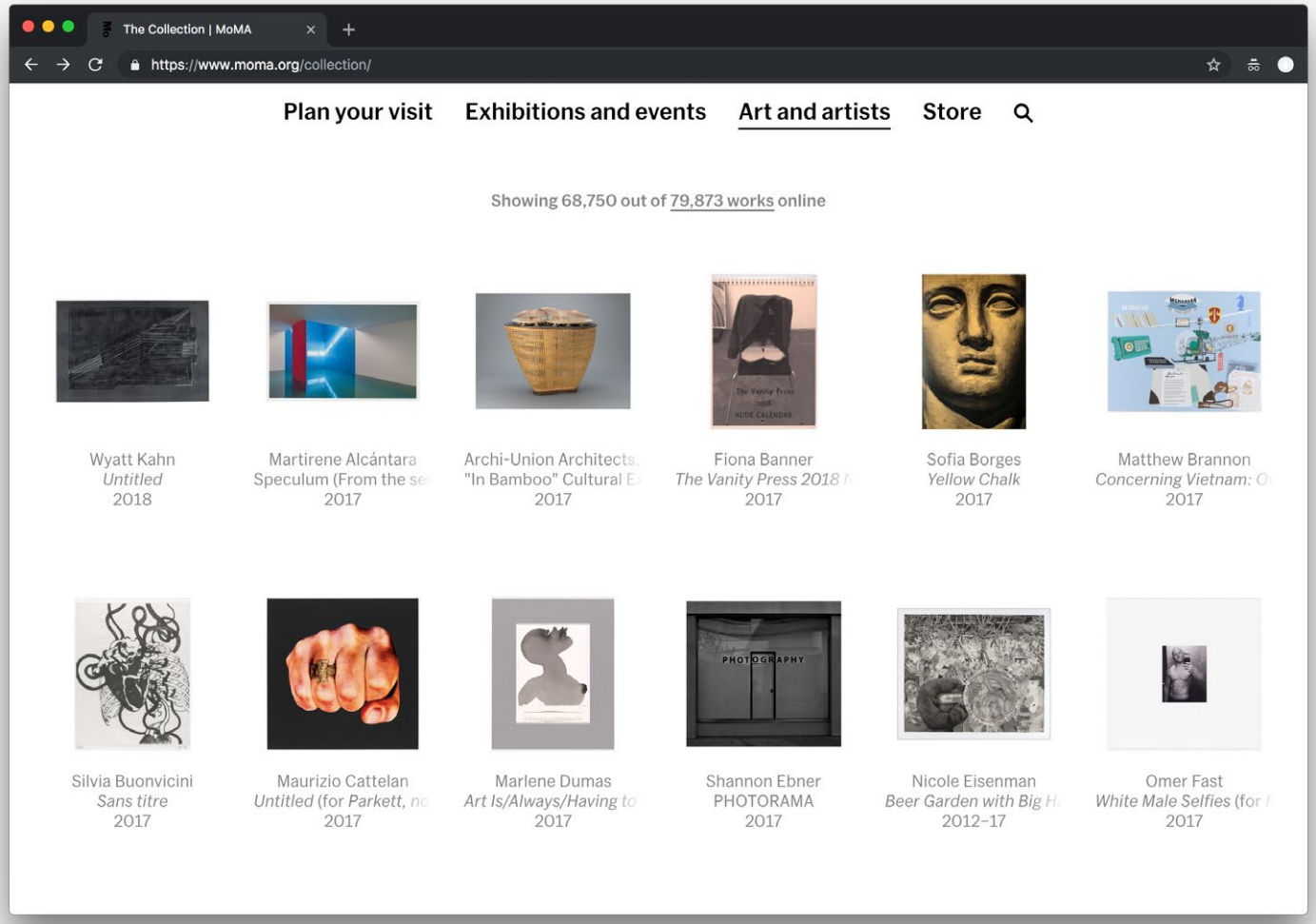
MoMA (US)



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

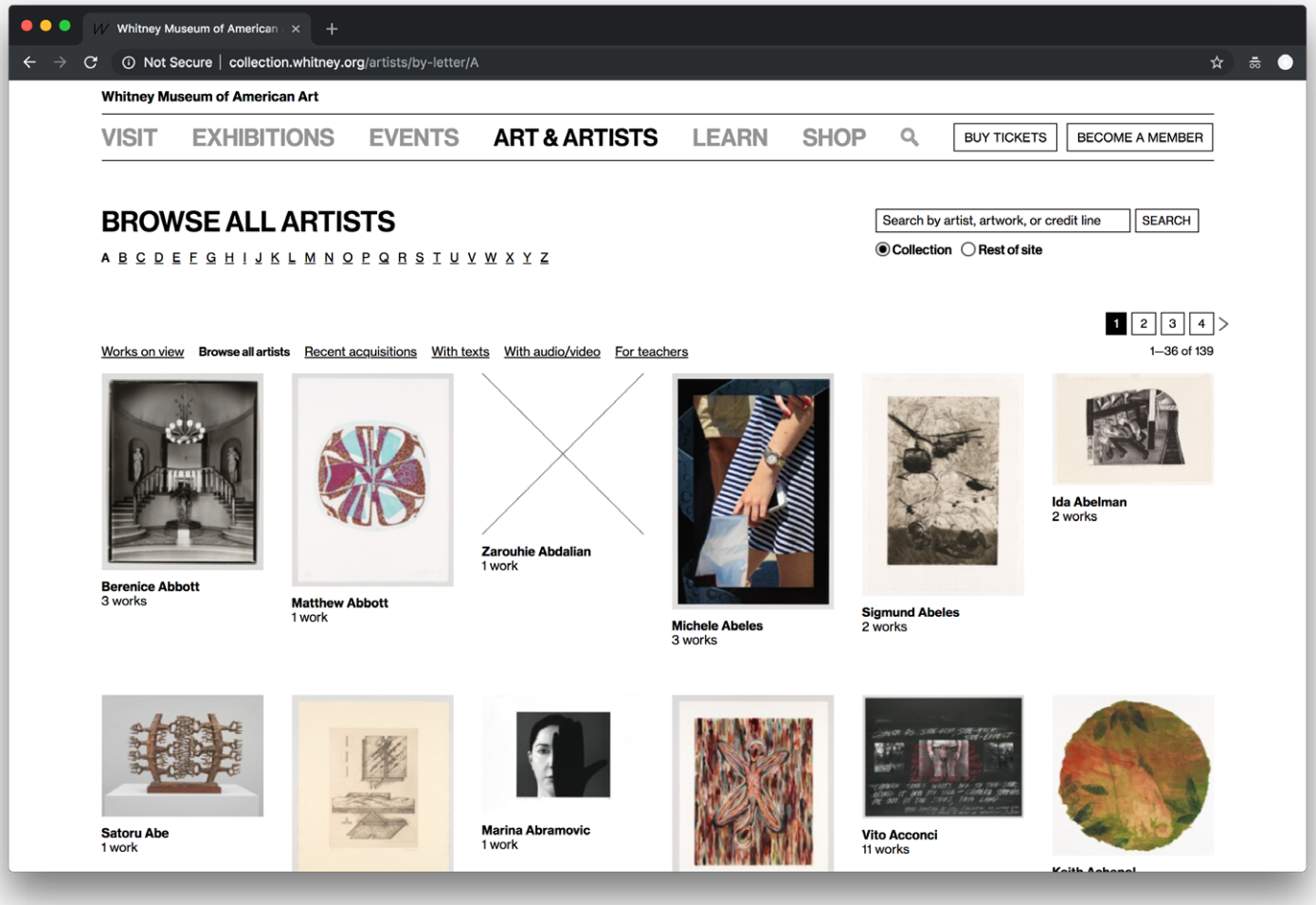
3 Interfaces for collection entry points



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)

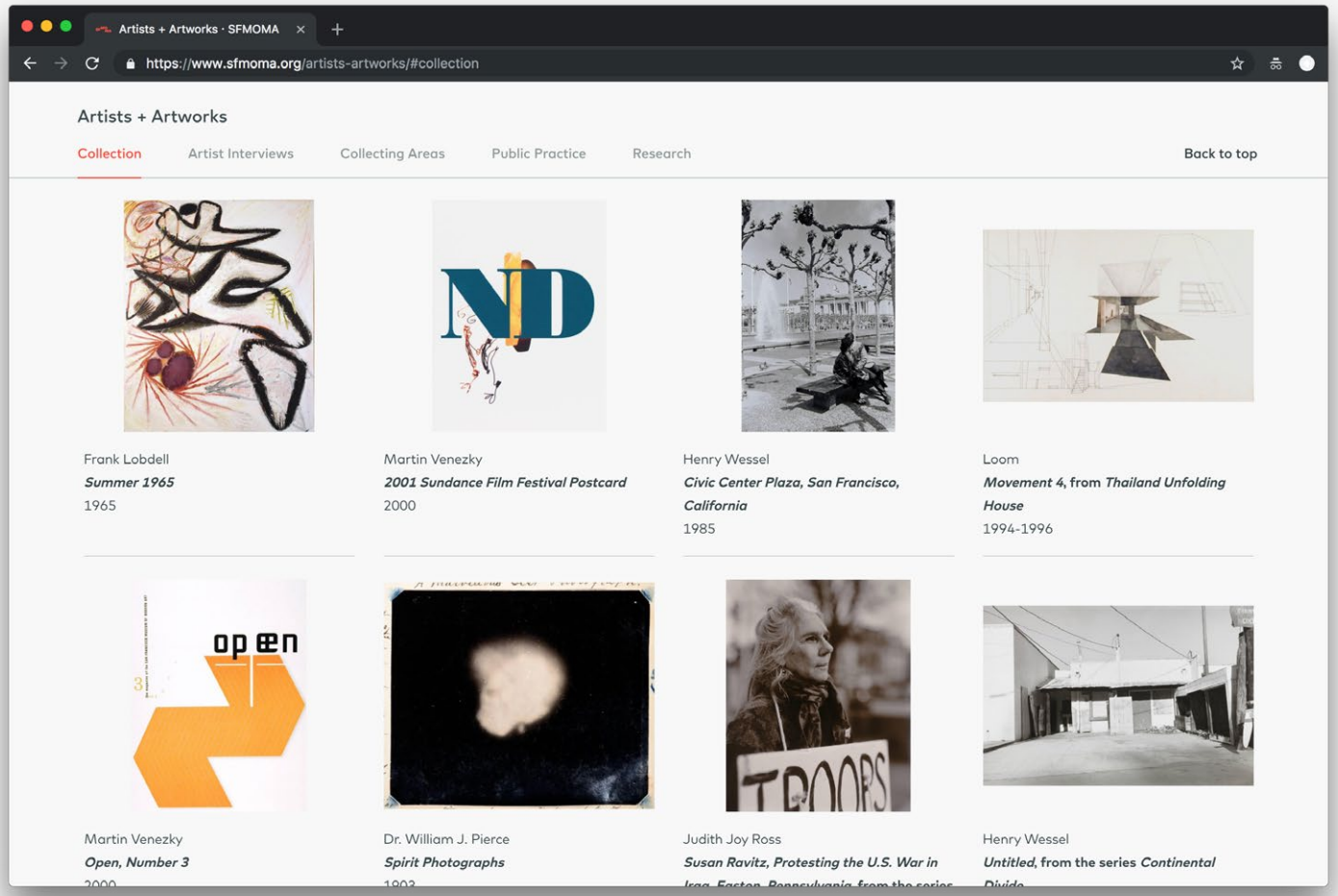


Entry point to the collection: Some filters and sorting utilities are featured near the top of the page, followed by previews (with image thumbnail surrogates).

☆
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)



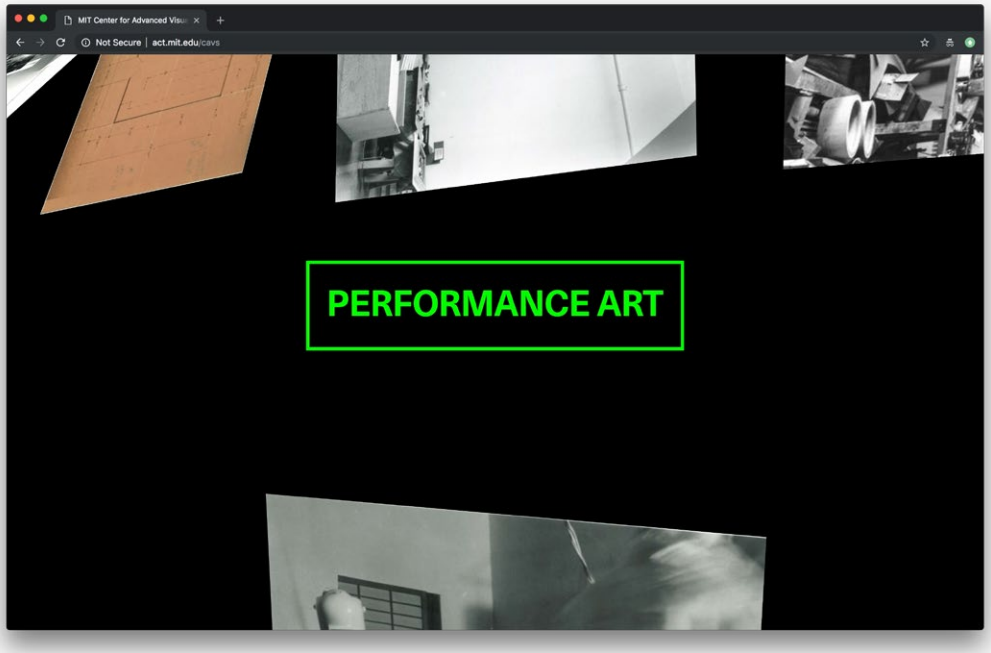
Entry point to the collection: Some overviews and previews are provided based on a limited number of categories (e.g. “collecting areas”).

☆
Randomization

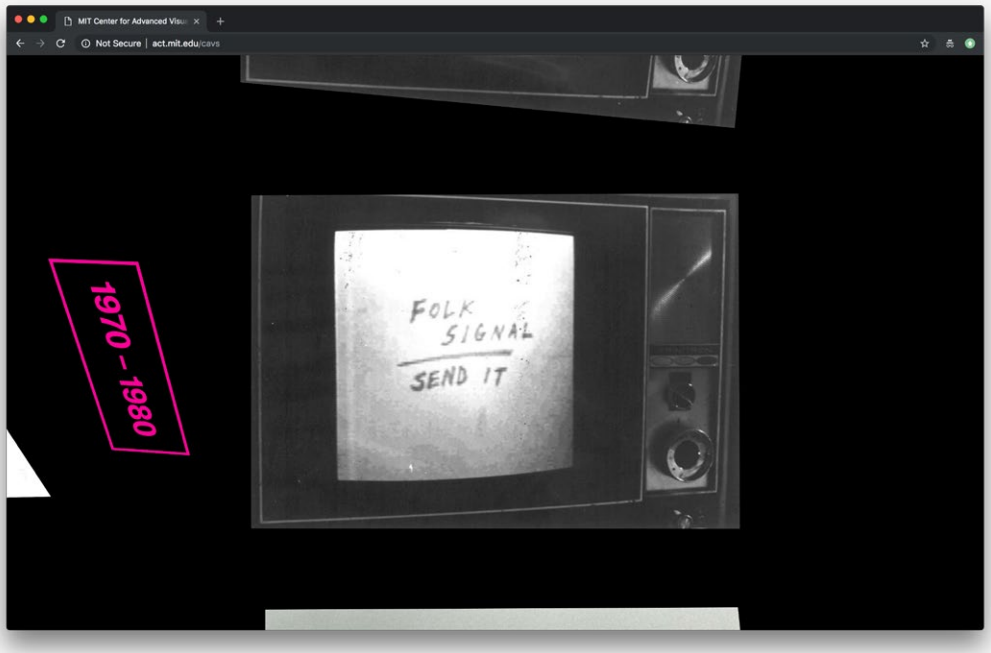
☆
Overviews & previews

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.

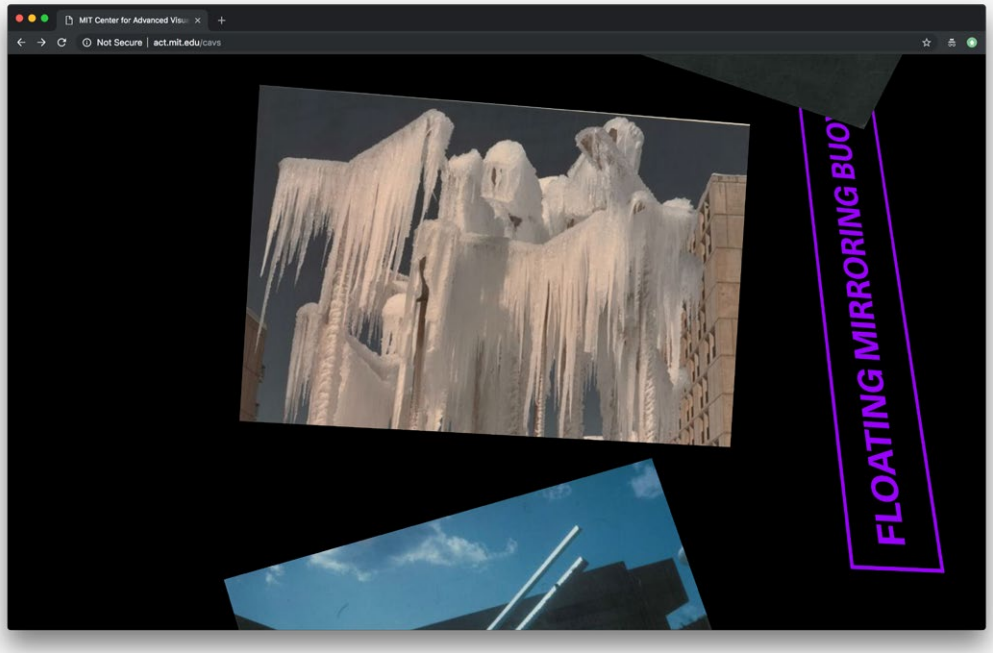


Entry point to the collection (cont.).

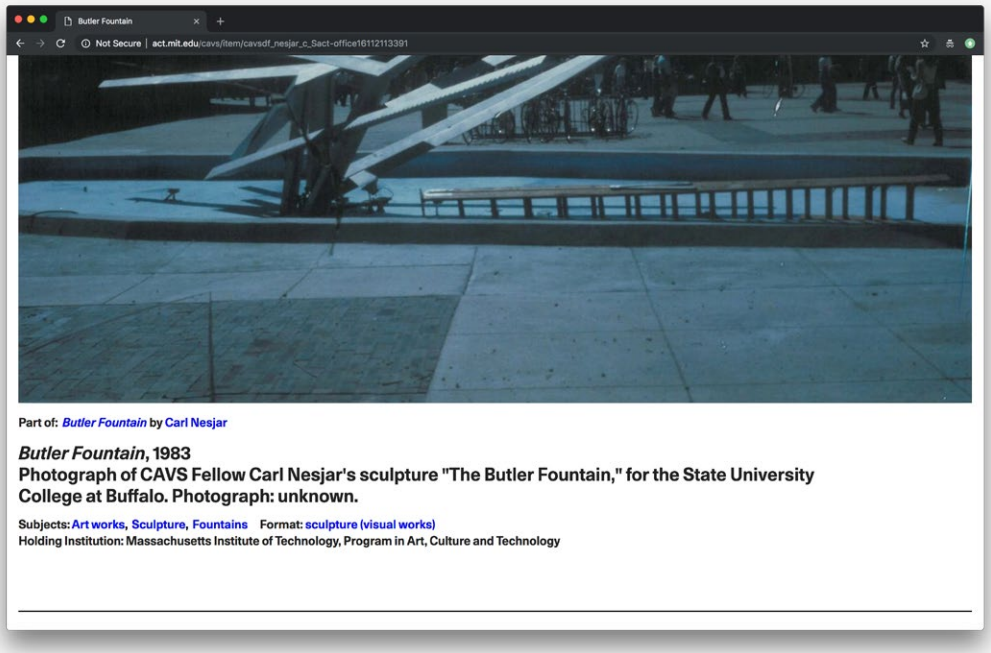
☆	☆	☆
Generous interfaces	**Overviews & previews**	**Randomization**

3 Interfaces for collection entry points

Entry point to the collection (cont.).

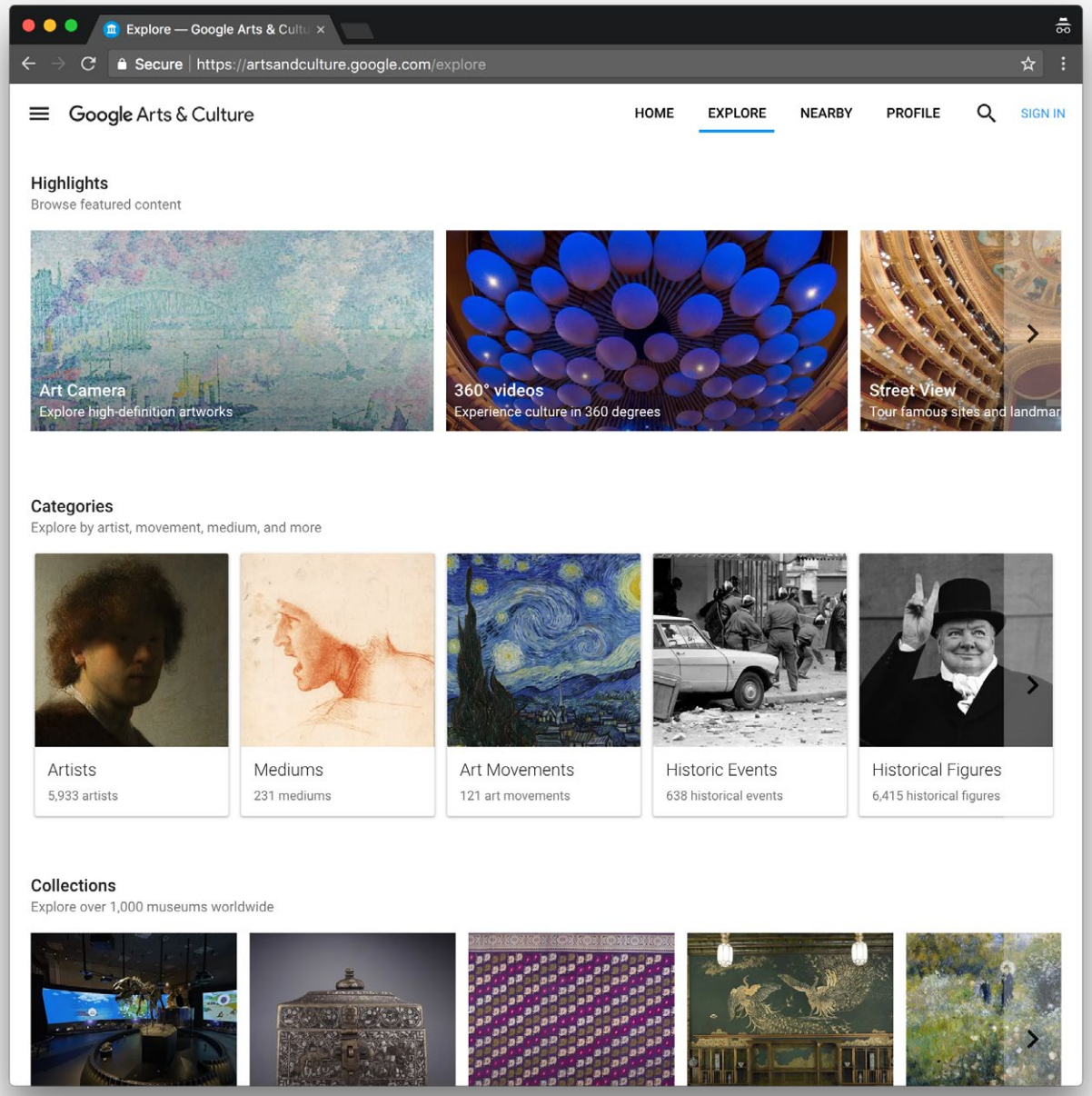


Example view of an item record: An image and minimal amount of metadata represent the item.



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.

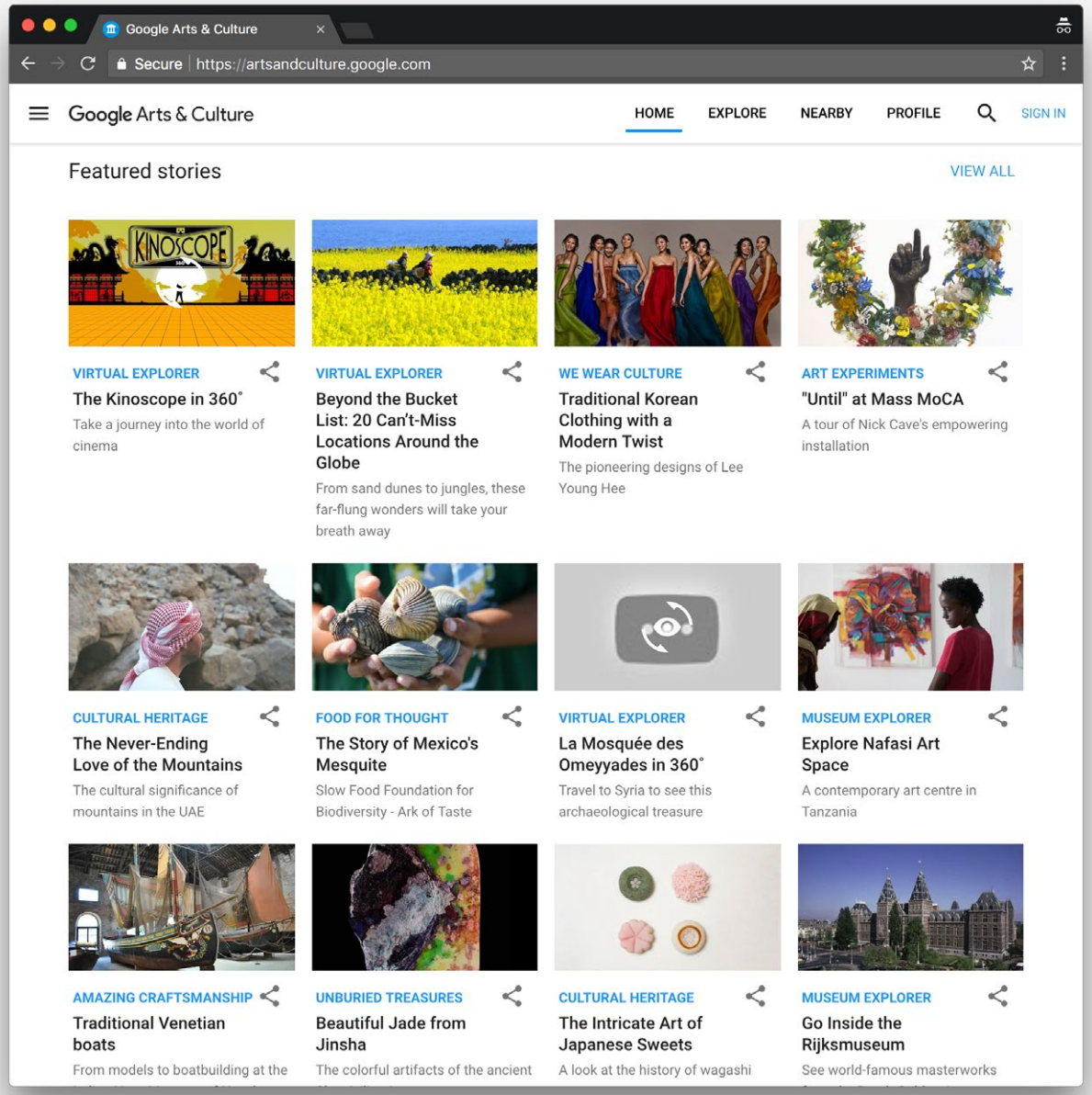
Google Arts & Culture



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

☆	☆
Overviews & previews	**Curated selections**

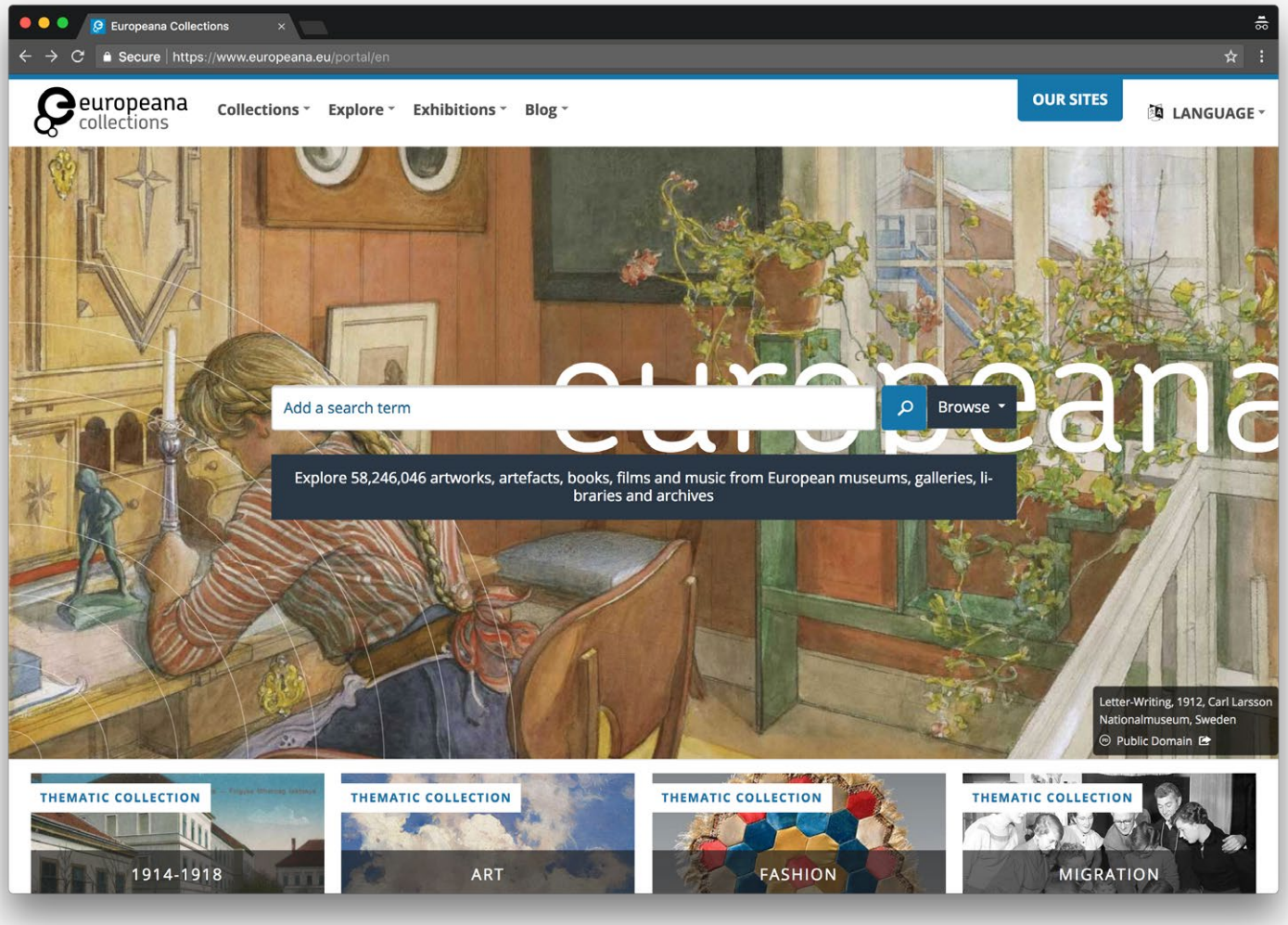
3 Interfaces for collection entry points



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)

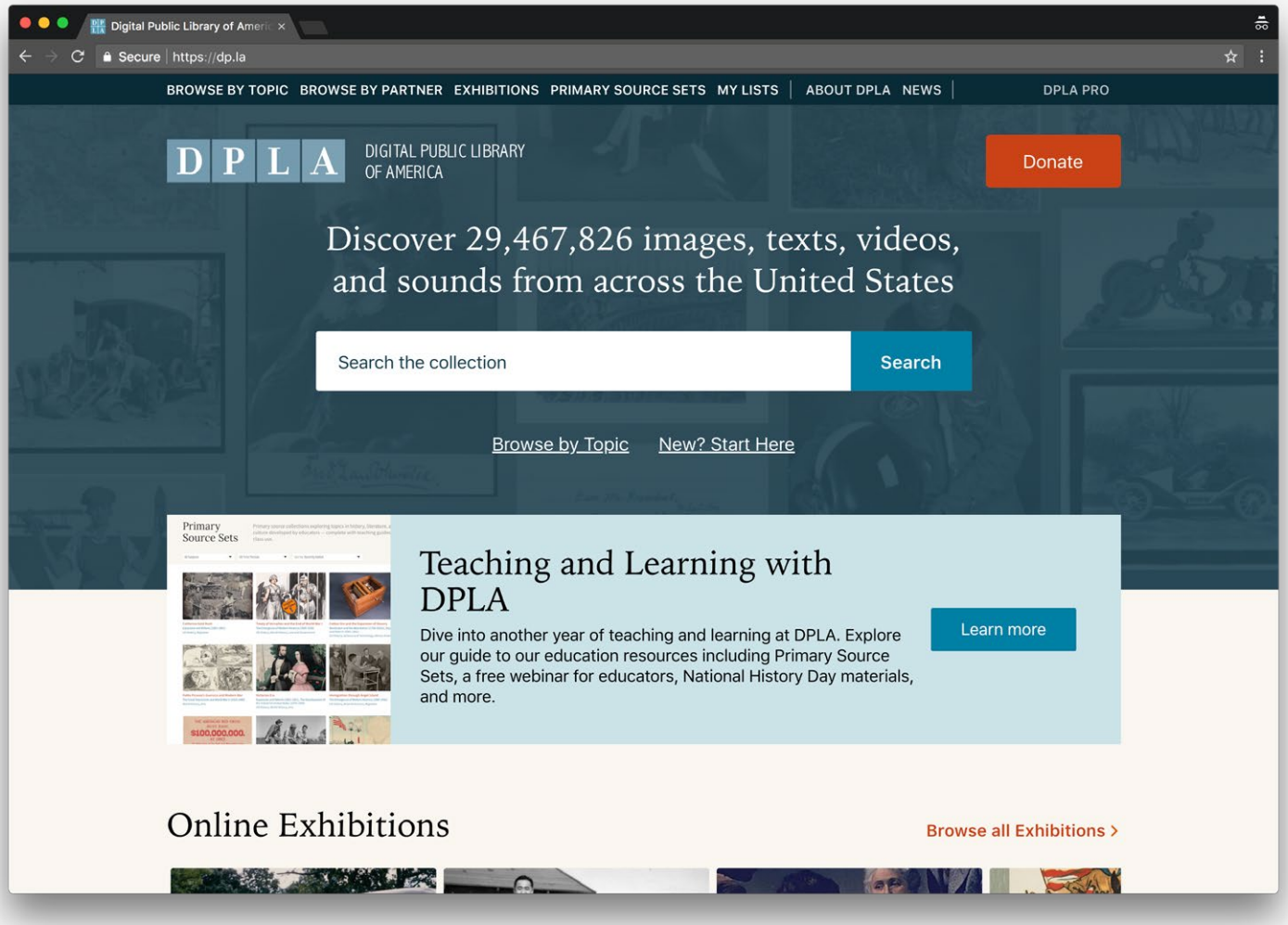


Entry point to all collections.

Curated selections

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.

DPLA (US)



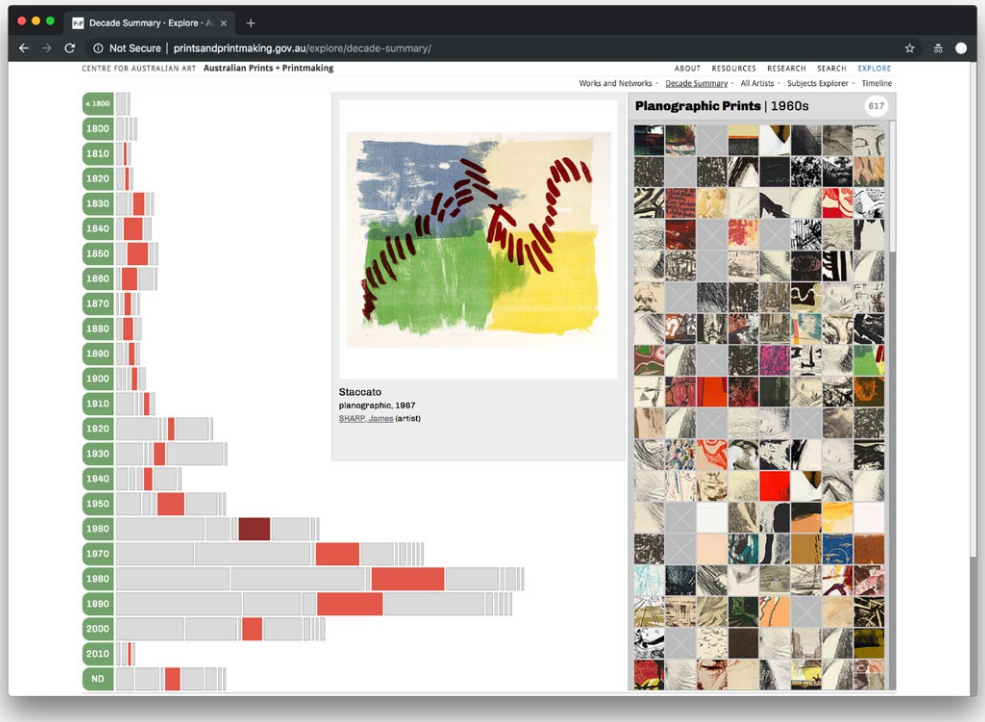
Entry point to all collections.

☆
Curated selections

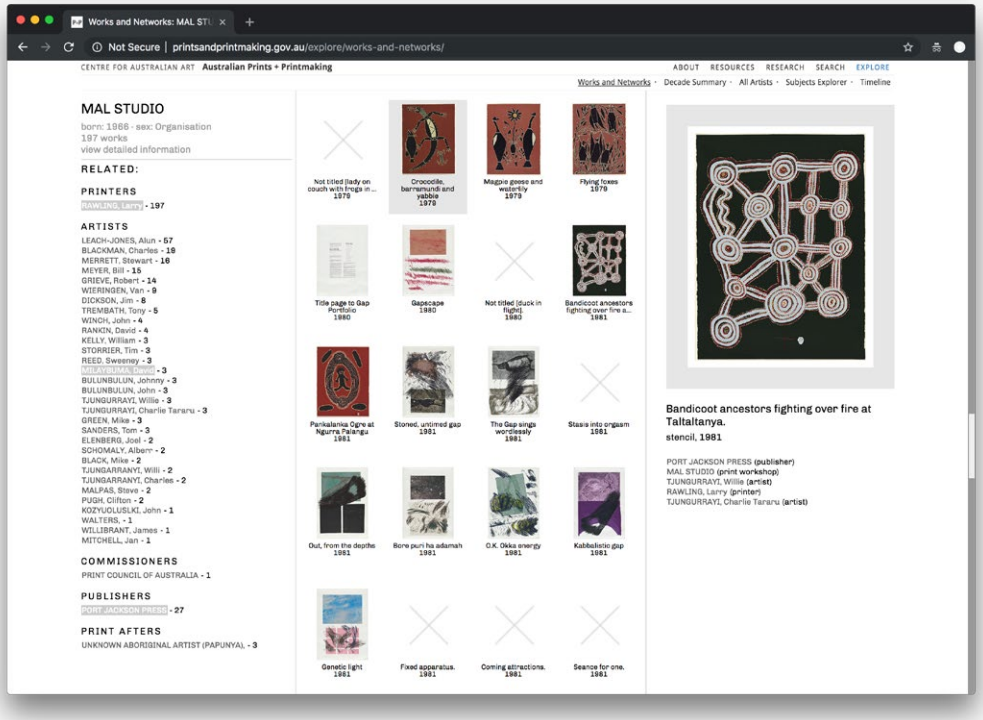
Reference URL: https://dp.la
Date of screenshots: 2018-09-12
Notes: Similar to the Europeana portal, the DPLA portal focuses on search as a primary navigation mode. There are some curated selections and additional browsing utilities, but search remains the primary entry point.

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.

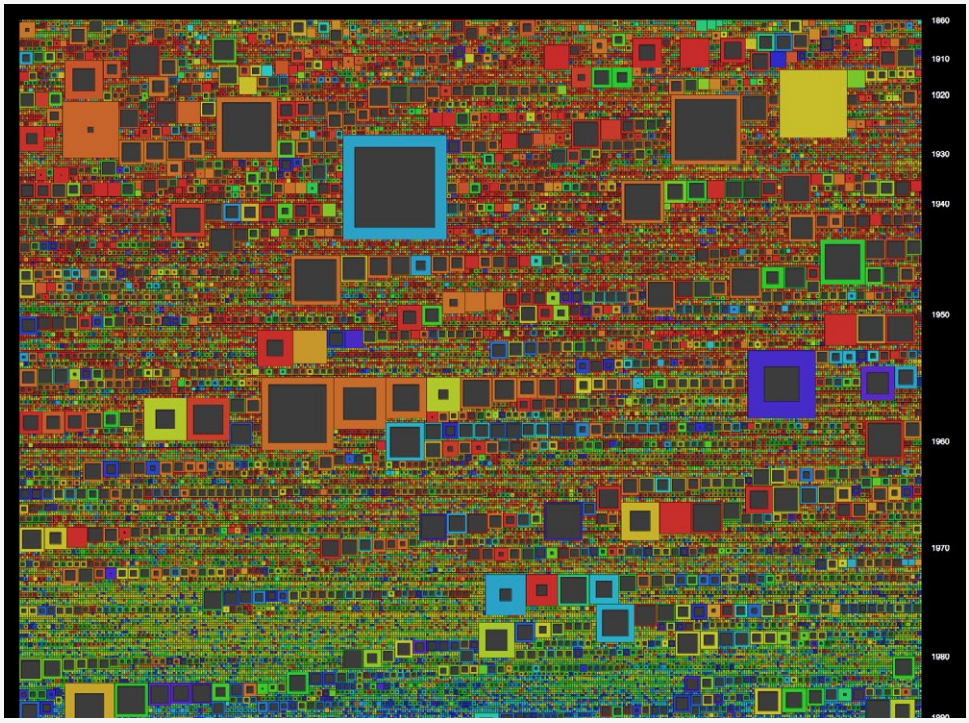


Example collection overview interface 1: Items are visualized based on categories of relations and supplemented by thumbnail previews.

☆ Generous interfaces	☆ Overviews & previews	☆ Data viz

4 Interfaces utilizing collection overview visualizations

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

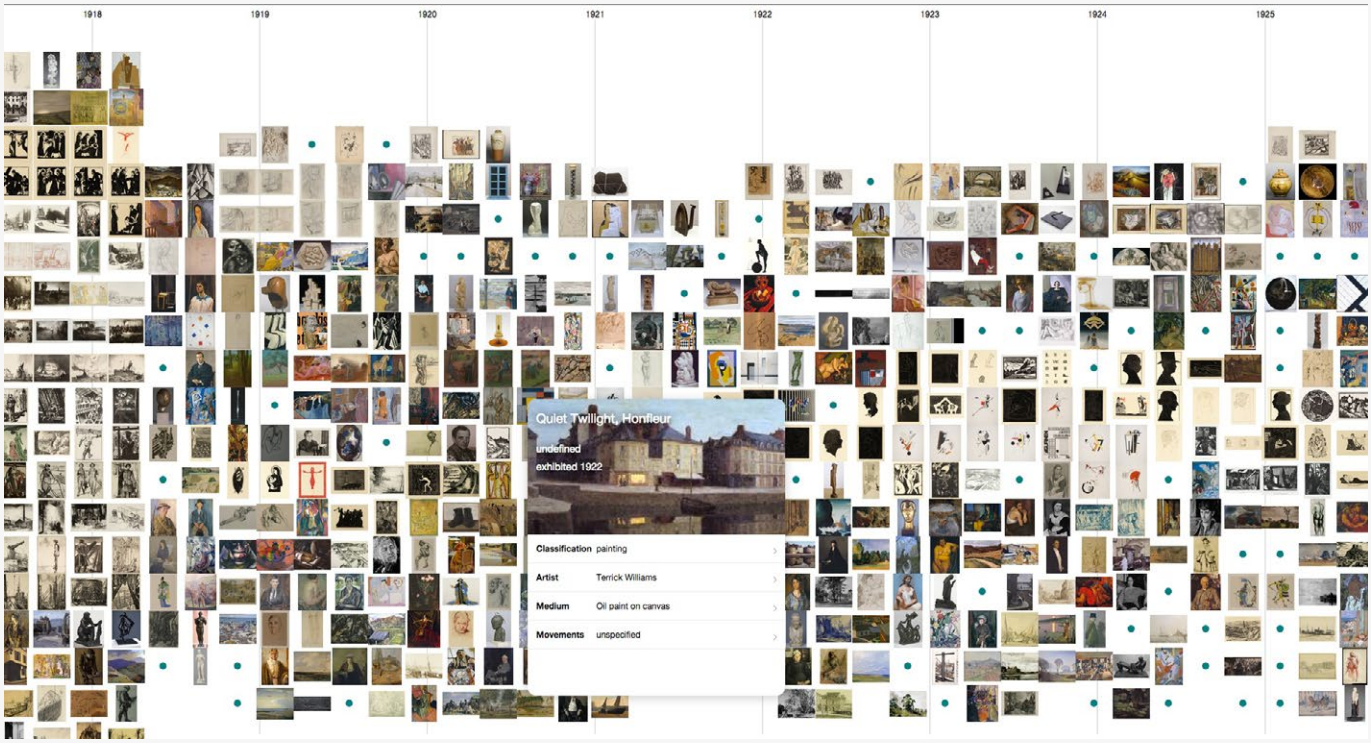


Example collection overview interface 2: Video screenshot shows the possible interactions with the abstract representations.

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 ('un-clean') 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

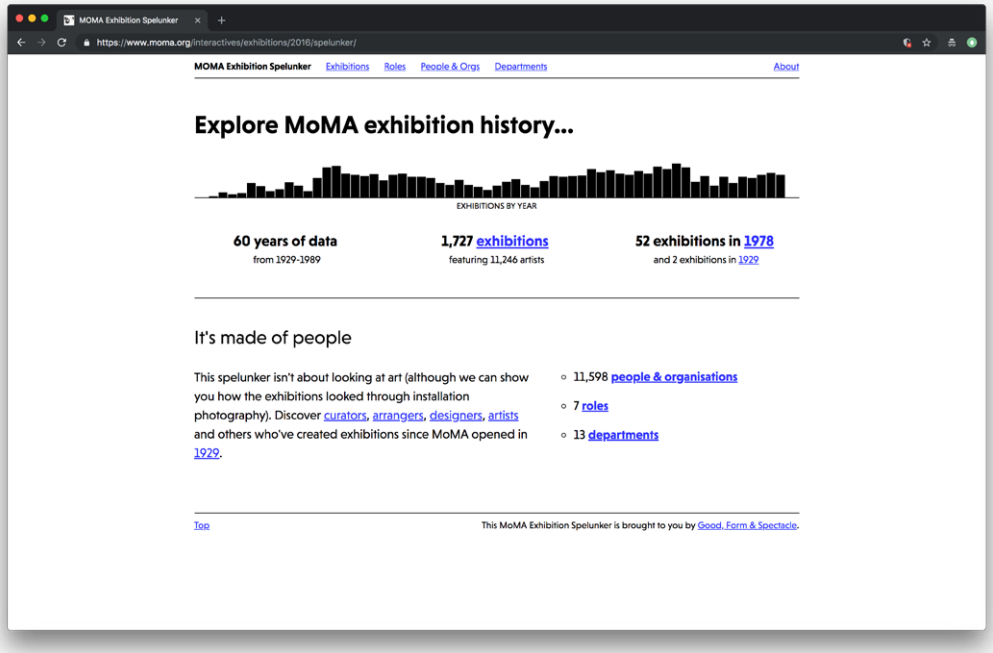
☆
Data viz

☆
Multi-object timeline

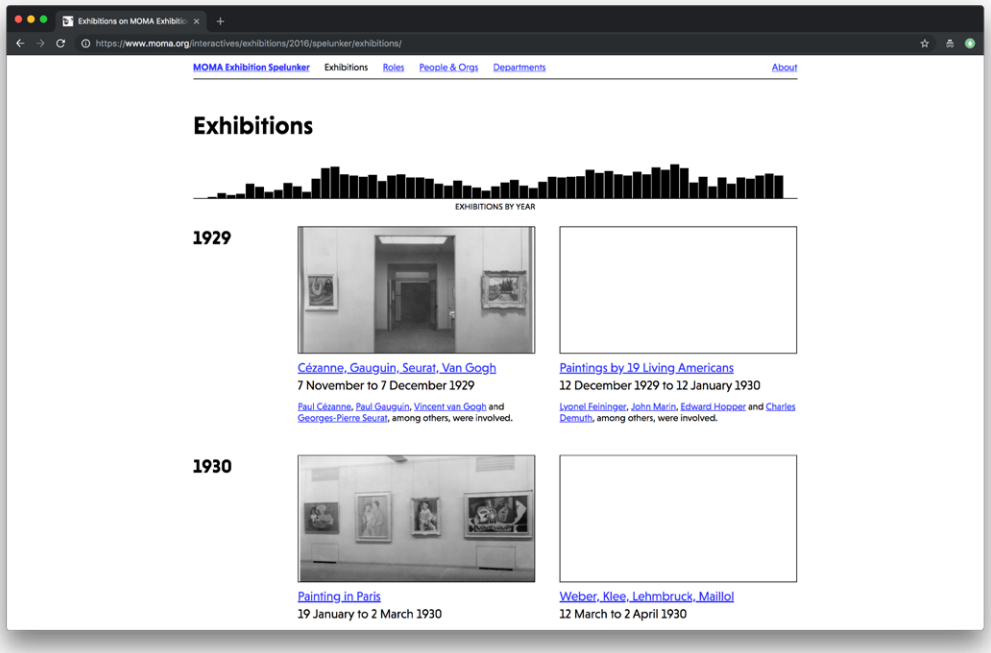
Reference URL: http://www.kraeutli.com/index.php/category/projects/
Date of screenshots: 2018-11-20
Notes: Designer and researcher Florian Kräutli has developed numerous collection interface prototypes and data visualizations aiming to tackle various questions around item exploration (particularly in 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

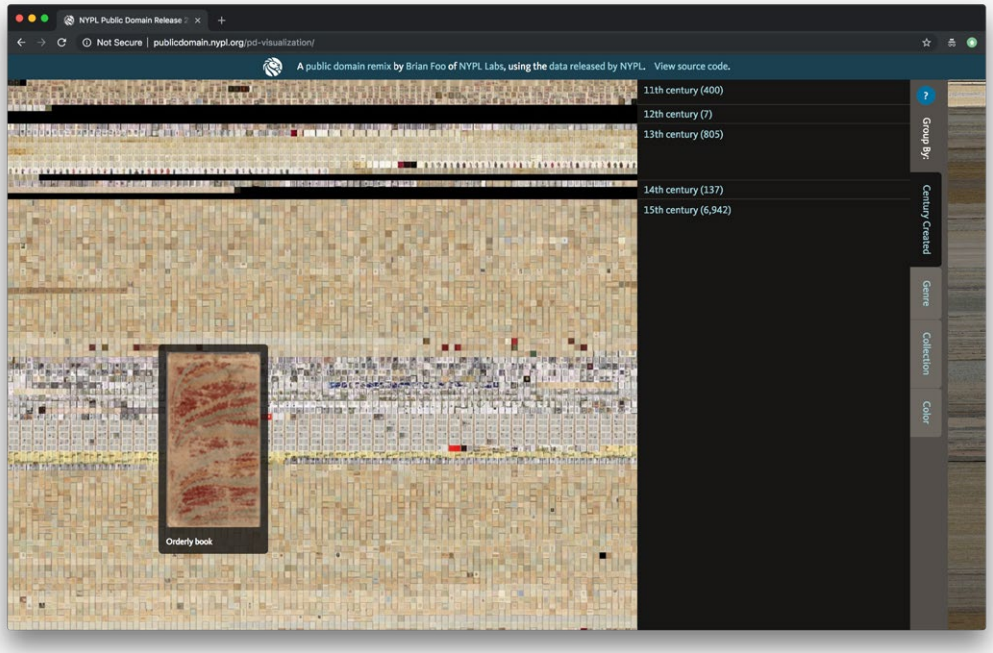
☆
Data viz

☆
Single-object timeline

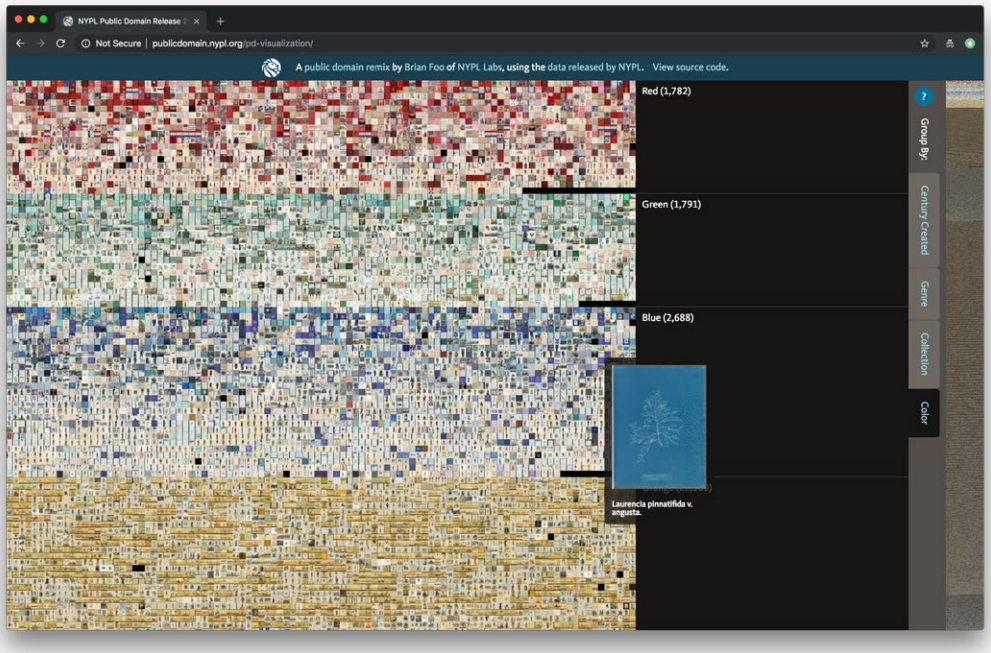
Reference URL: https://guernica.museoreinasofia.es/cronologia/en/
Date of screenshots: 2018-11-20
Notes: While not strictly a collection overview interface, this interface bears relation to the design examples reviewed so far. This chronological timeline presents a range of events and documents all relating 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**

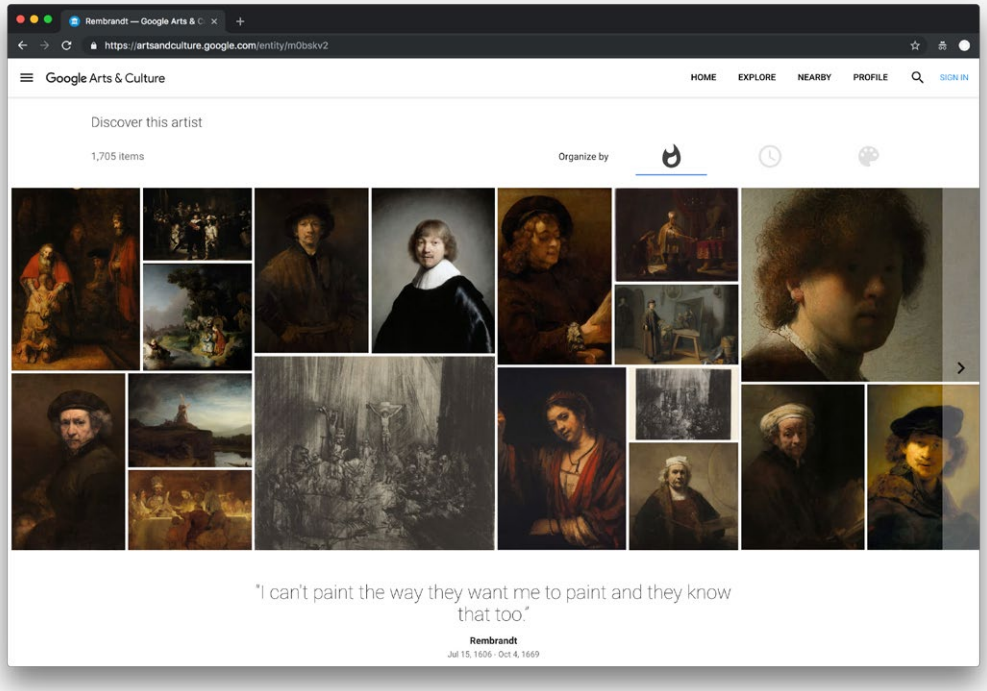
☆ **Data viz**

☆ **Multi-object timeline**

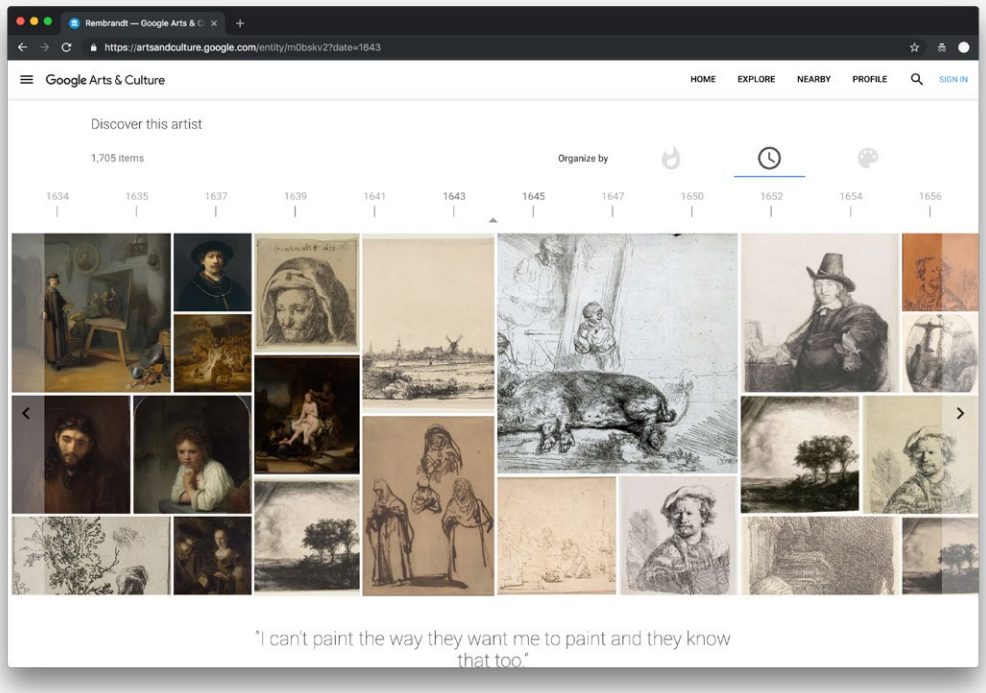
☆ **Sort by color**

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

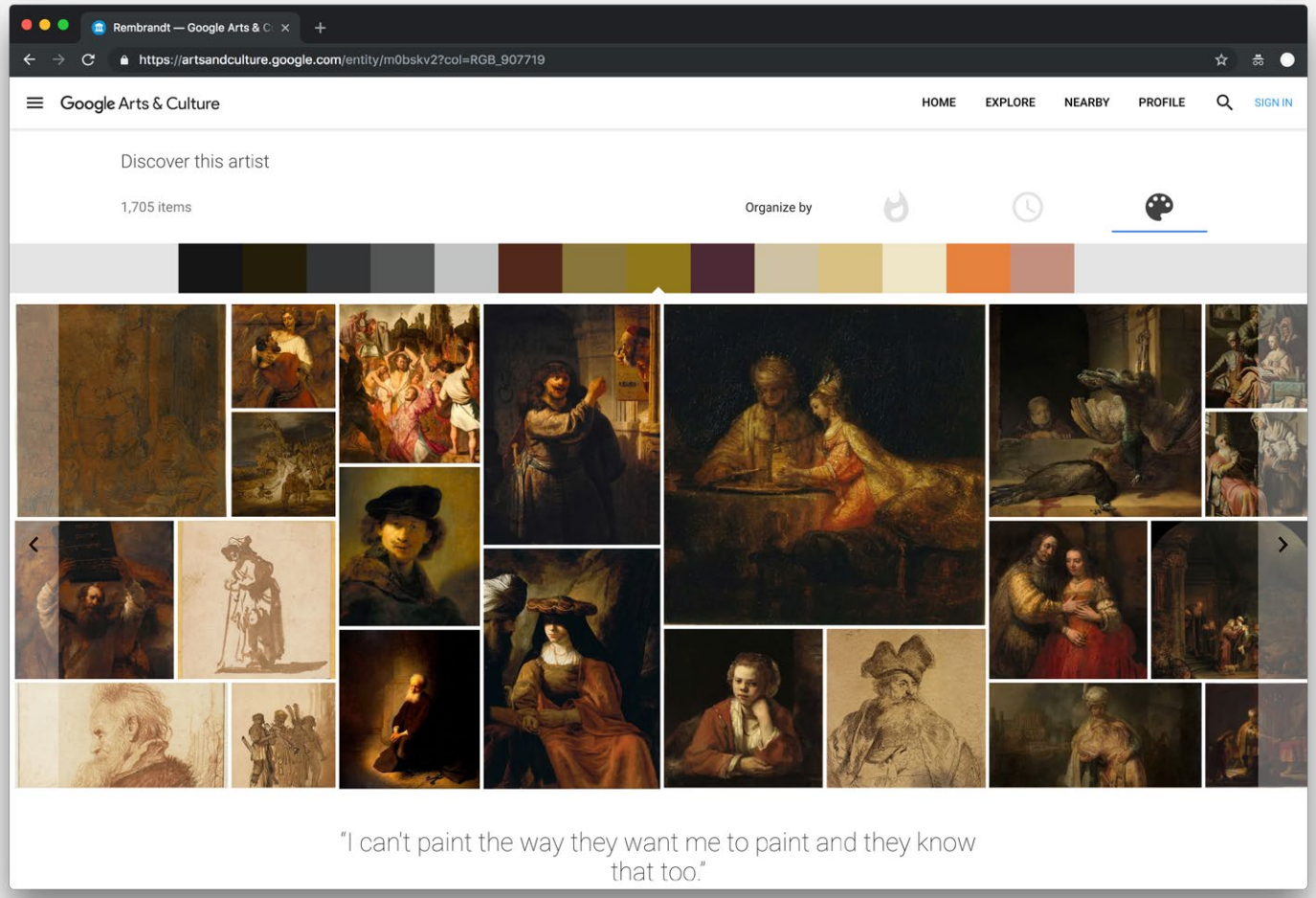


Overview interface for all items related to a specific artist (or other search term): This view can be sorted by popularity, time periods, or color.



☆ Generous interfaces	☆ Overviews & previews	☆ Data viz

4 Interfaces utilizing collection overview visualizations



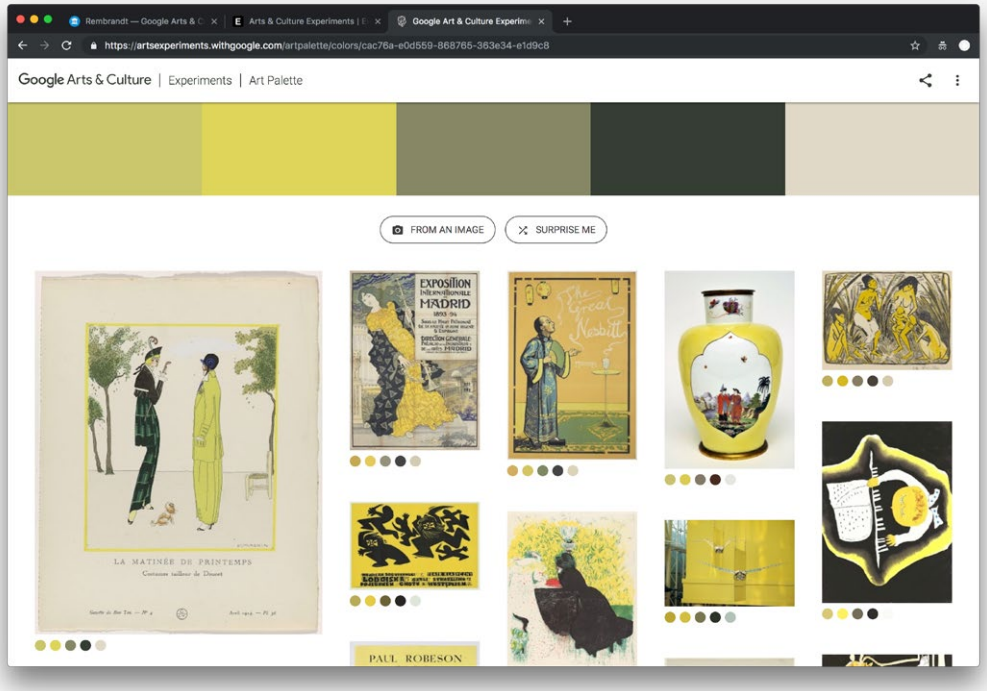
Overview interface for all items related to a specific artist: This view can be sorted by color similarity based on a value within the color palette of the collection overview.

☆
Multi-object timeline

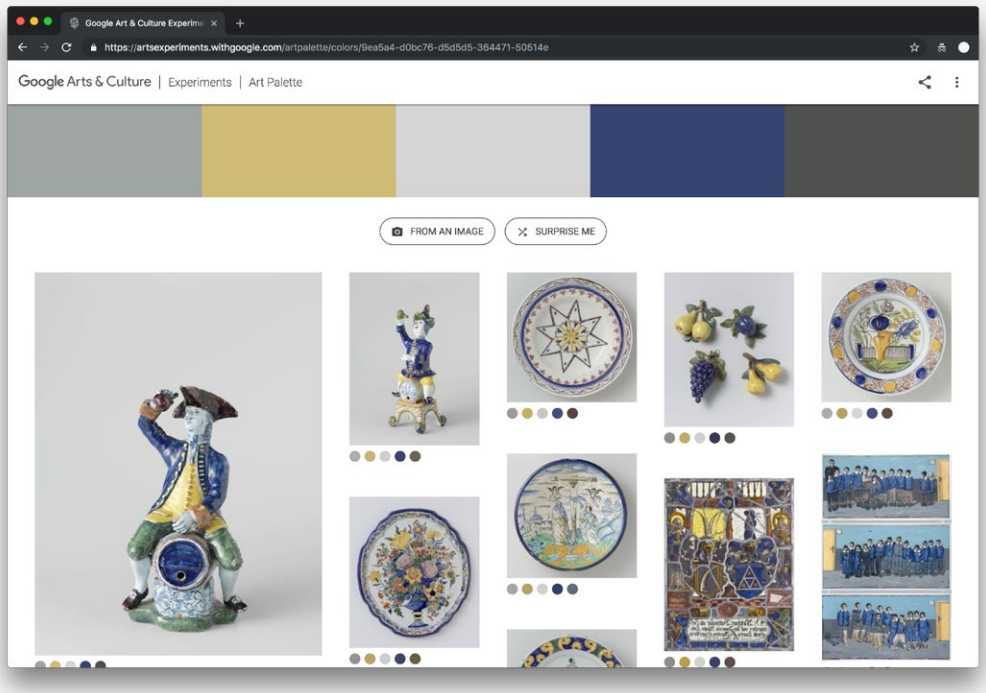
☆
Sort by color

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 transprancy).

Google A&C Experiments: Art Palette



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

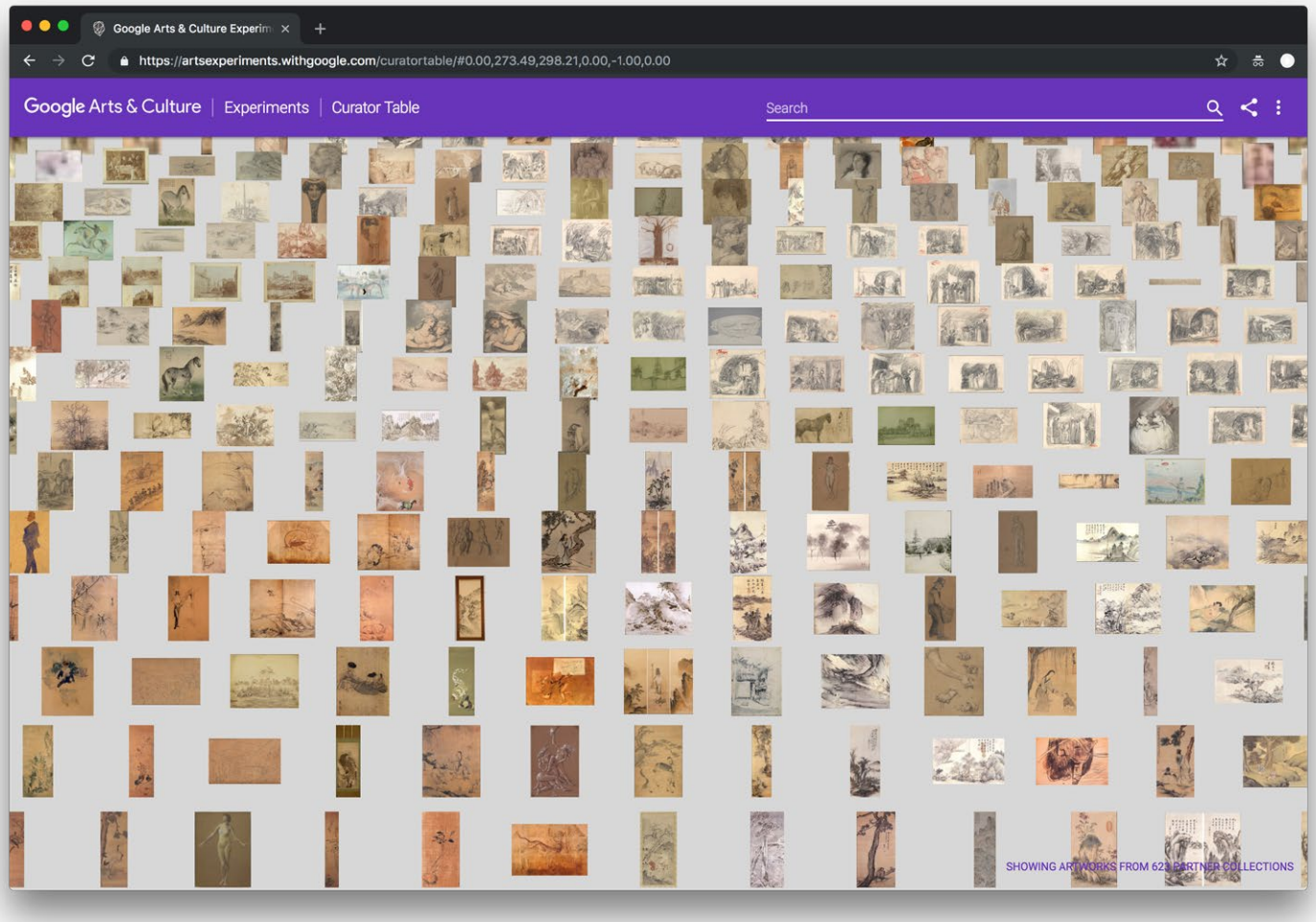


Example view of Art Palette 2.

☆ Overviews & previews	☆ Sort by color

Reference URL: http://act.mit.edu/cavs
Date of screenshots: 2018-11-20

Google A&C Experiments: Curator Table

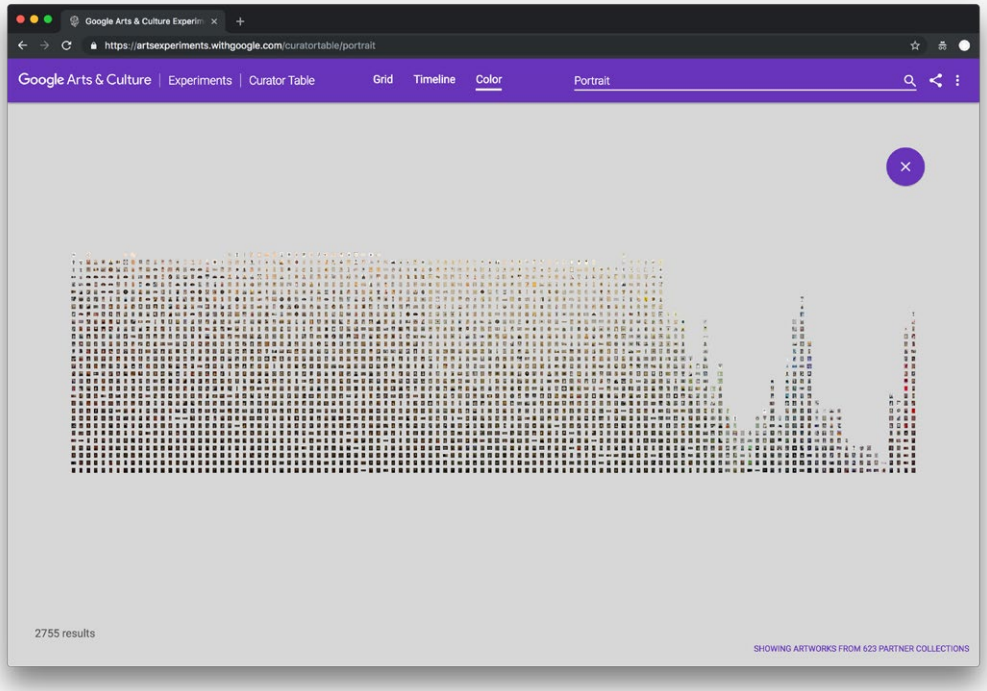


Example view of Curator Table 1: Collection overview with thumbnail previews presented in a 3-dimensional environment where computer vision and machine learning enable different modes for organizing and structuring collection items.

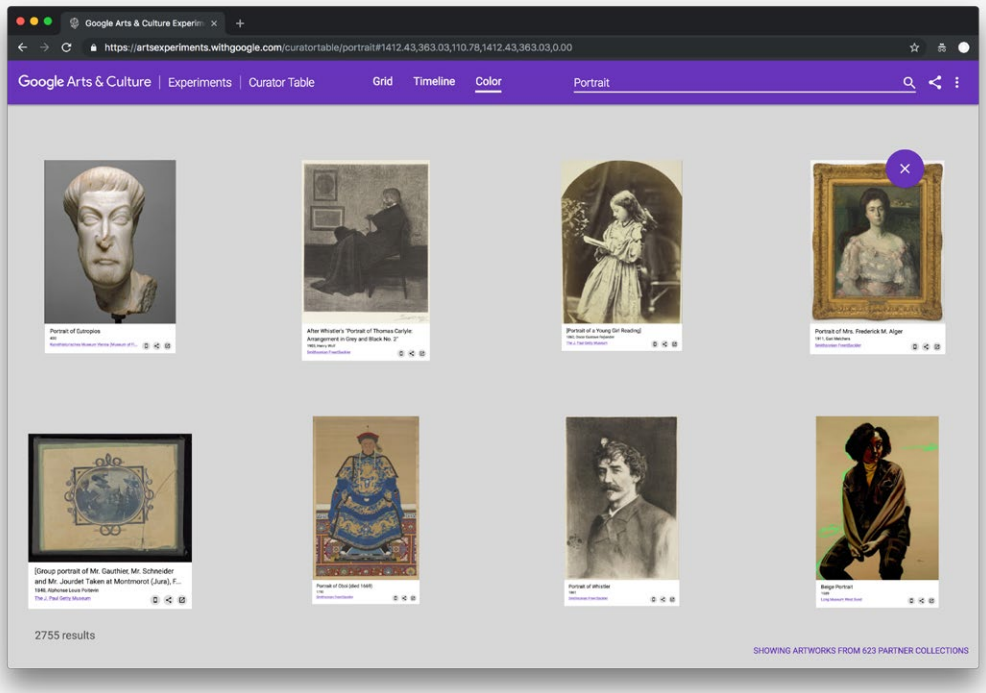
☆
Generous interfaces

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.

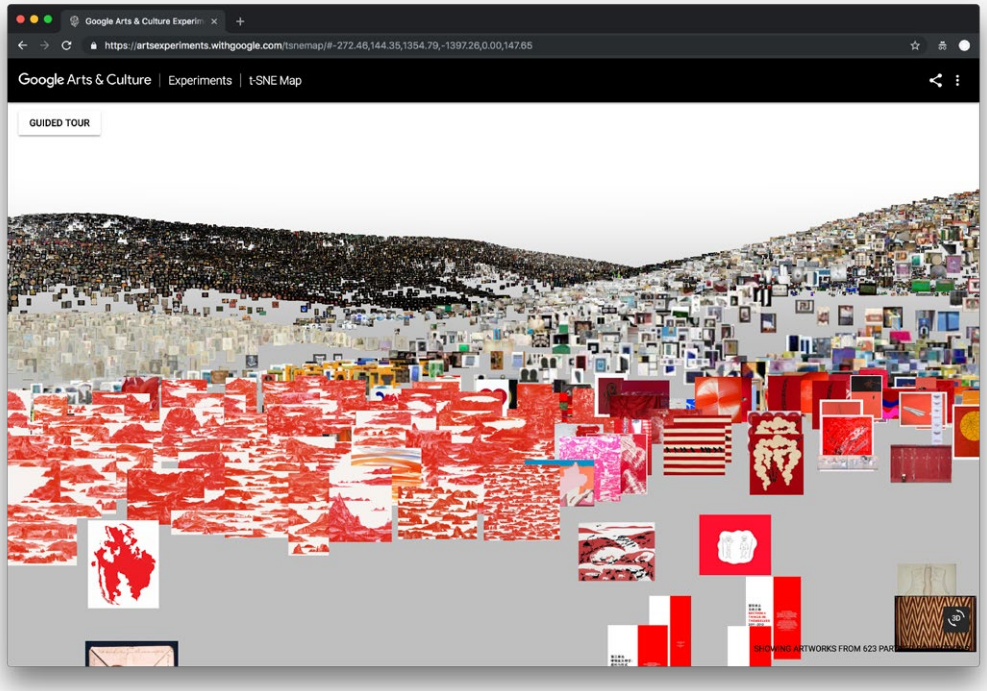


Example view of Curator Table 3: Zoomed-in view with thumbnail previews provides some contextual information.

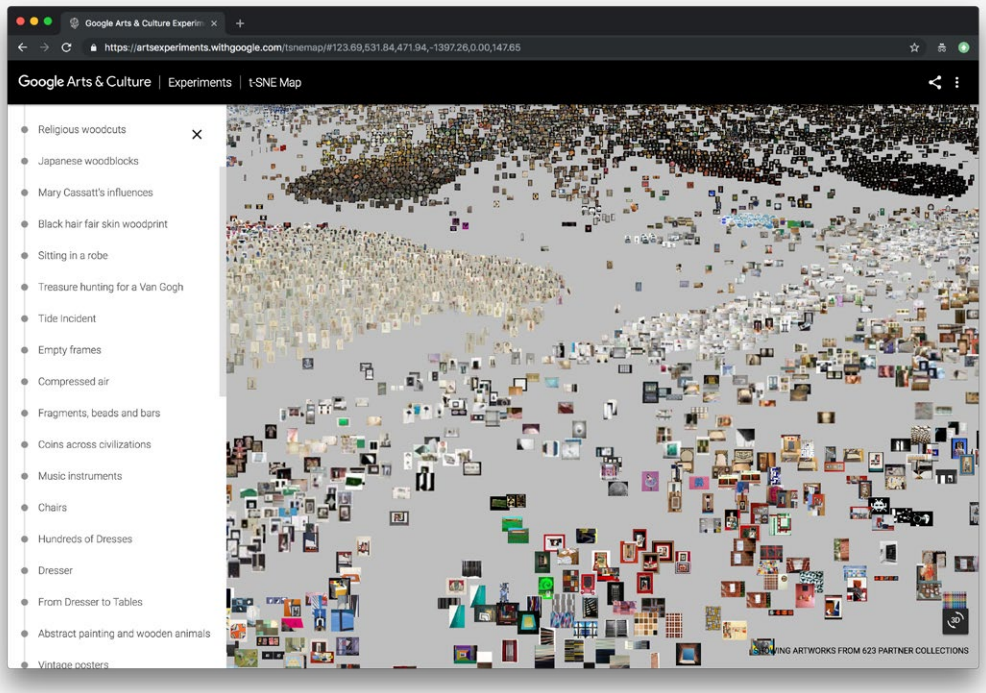
☆	☆	☆
Overviews & previews	**Sort by color**	**Multi-object timeline**

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**

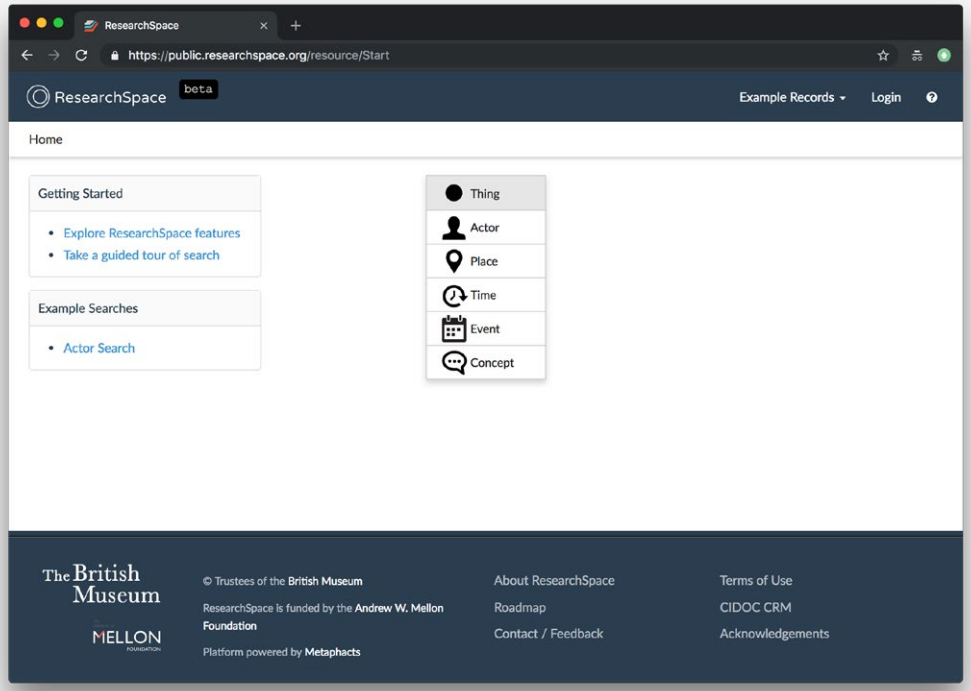
☆ **Overviews & previews**

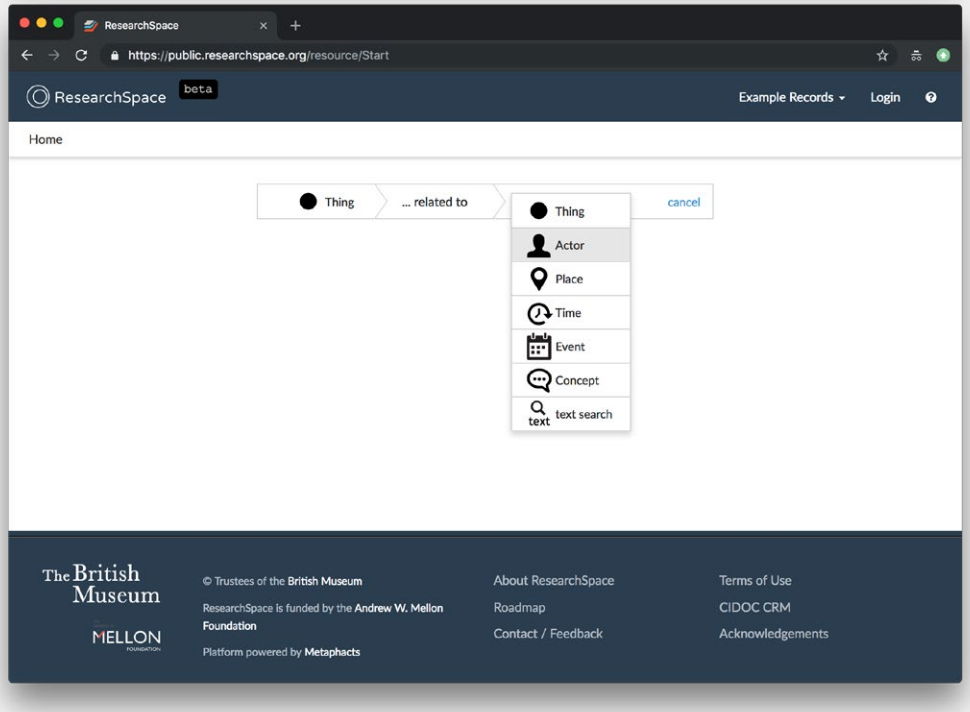
☆ **Sort by color**

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

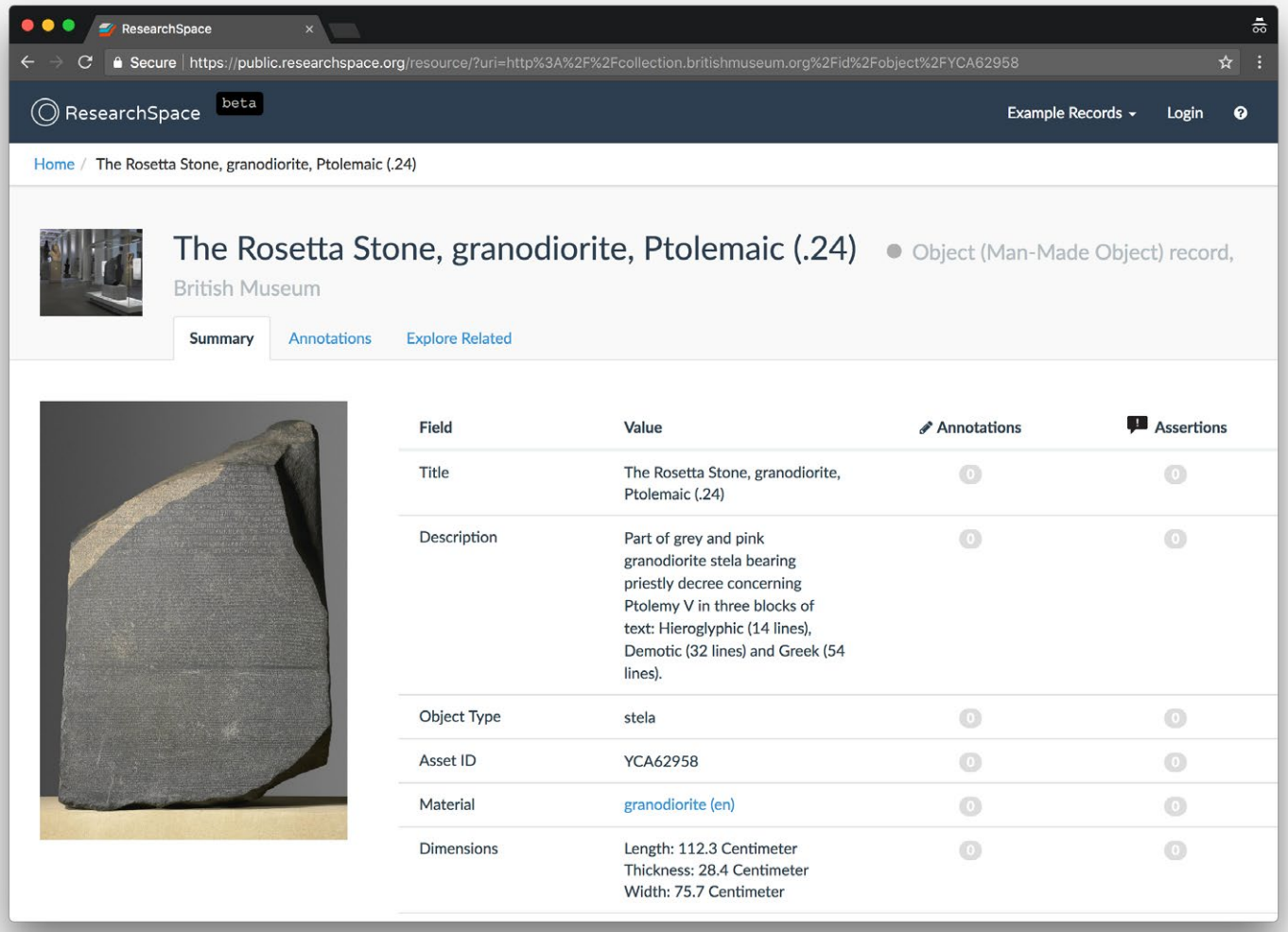
British Museum—Research space (UK)





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.

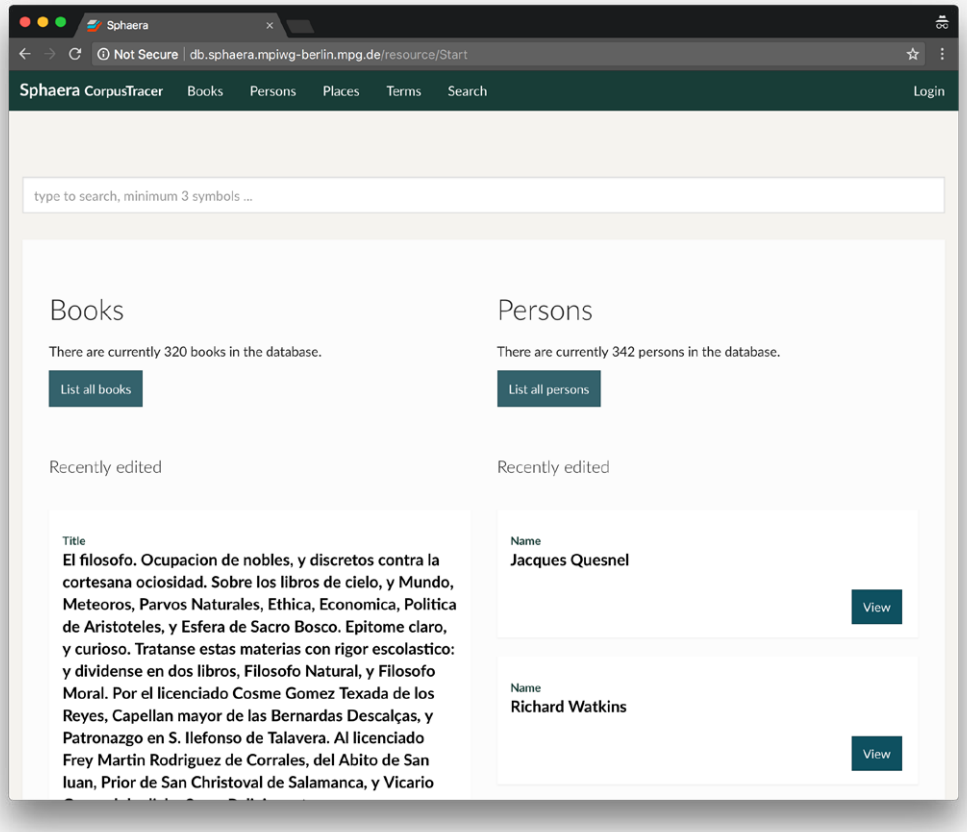
☆	☆	☆
Linked data	**SPARQL query GUI**	**Capacity for contradiction**



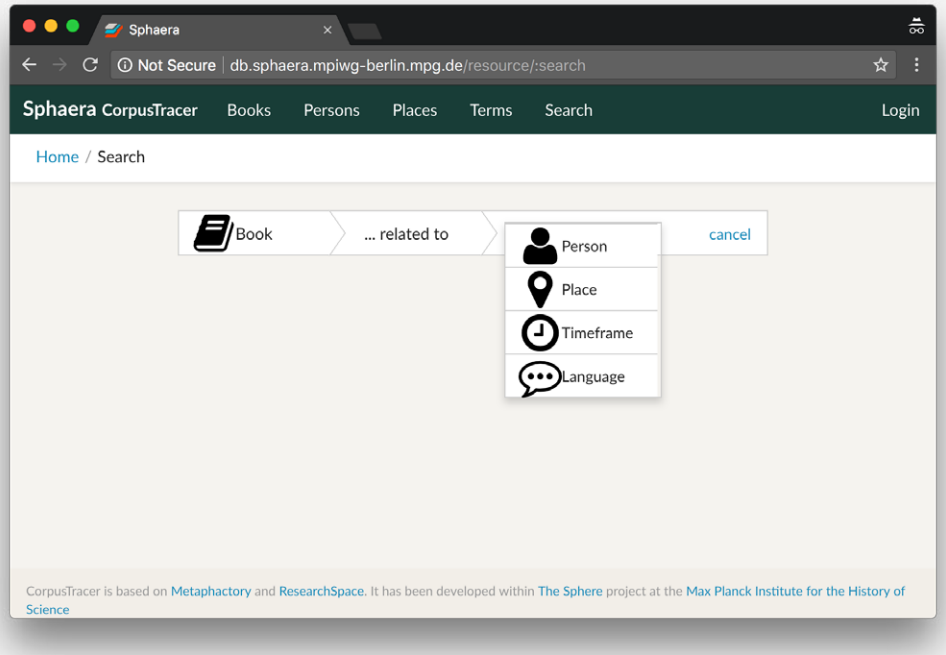
Example view of an item record: Linked data statements are represented in a tabular format (as fields and values).

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)



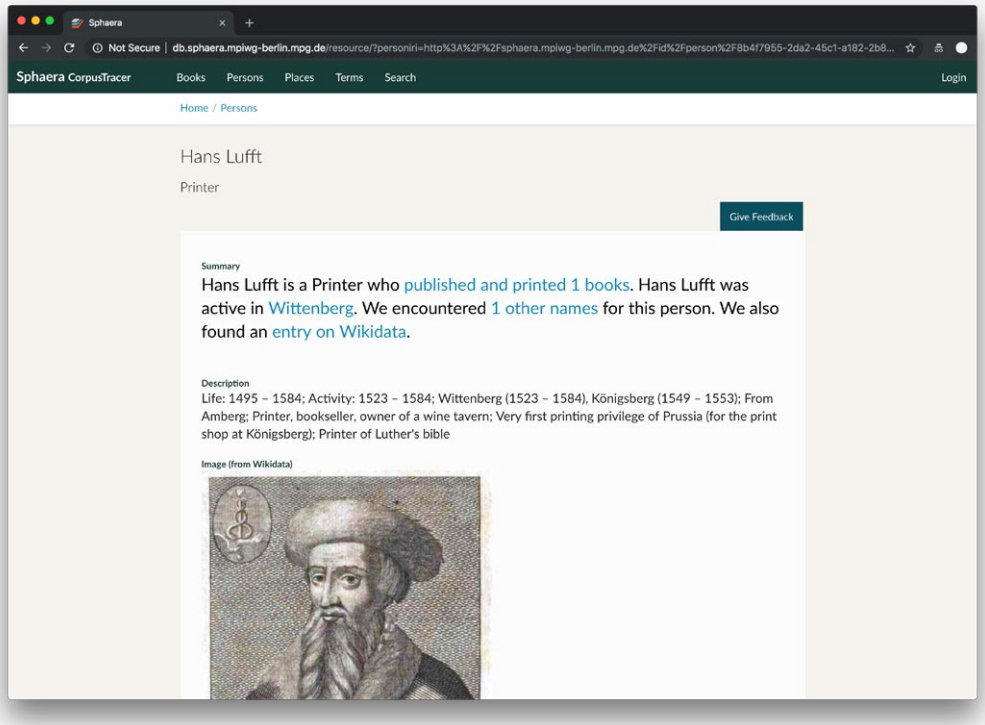
Entry point to the collection: A collection overview is provided based on two primary record types—books and persons.



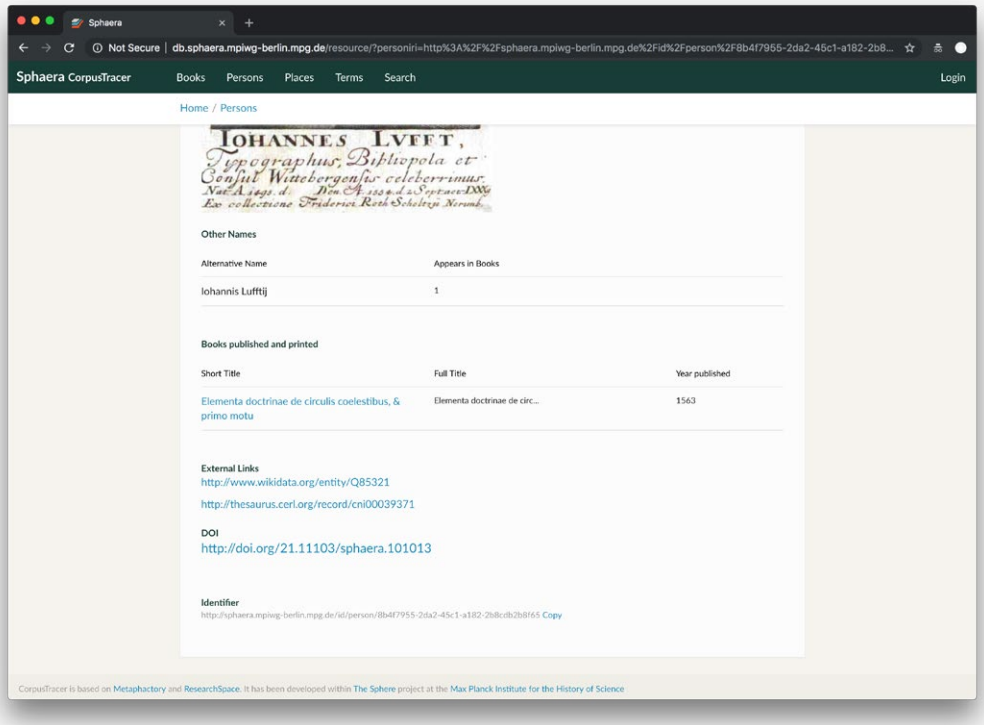
Search interface view: This interface is an application of the SPARQL query GUI of Research Space.

☆	☆	☆
Linked data	**SPARQL query GUI**	**Links to related queries**

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.



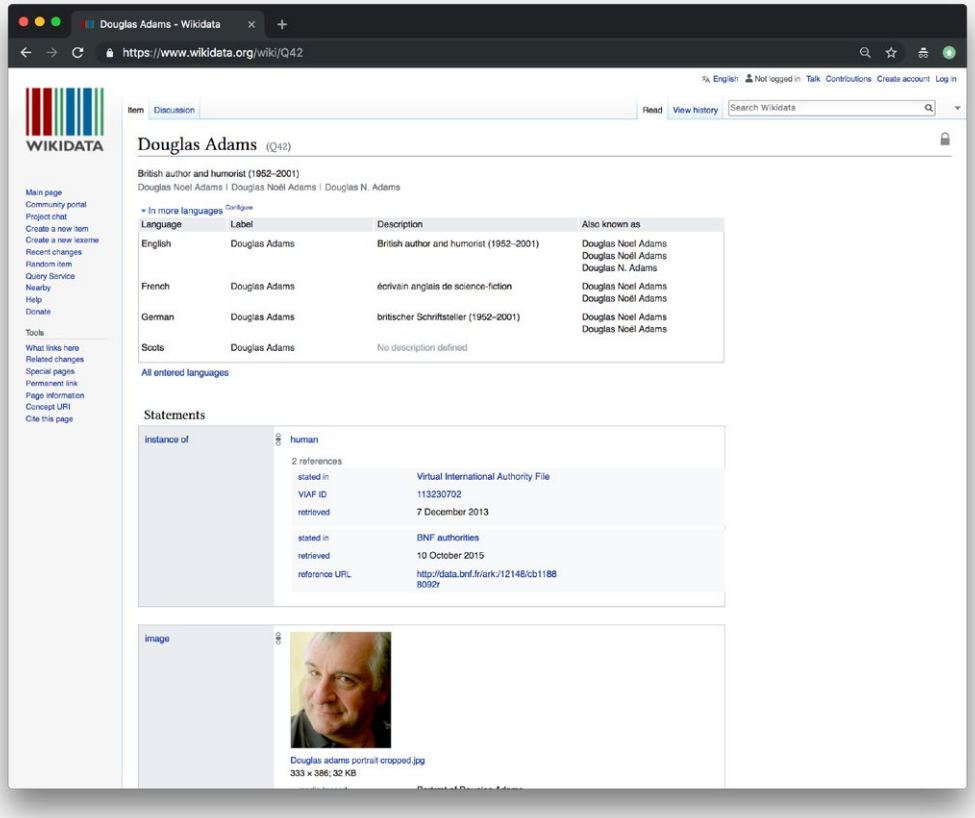
Example view of an item record: More metadata statements are presented further down on the page.



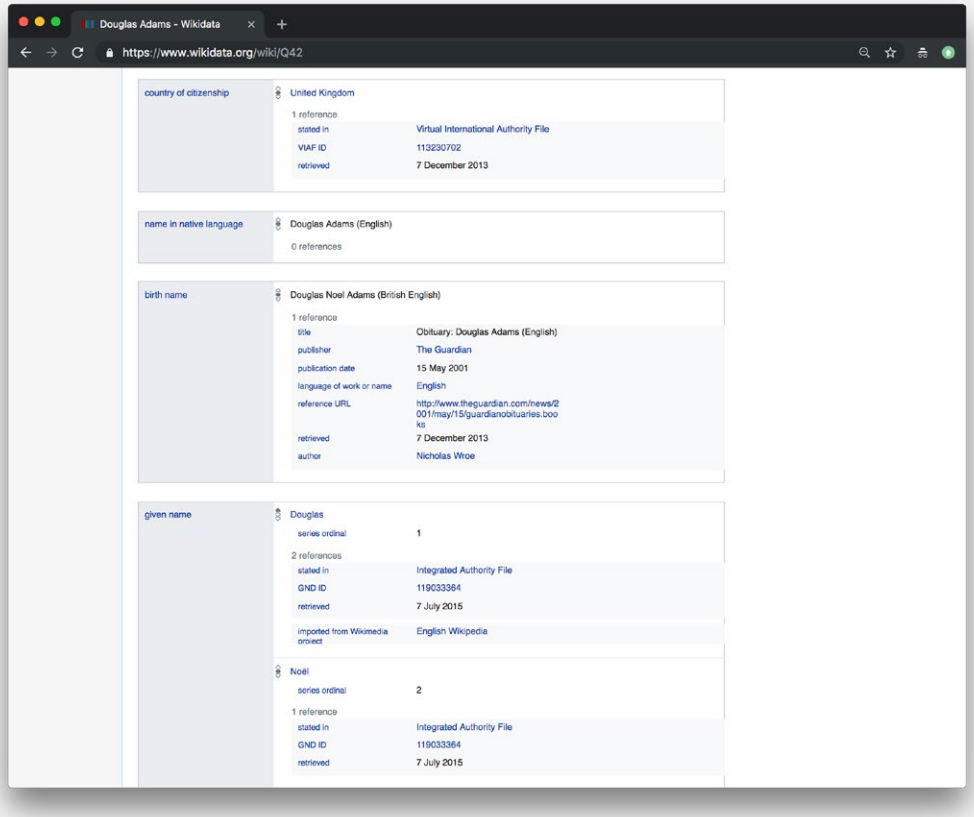
Natural language summary generated from structured data

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.

Wikidata / Wikibase default interface



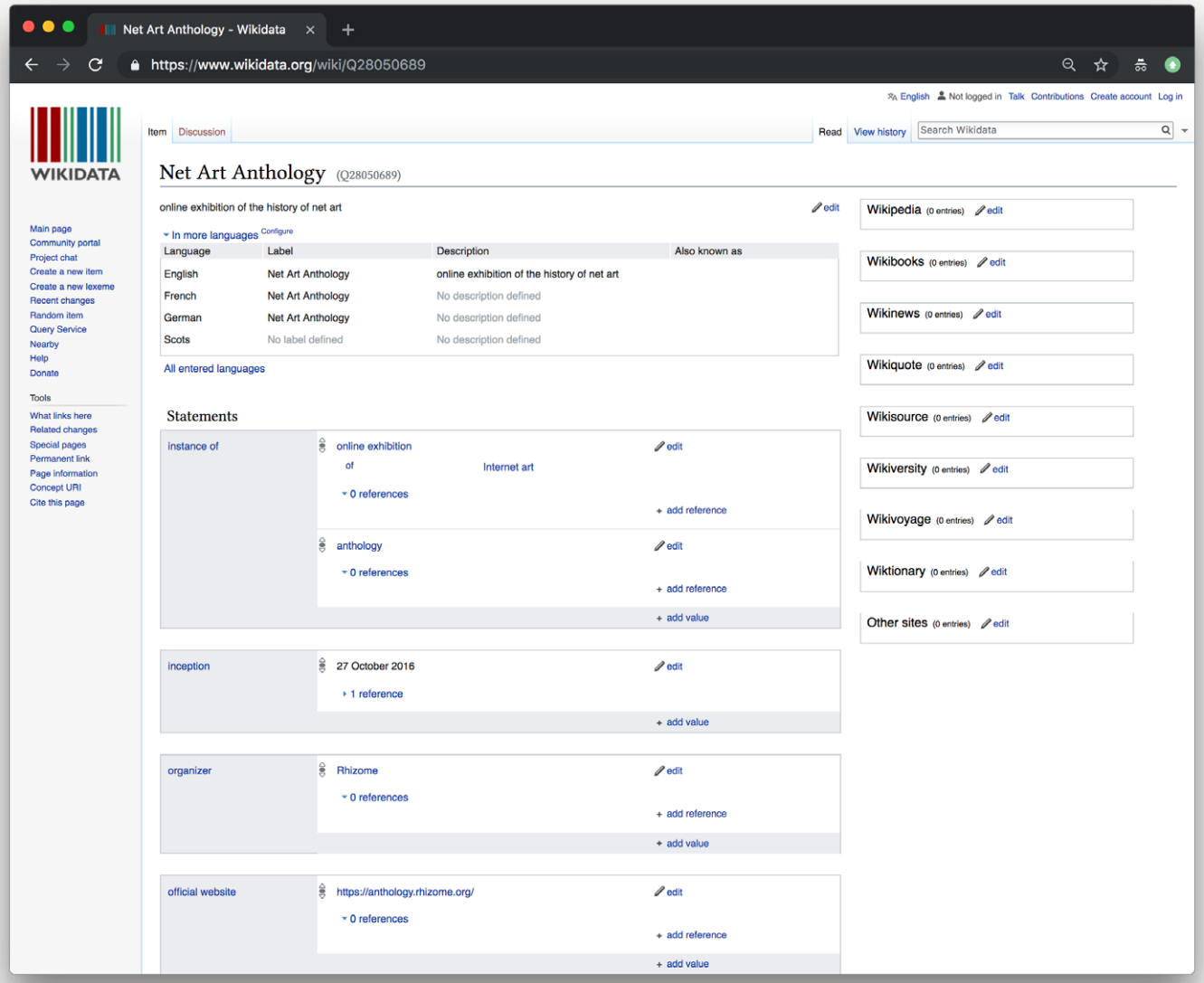
Example view of an item record 1: The item page features a text label, description, aliases, translations of the label and description, alongside a series of (unordered) statements.



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



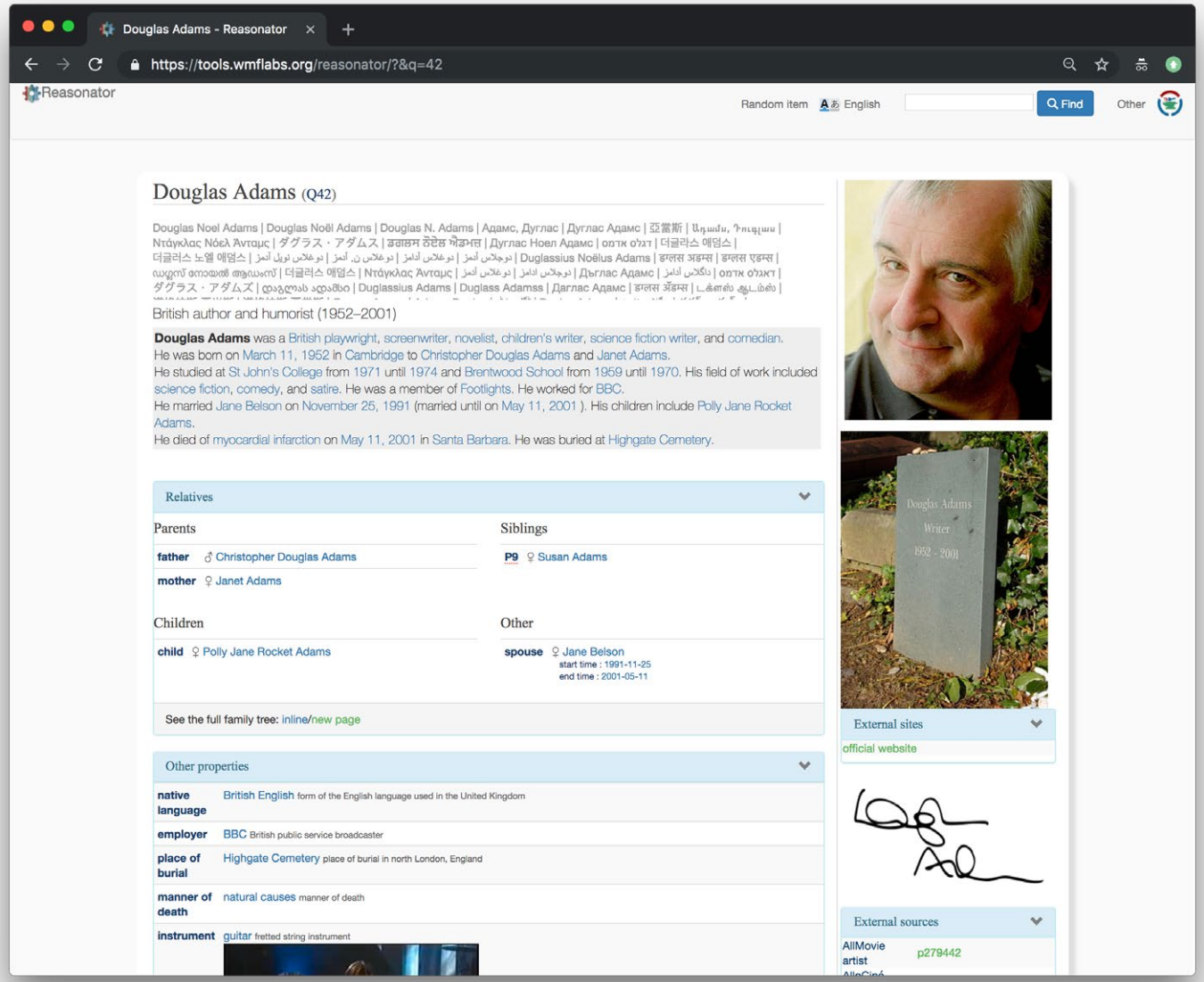
Example view of an item record 2: An item page can also have just a few statements; there are no minimum or maximum metadata requirements.

Explorable terminology

Capacity for contradiction

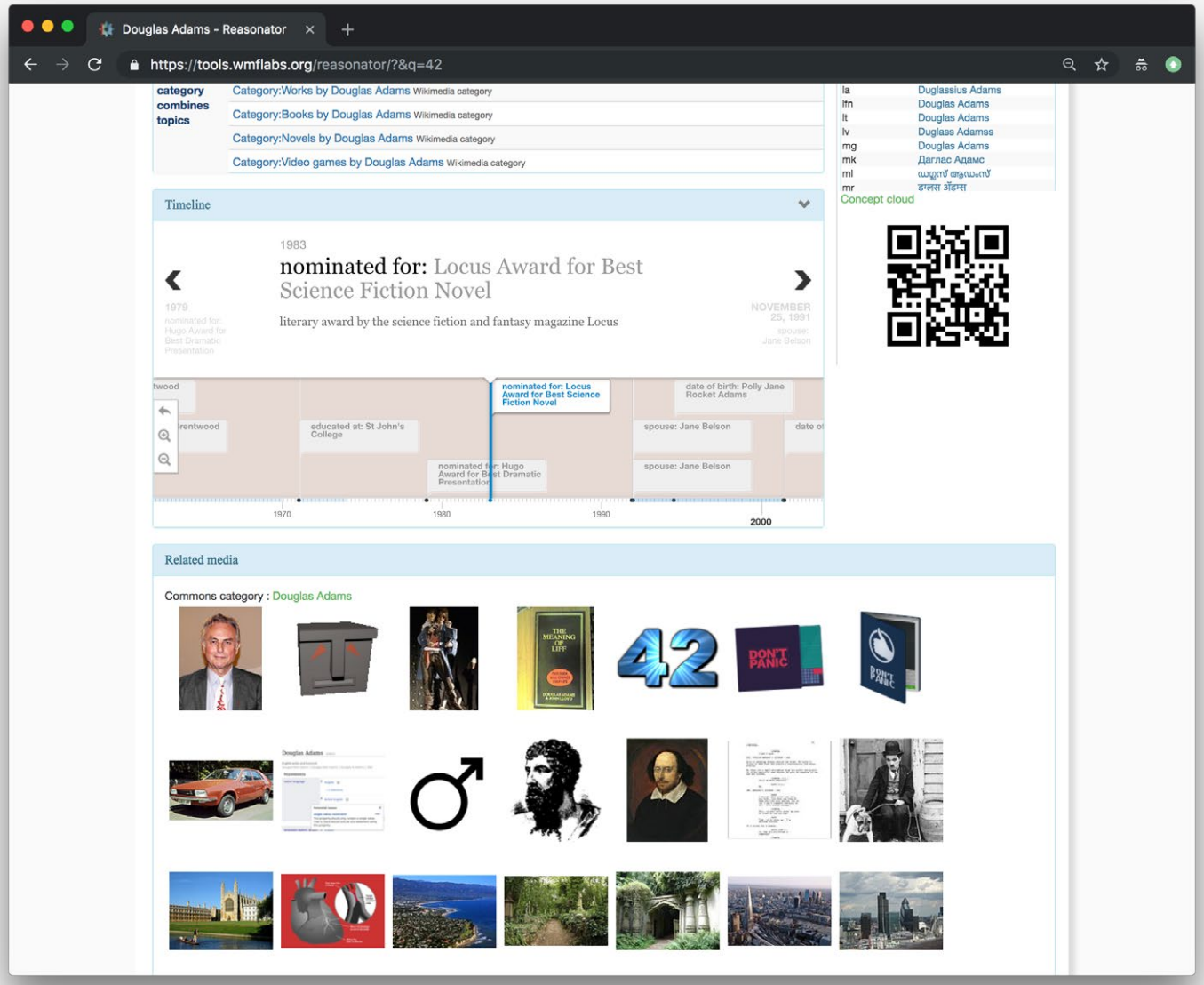
Reference URL: https://www.wikidata.org/
Date of screenshots: 2018-11-22
Notes: The default Wikidata (Wikibase) interface is included here as a point of comparison with other interfaces which have been developed to pull data from Wikidata and present it in alternative ways. While this default interface 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.

☆ **Linked data**	☆ **Metadata clustering**	☆ **Expression of relations**
☆ **Explorable terminology**	☆ **Metadata in collapsible element**	☆ **Capacity for contradiction**



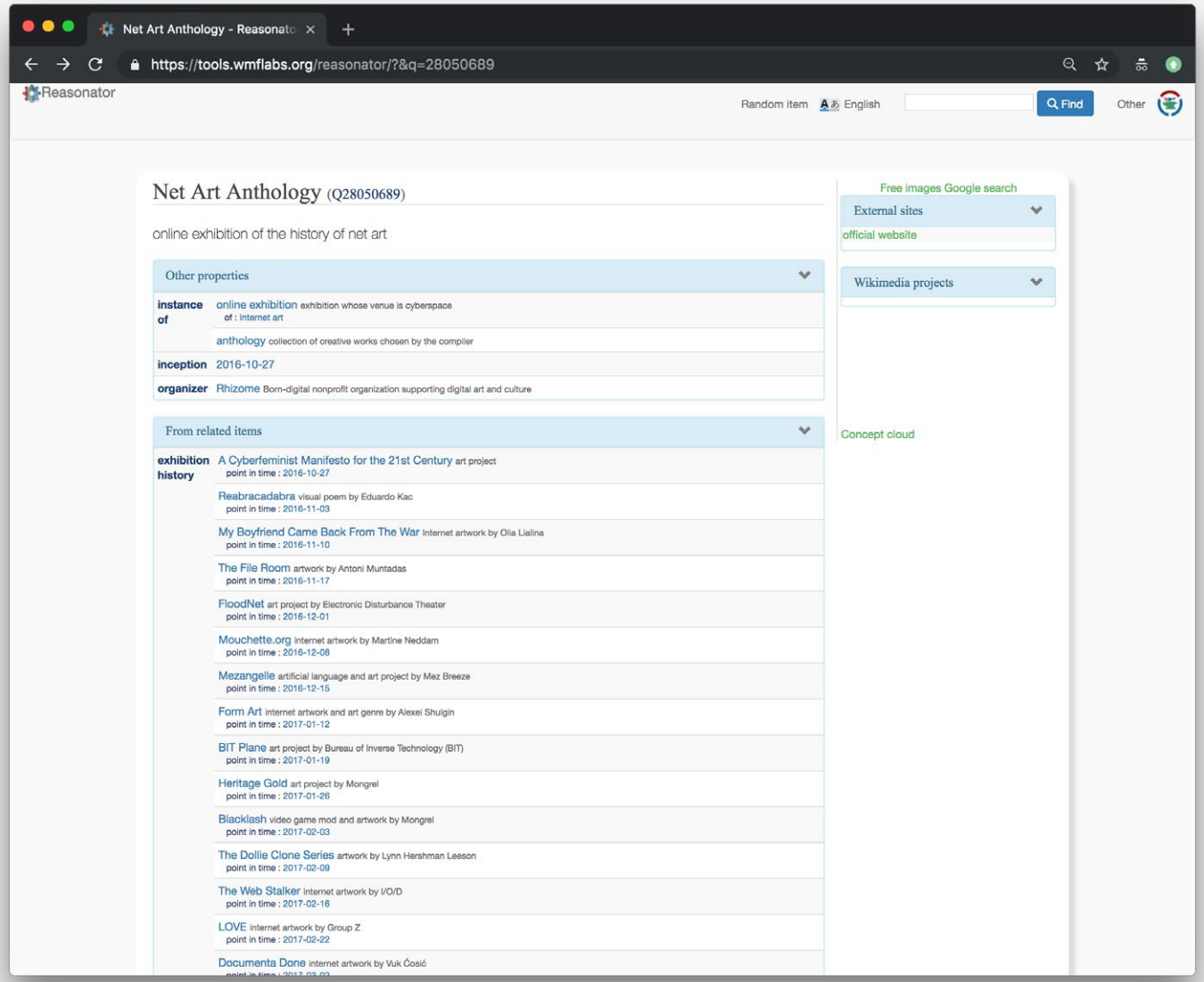
Example view of an item record 1: A timeline of events connected to the item and other related media are featured further down on the page.

Single-object timeline

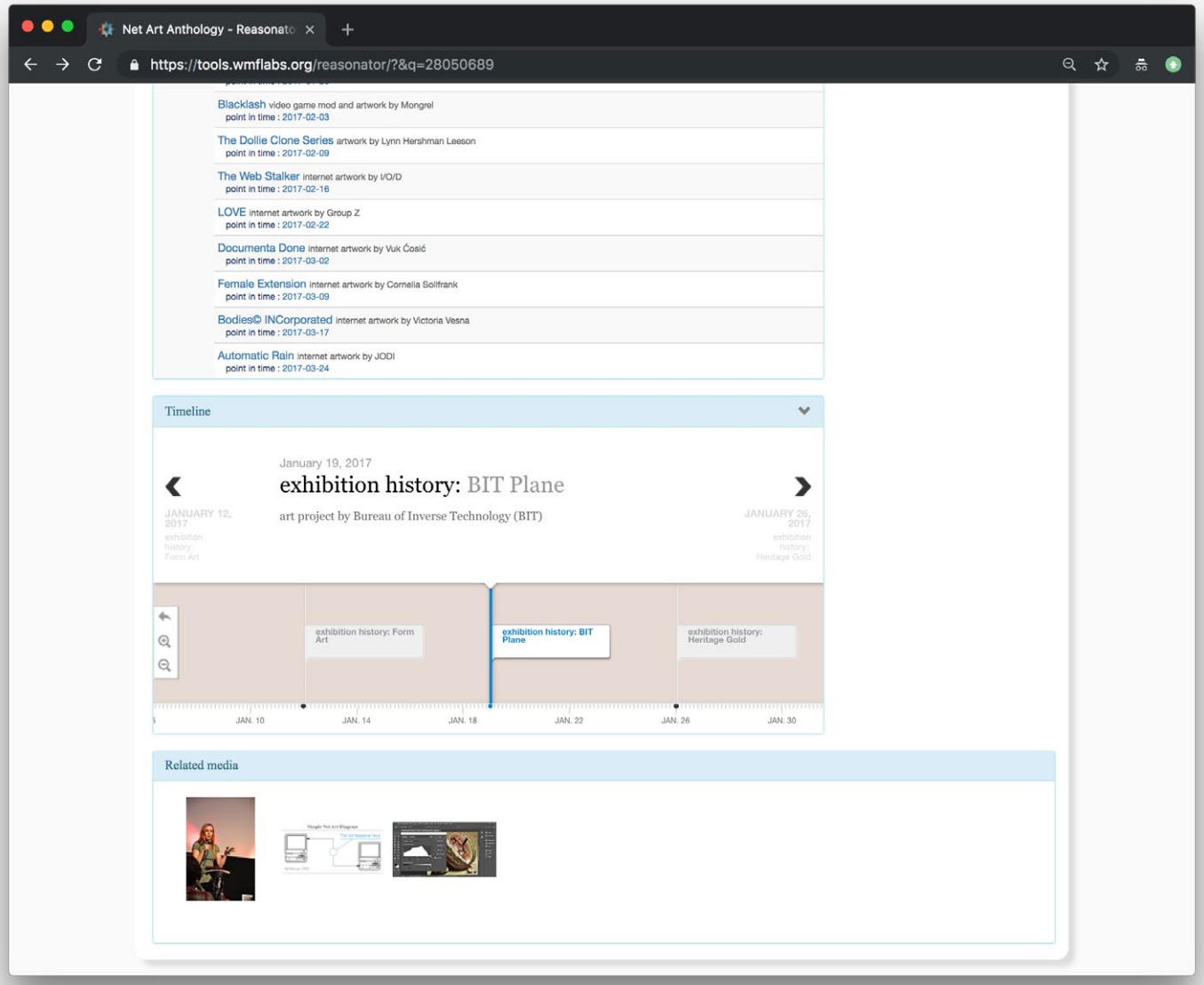
Open source

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.)



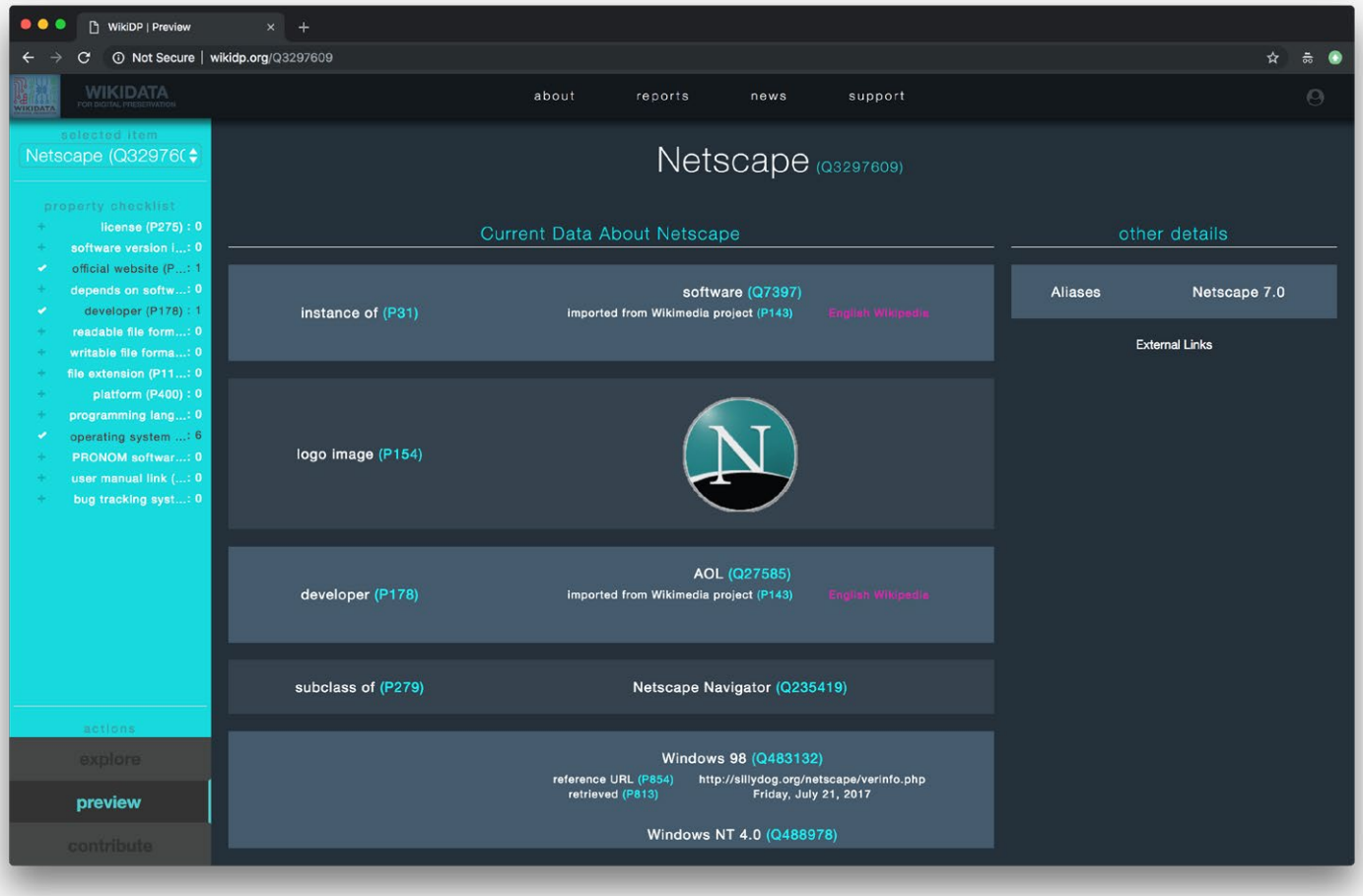
Example view of a an item record 2: Statements are presented in customized clusters and collapsible elements, notably “related items”.



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.

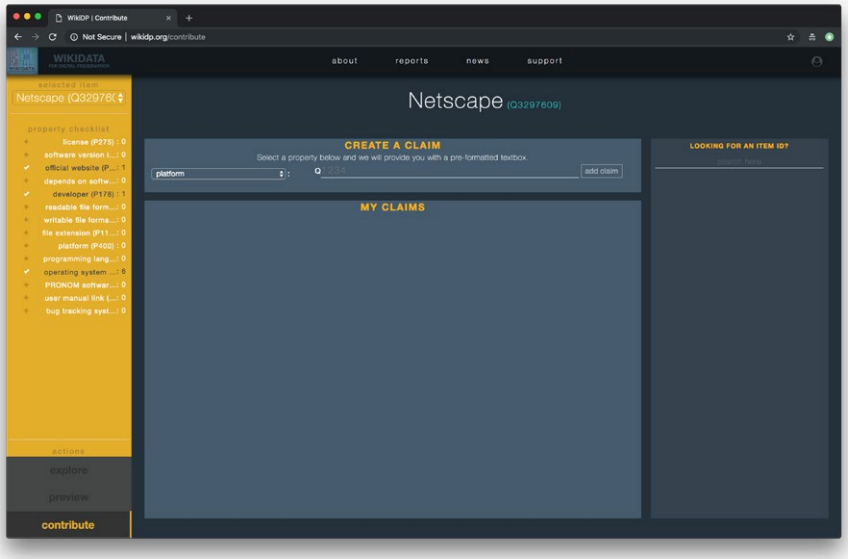
Wikidata for Digital Preservation portal



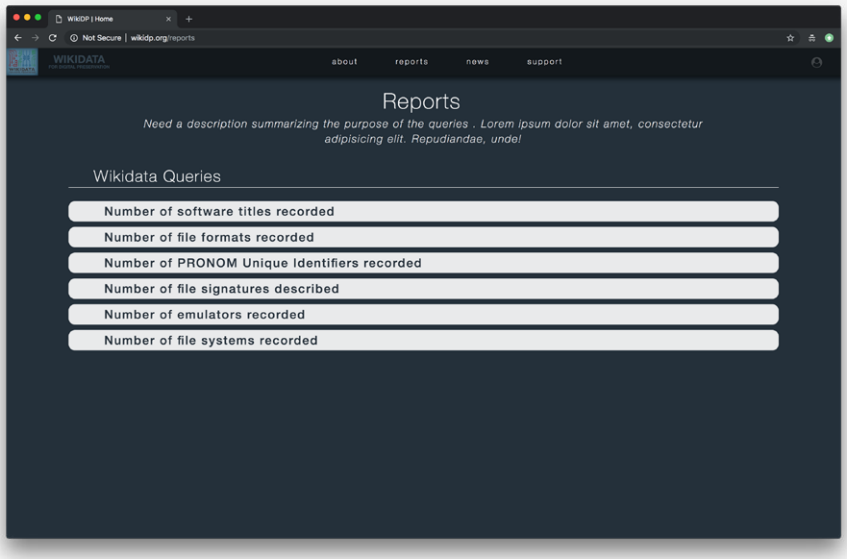
Example view of an item record: Statements are pulled from Wikidata and presented in a custom-styled interface.

☆ **Linked data**	☆ **Metadata checklist**	☆ **Capacity for contradiction**
☆ **Invitation to contribute**	☆ **Explorable terminology**	
☆ **Open source**	☆ **Links to related queries**	

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

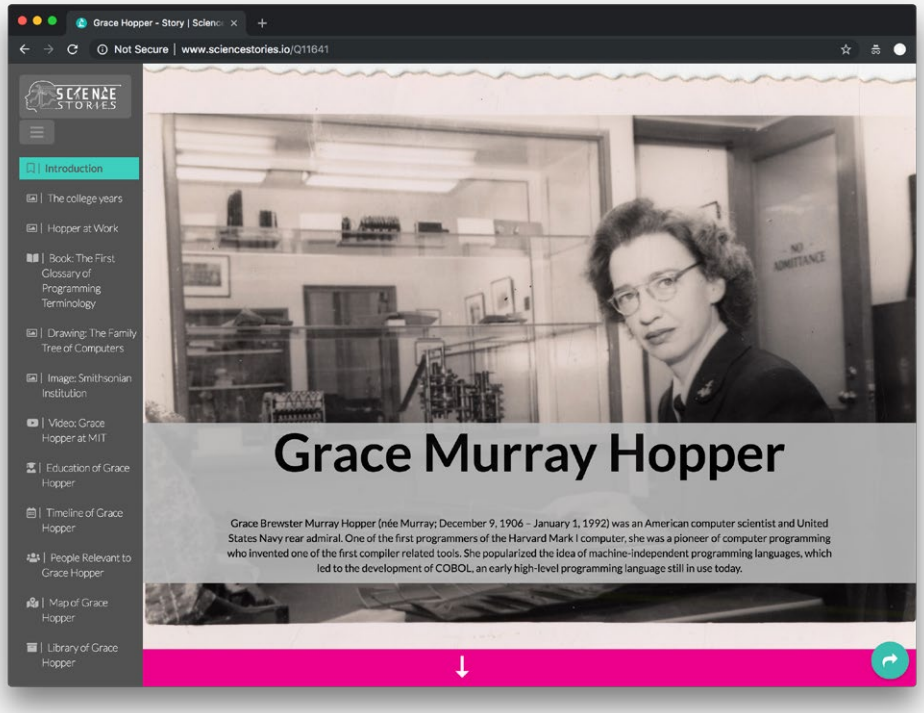


Exploratory options: The portal features some links to pre-set Wikidata queries of common interest.

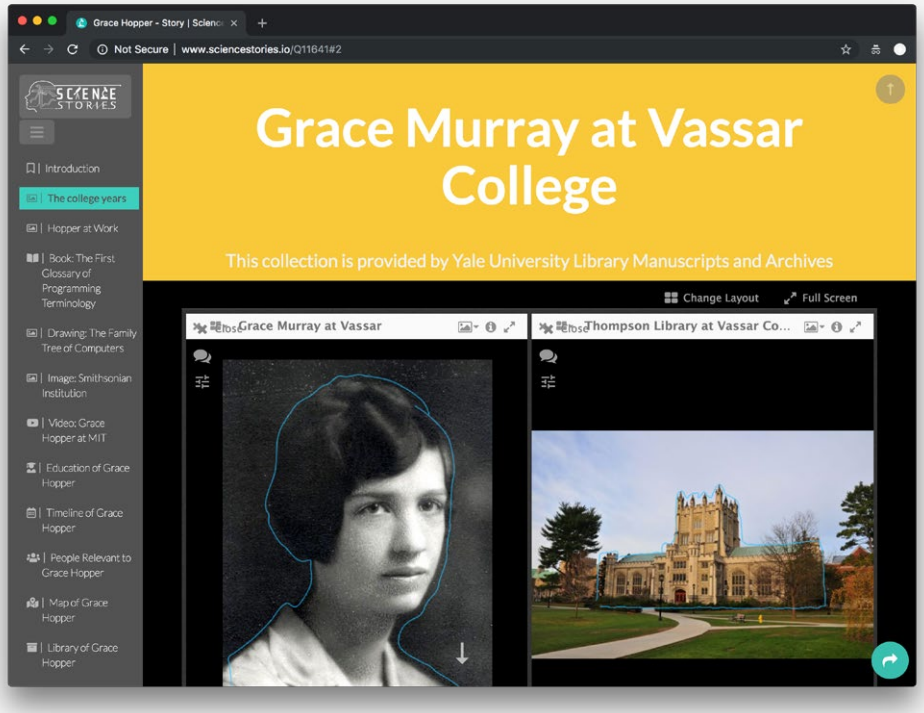


Reference URL: https://artsandculture.google.com/
Date of screenshots: 2018-11-20
Notes: The Wikidata for Digital Preservation portal is a Python-based interface visualizing data from Wikidata. Unlike Reasonator, which functions as an overlay to the entire Wikidata database, this portal is specific to 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



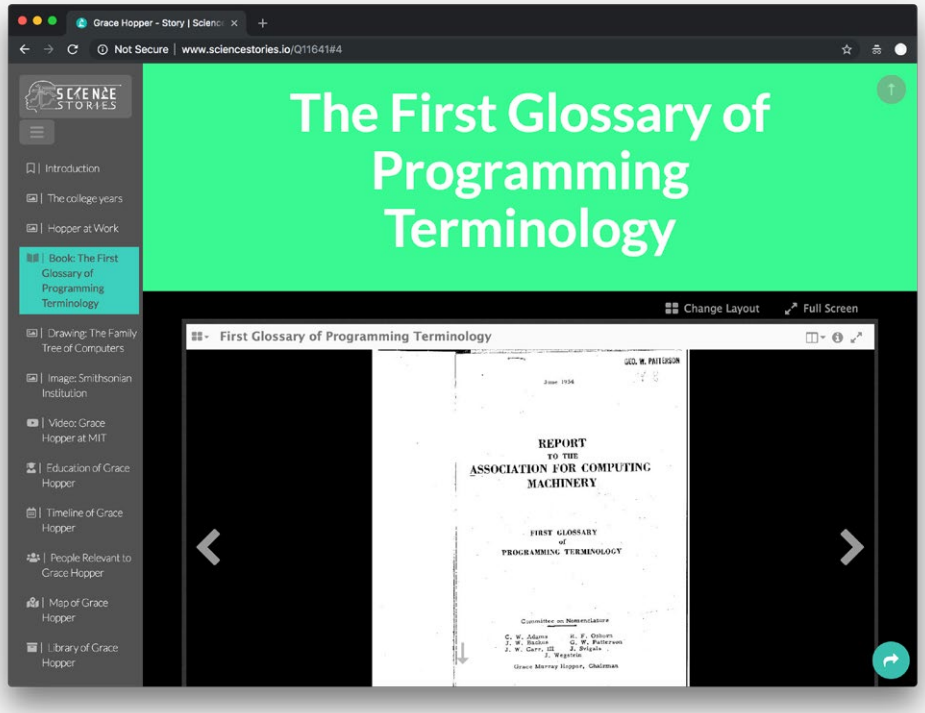
Example view of a "story", dedicated to a person's record.



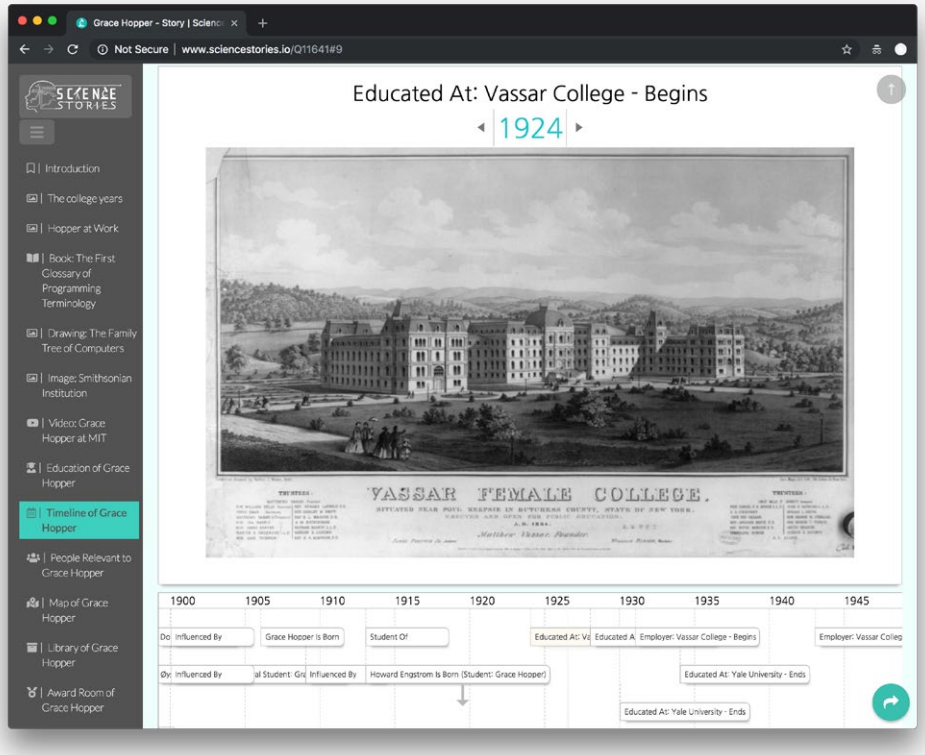
Example view of a "story": The interface uses the IIIF-compliant Mirador image viewer to display images from open collections.

☆	☆	☆
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.



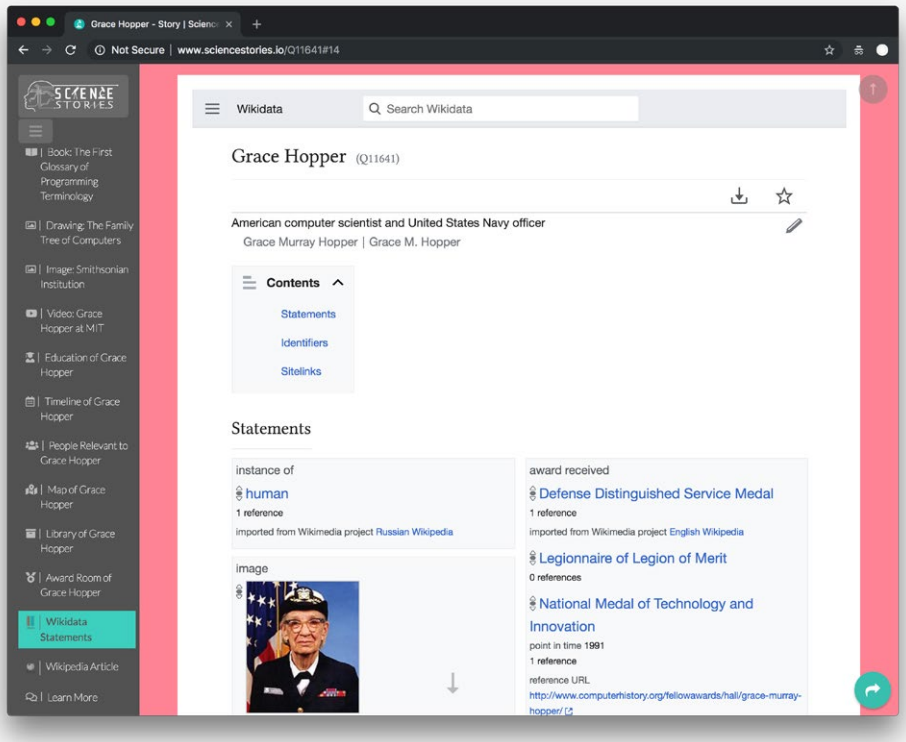
Example view of a "story": A customized timeline view is rendered based on statements contained in the Wikidata record page.

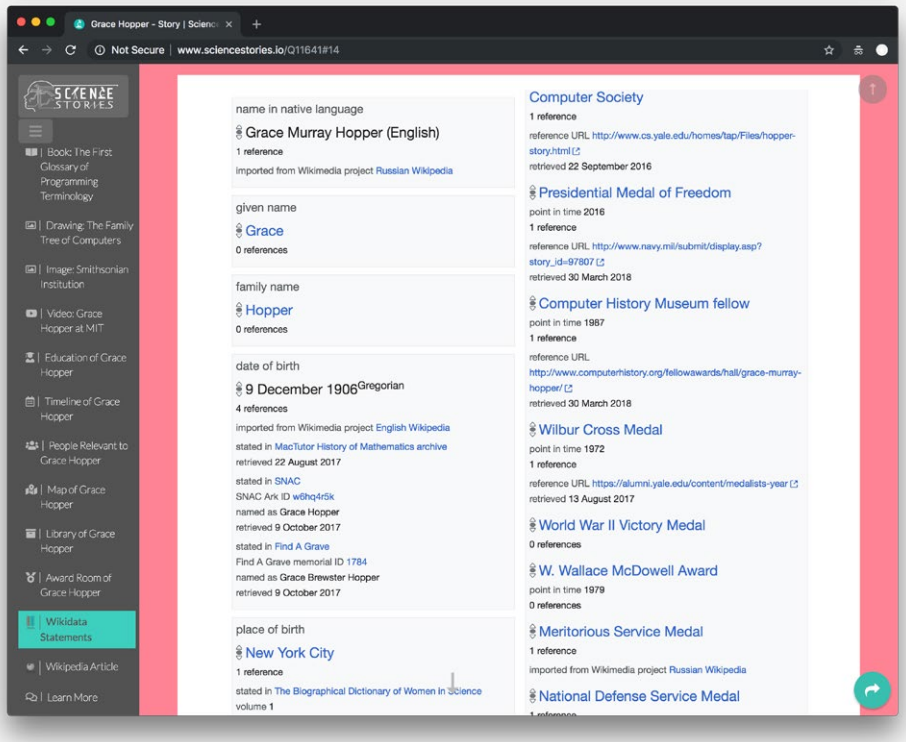


☆
Open source

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.)



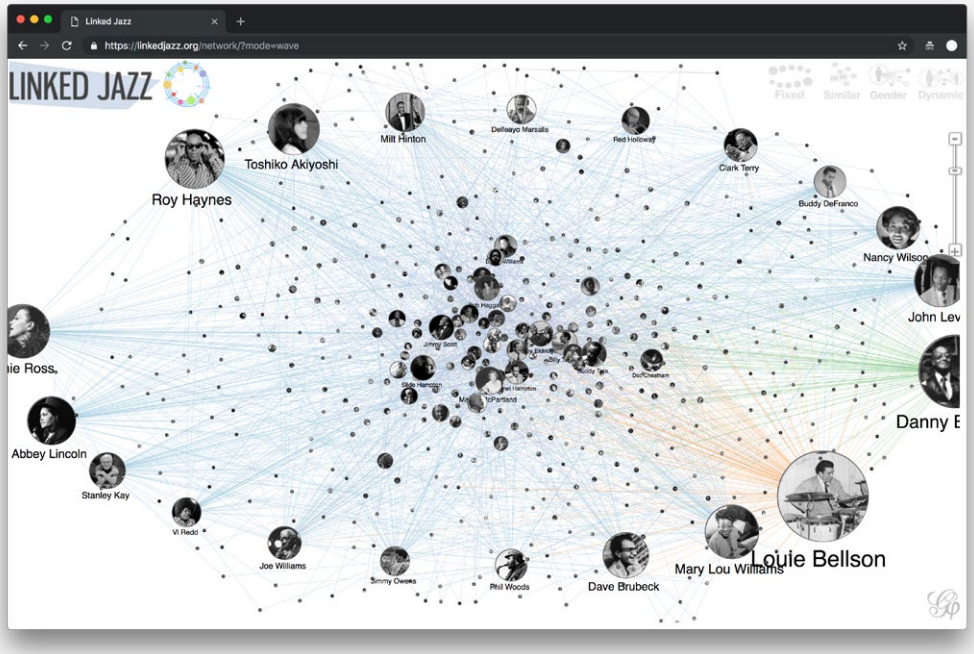


Example view of a "story": The interface also features a customized view of the Wikidata record page.

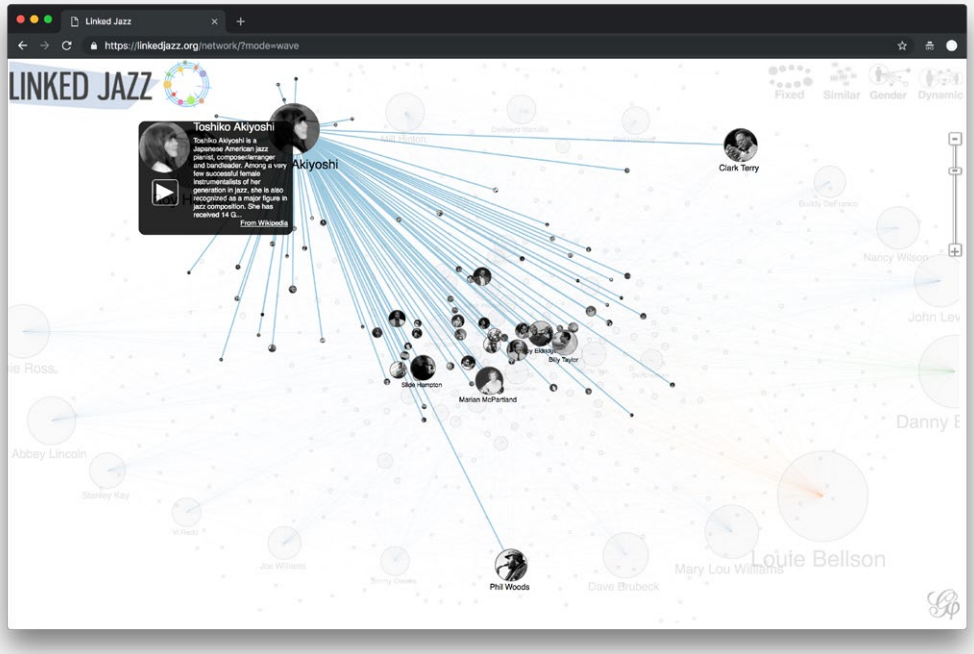
Notes (continued from p.85): Similarly to the previous portal interface, however, this one does not fundamentally redesign how Wikidata statements are presented to users. The overall 'flow' of the story is highly structured and works best for a single type of record—for example, a person's records. Such 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)



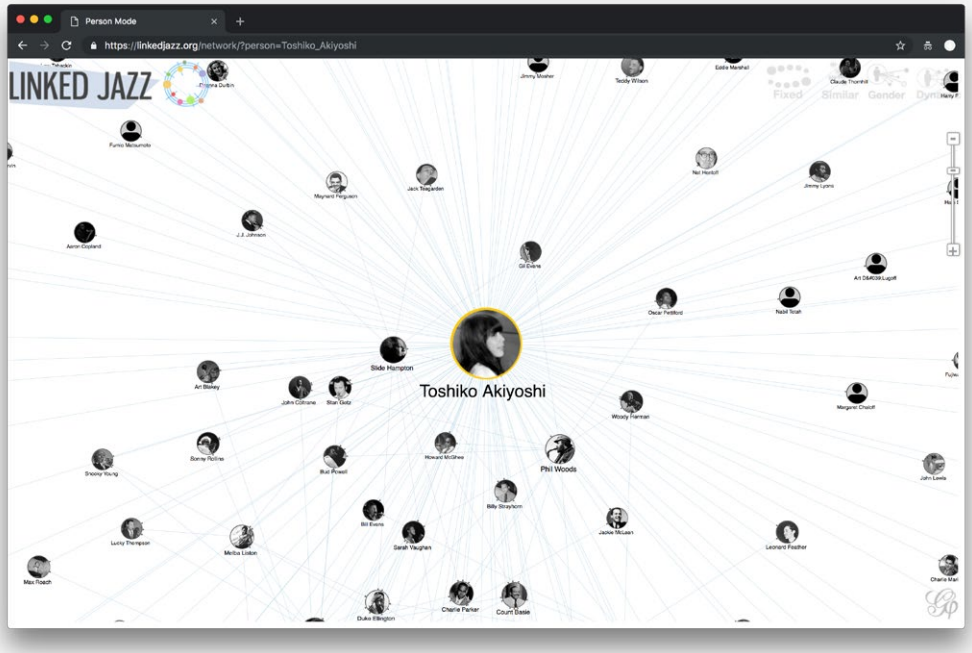
Example collection overview: A network diagram traces the relations between actors in the data set.



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

☆ **Linked data**	☆ **Network diagram**
☆ **Expression of relations**	☆ **Open source**

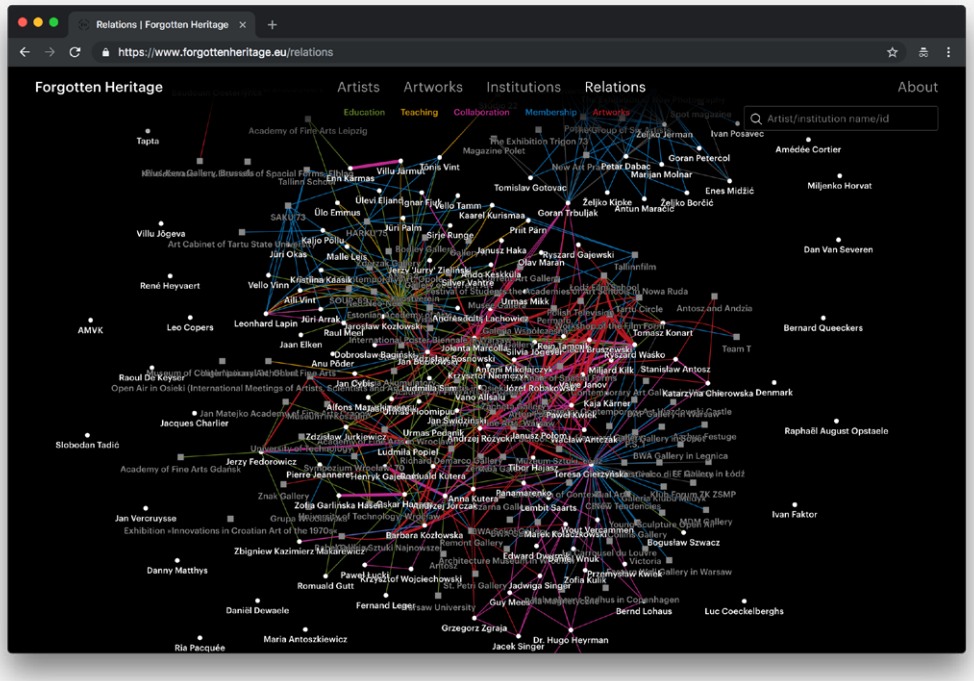
Example collection overview: Clicking on diagram nodes, recenters the node and highlights relevant relations.



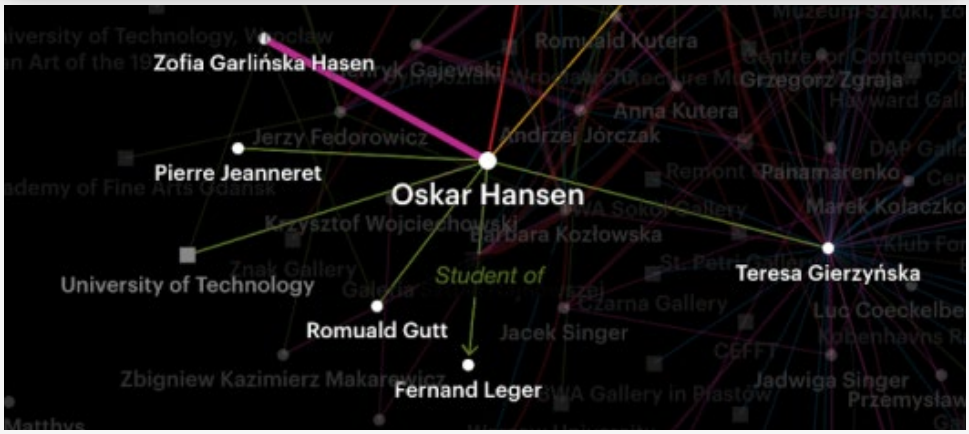
Example collection overview: Hovering over diagram nodes in this 'filtered' state narrows down the view even further, plus features a 'preview' data box for the relevant node.

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.

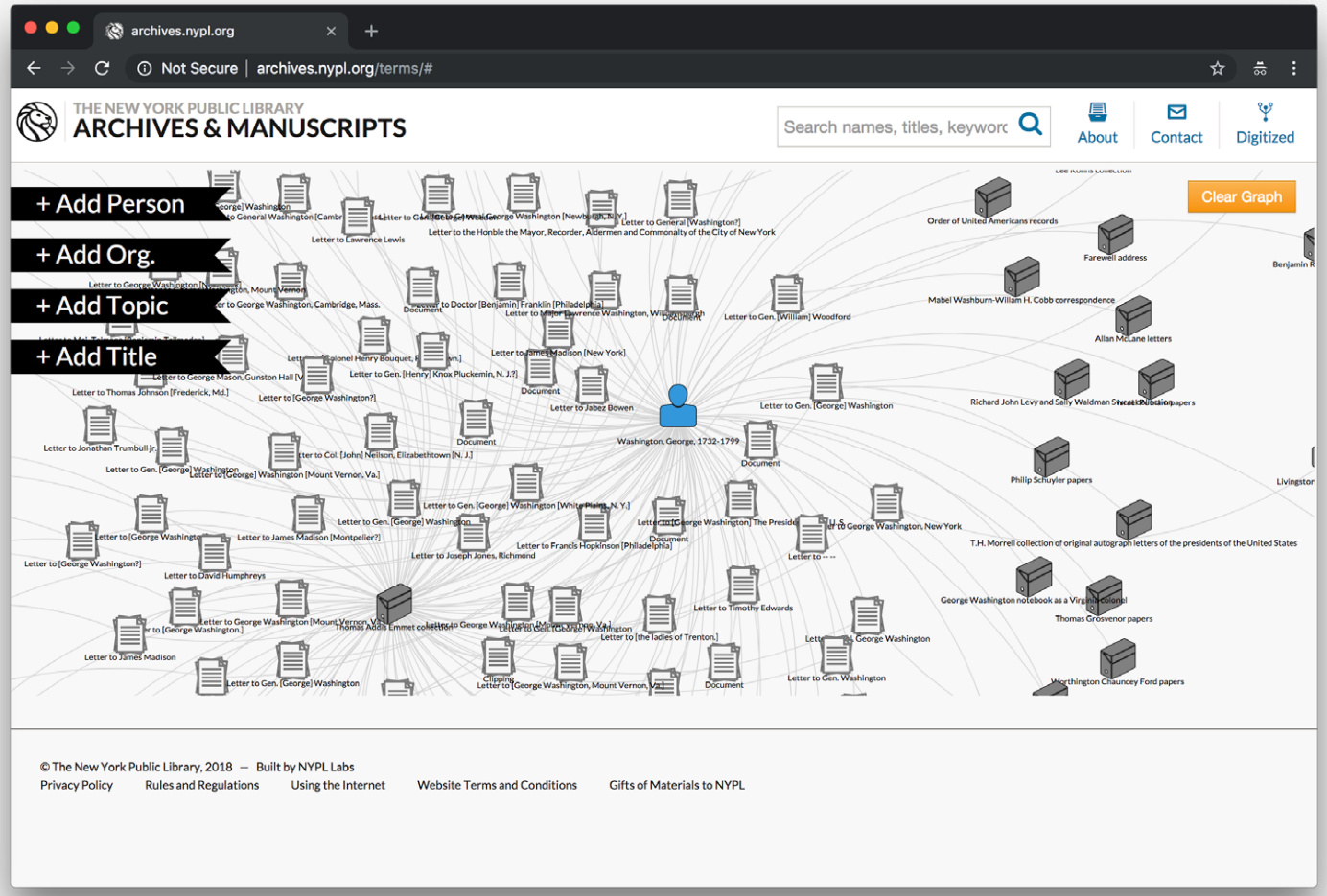
☆
Linked data

☆
Network diagram

☆
Expression of relations

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.

NYPL Labs: Beta Tools (US)



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

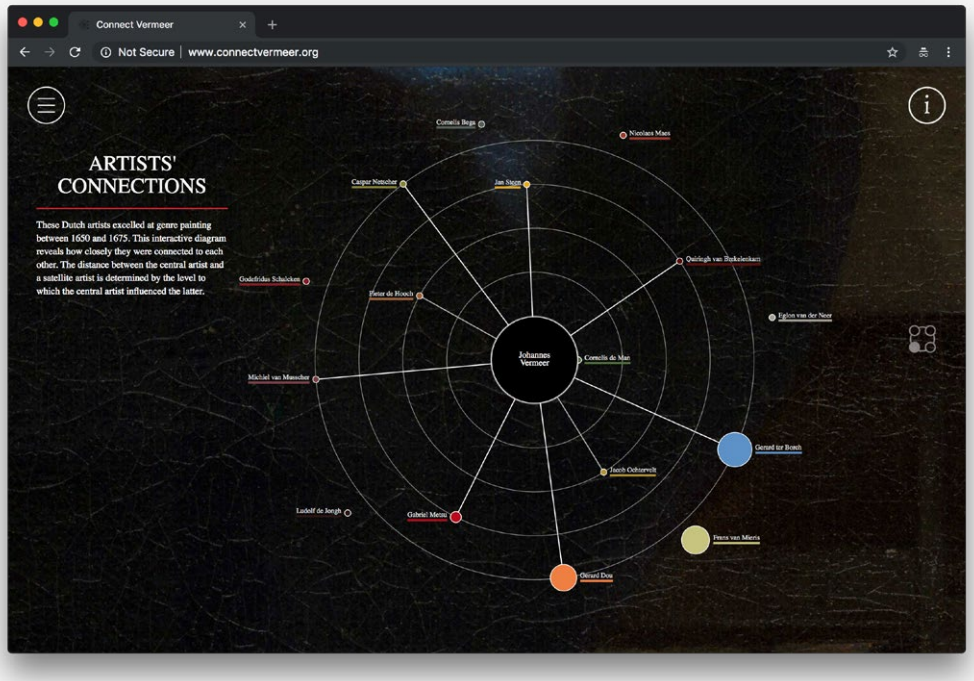
☆
Linked data

☆
Network diagram

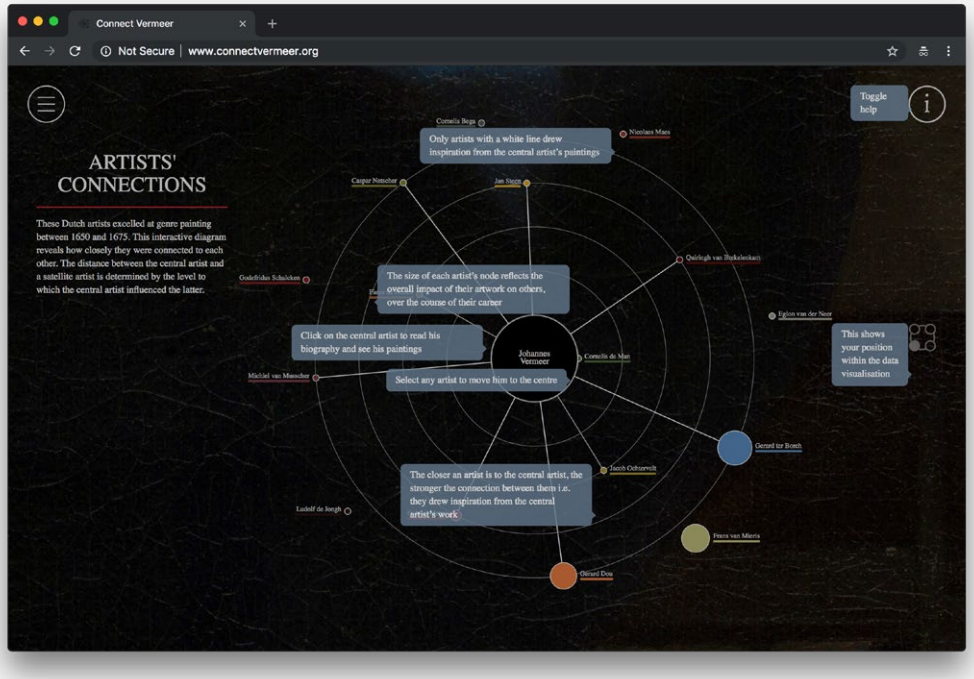
☆
Expression of relations

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)



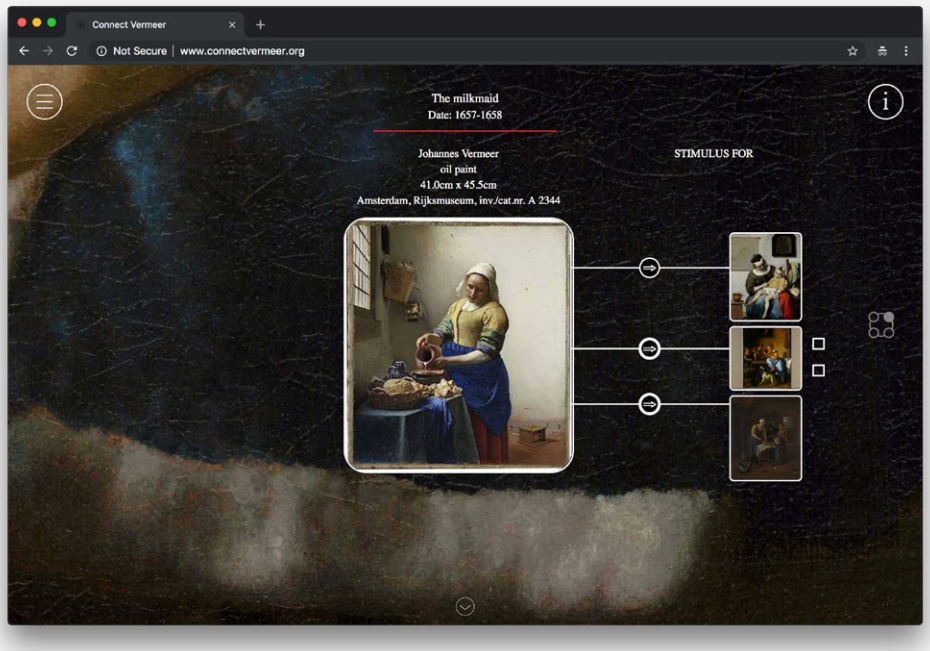
Example collection overview: Data visualization presenting relations between actors in the data set.



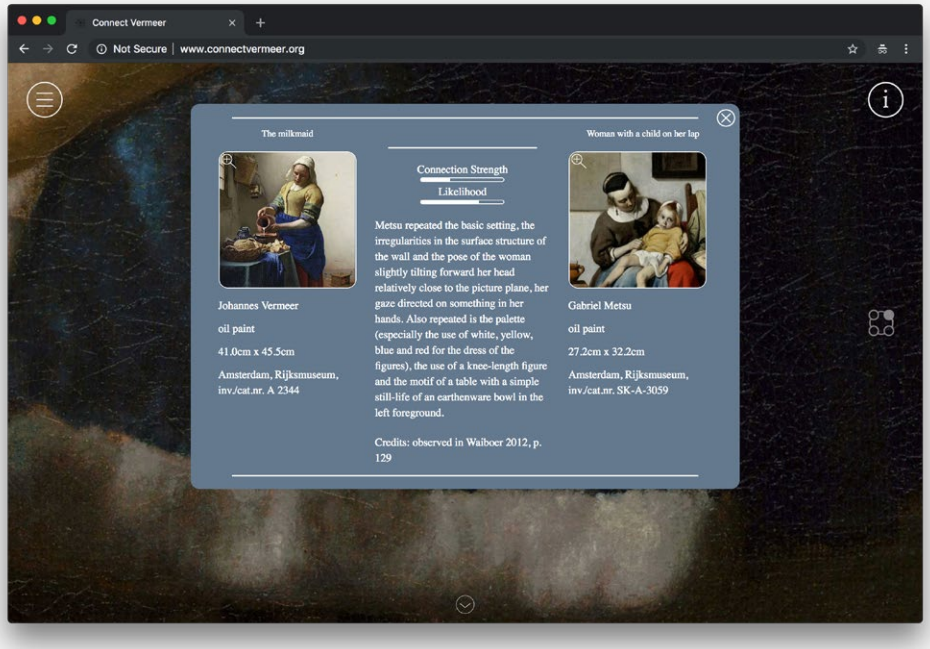
Example collection overview: Data visualization presenting relations between actors in the data set with an overlay providing explanatory text.

☆	☆	☆
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.



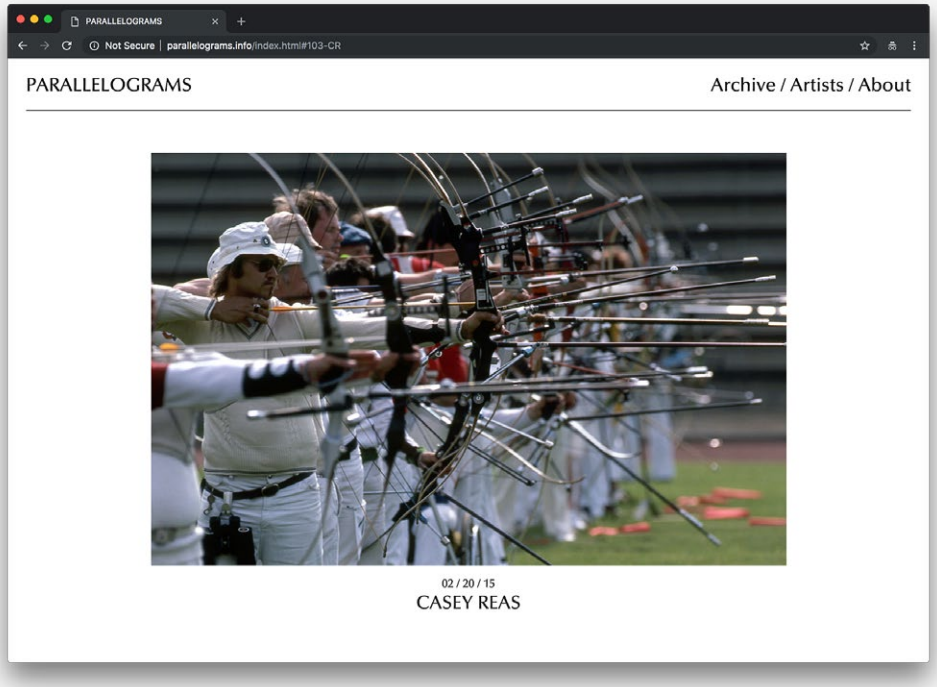
Example view of an item record: An explanatory overlay provides further information about the nature of the relationship between two artworks.



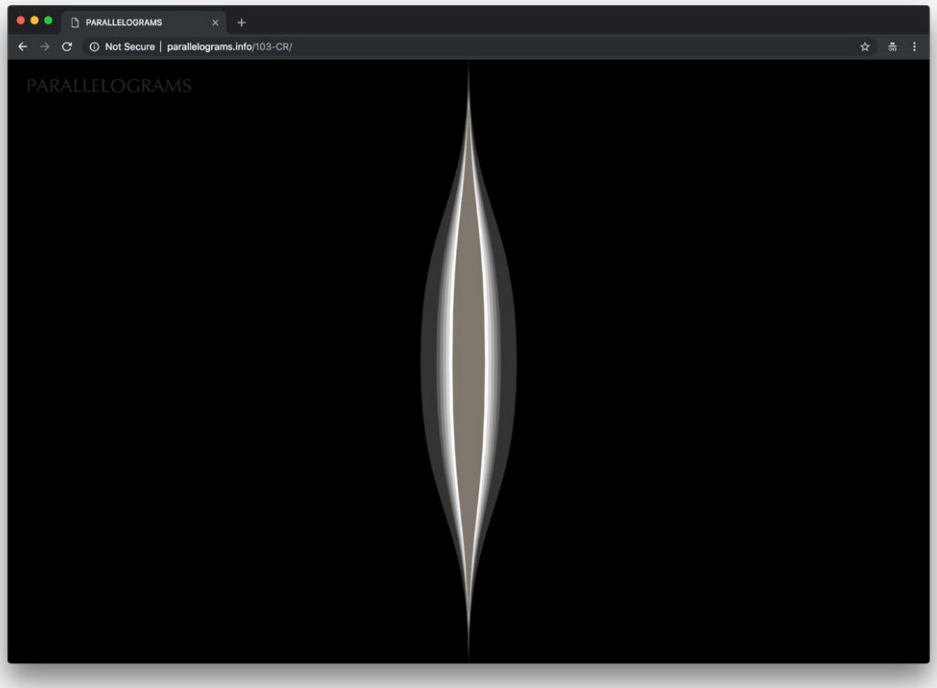
Reference URL: http://www.connectvermeer.org/
Date of screenshots: 2018-11-23
Notes: This joint project between three art institutions brings together research within a common linked data framework (using the CIDOC-CRM standard). While the visualization relating to artists remains largely opaque (despite 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.



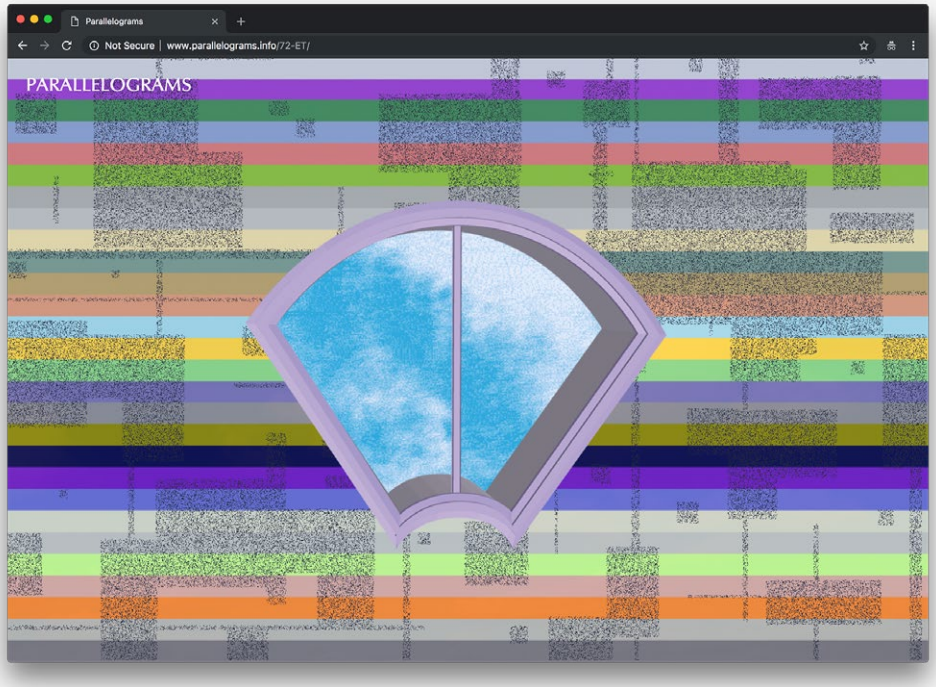
Example artwork view 1: The artwork is presented full screen. The only reference back to the exhibition index is the logo just visible (gray text upon black ground) in the top left corner.

☆
'White cube' exhibition approach

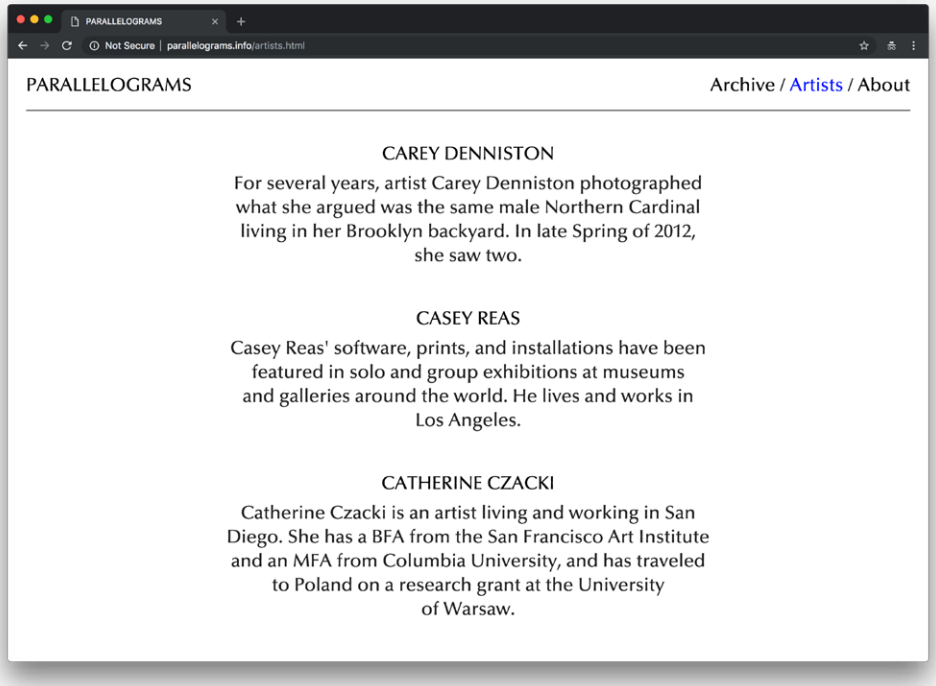
☆
Overviews & previews

☆
Artworks hosted on exhibition site

Example artwork view 2.



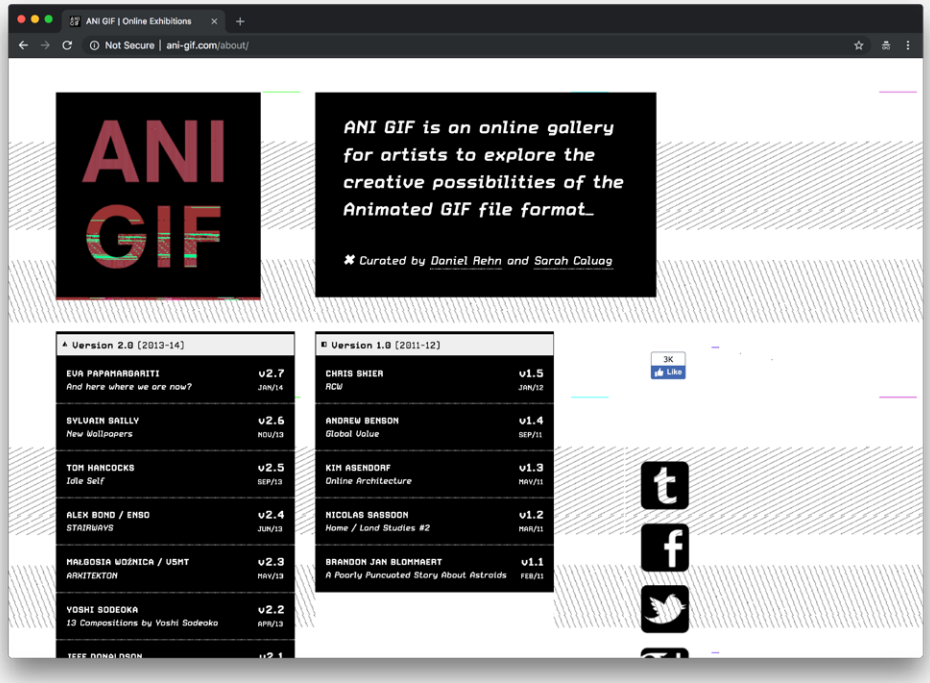
The only contextual information provided is a list of artists' names and short biographies.



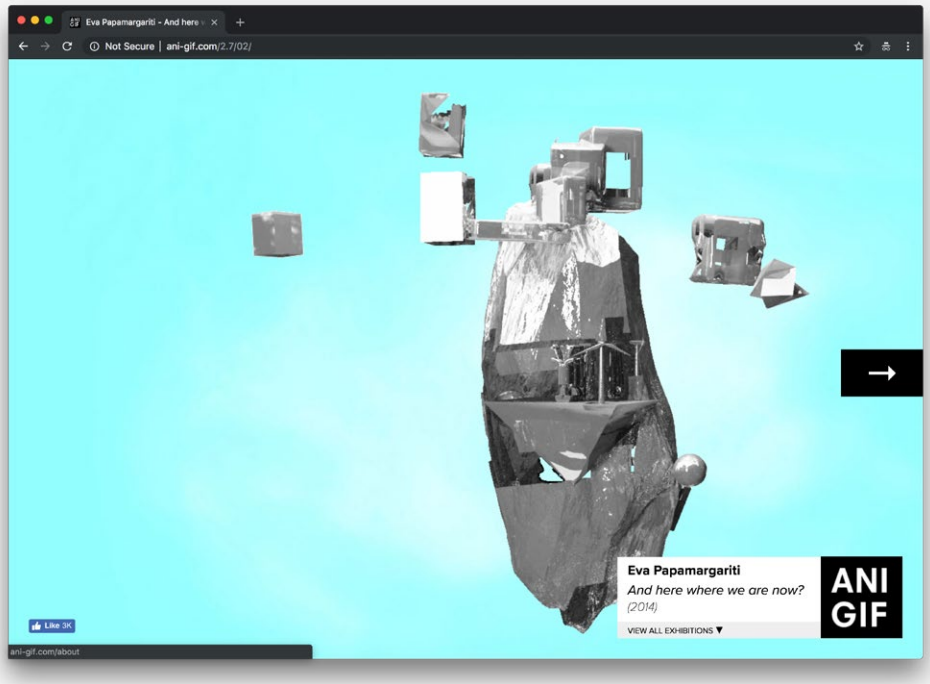
Reference URL: http://parallelograms.info/
Date of screenshots: 2018-11-25
Notes: This online exhibition is organized as a series of individual commissions, developed between 2010–2015. Artwork thumbnails are presented as clickable elements which open new, self-contained pages. The majority of the artworks 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)



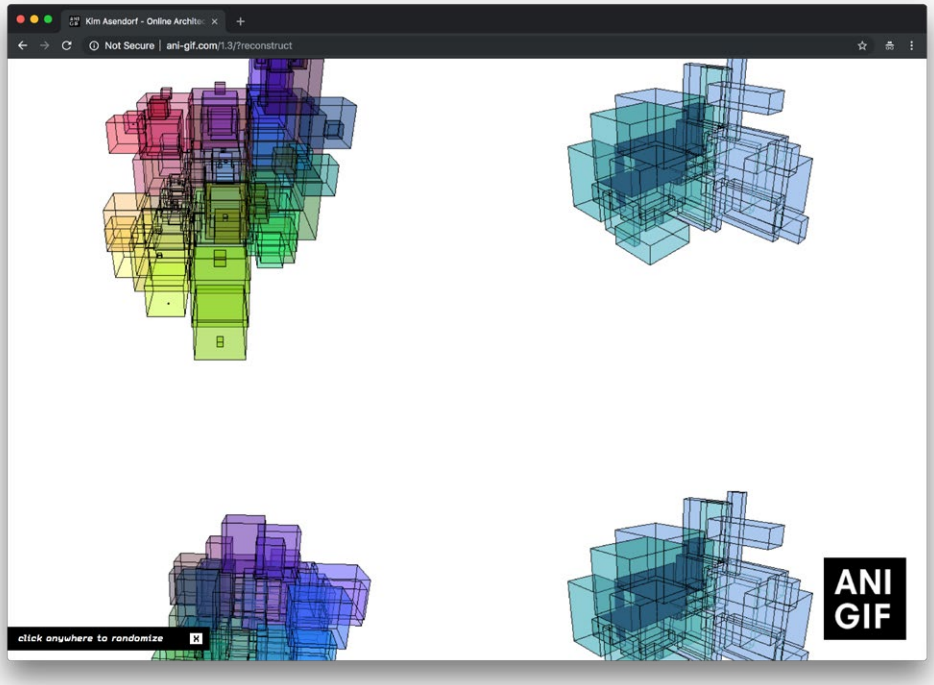
Landing view of the exhibition: A chronological list of artwork titles serve as links to individual commissions. Thumbnail previews are not provided.



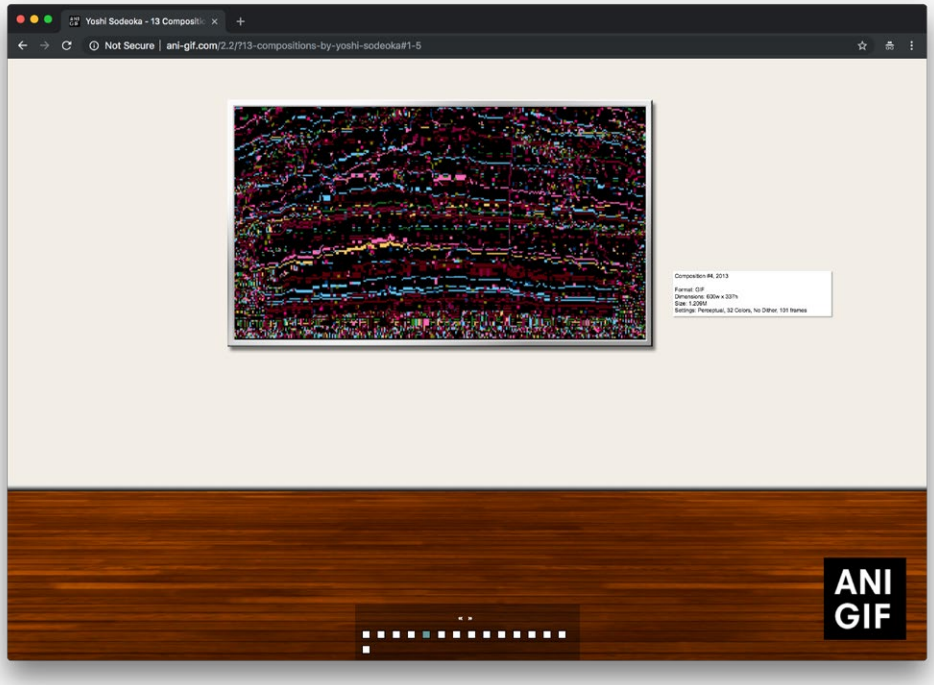
Example artwork view 1: Each commissioned artwork utilizes the entire space of the browser window. The only fixed page element is the square exhibition logo (lower right), which provides basic information about the artwork and links back to the homepage.

☆	☆	☆
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.



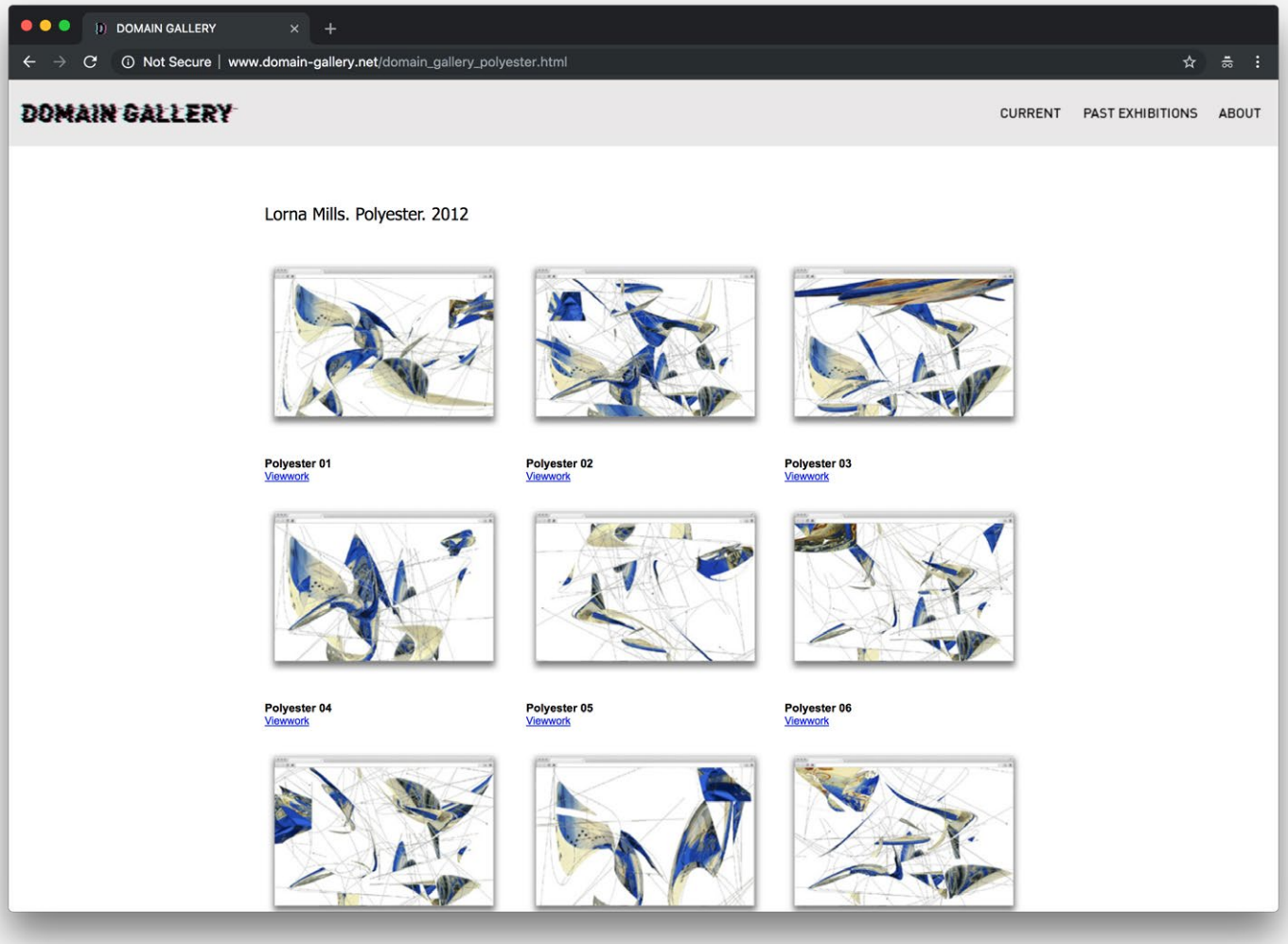
Example artwork view 3: This work utilizes a metaphorical 3D virtual gallery space.



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'.

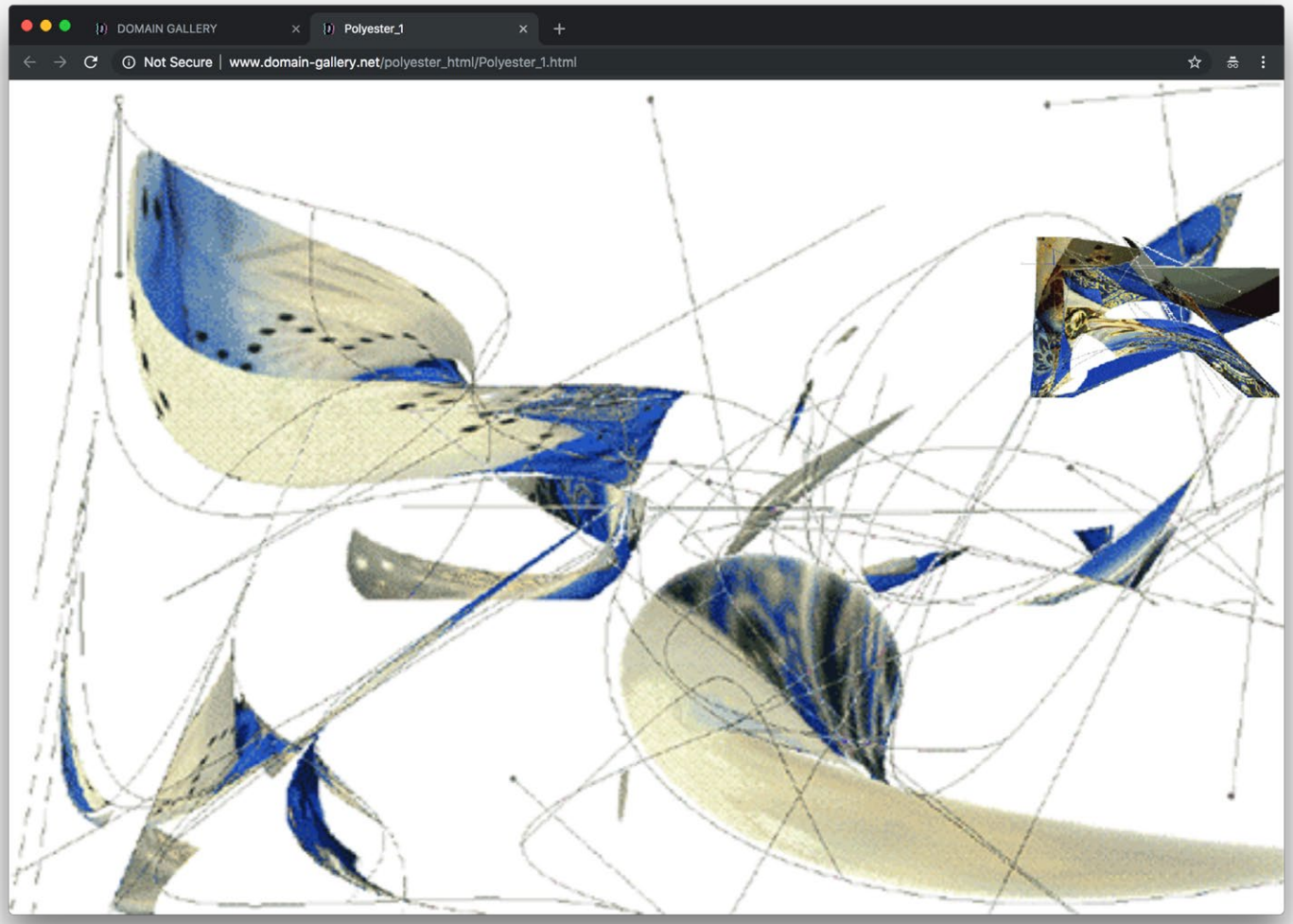
☆
Artworks hosted on exhibition site

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**

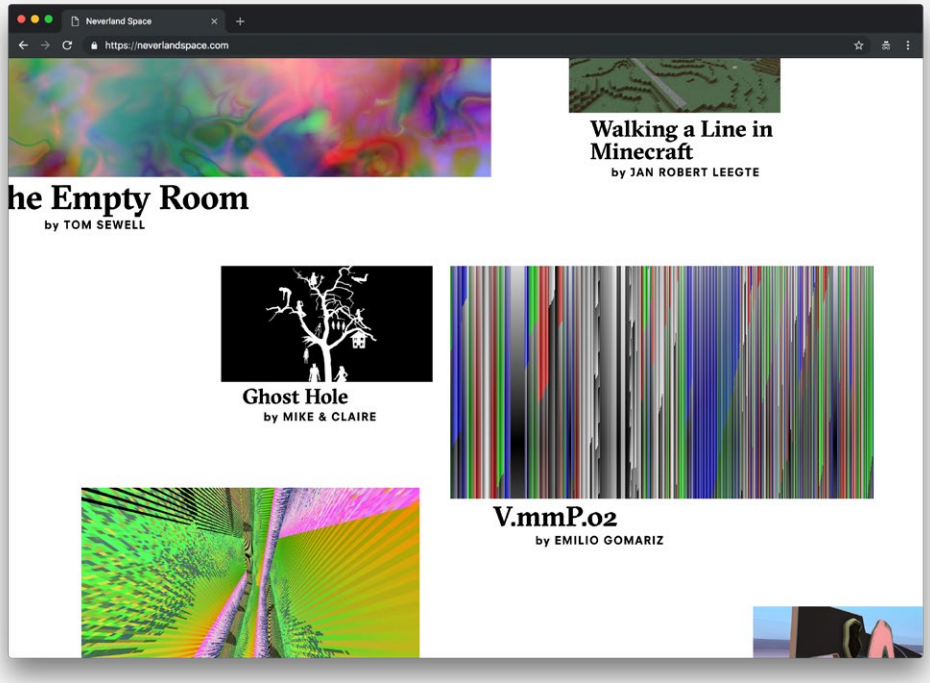


Example artwork view: The artwork opens up in a new browser tab and fills the entire browser window.

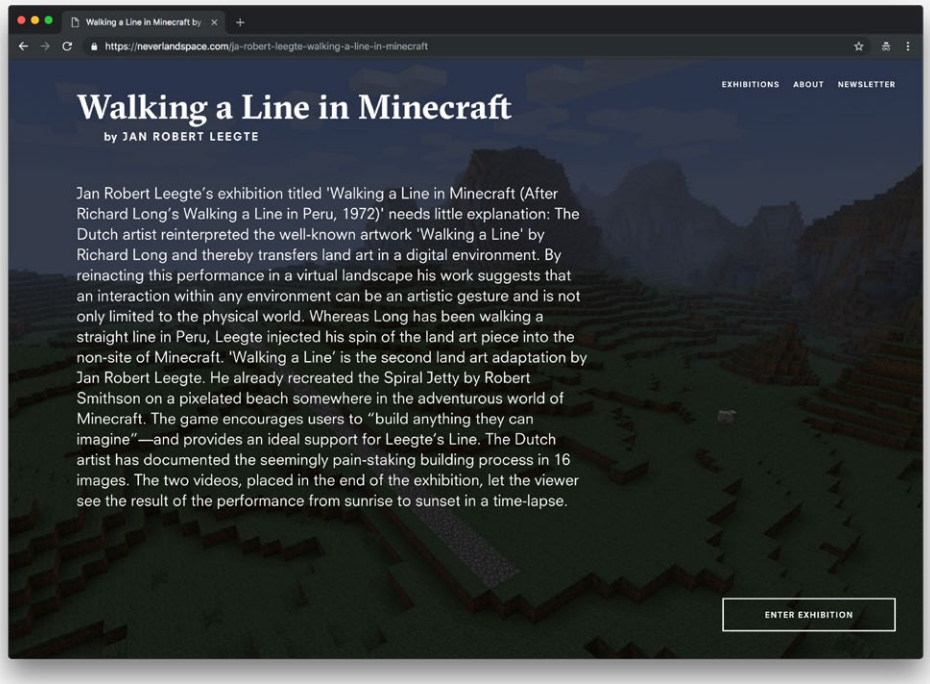
Browser frame included in previews

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.



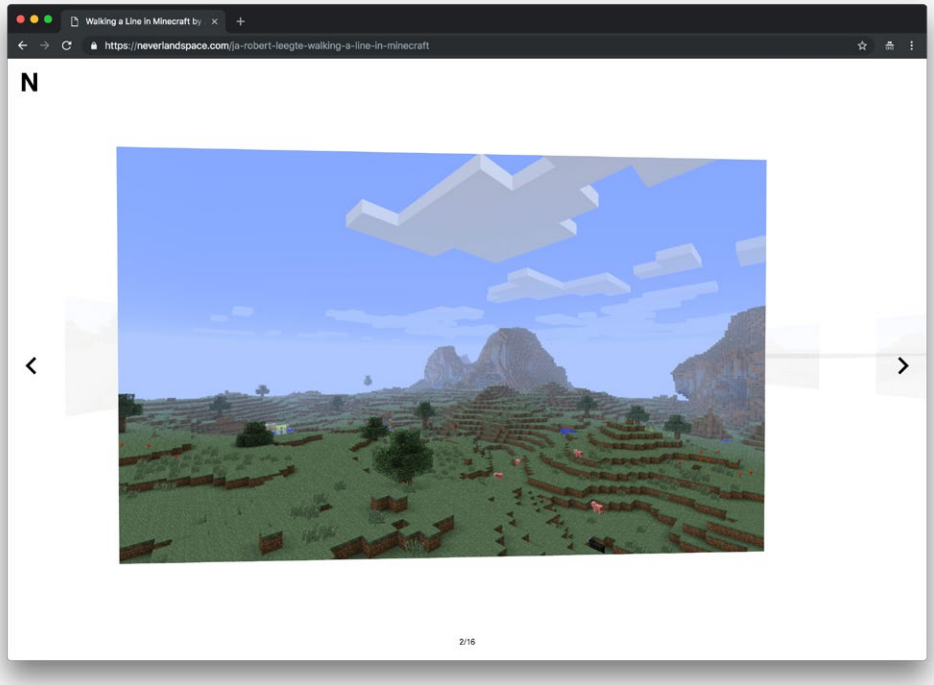
Entry point to a single exhibition.

☆ **'White cube' exhibition approach**

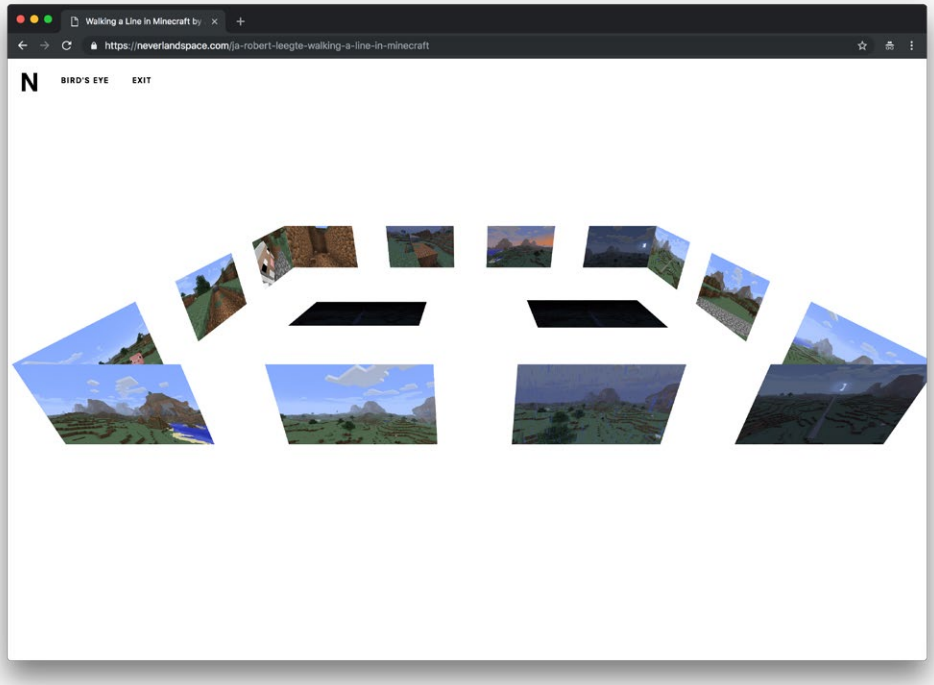
☆ **Overviews & previews**

☆ **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.

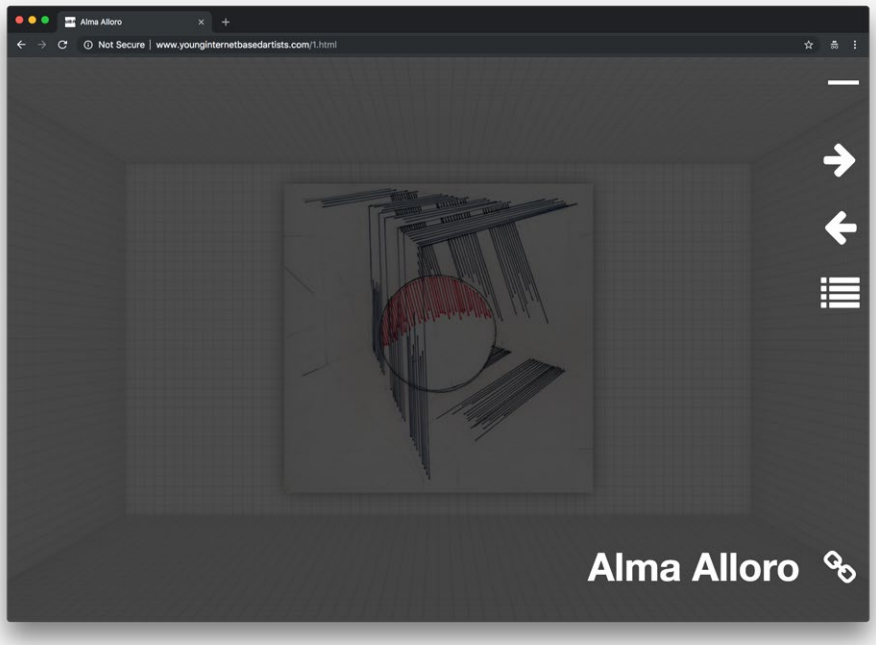


Artworks hosted on exhibition site

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.

Young Internet Based Artists (2013)

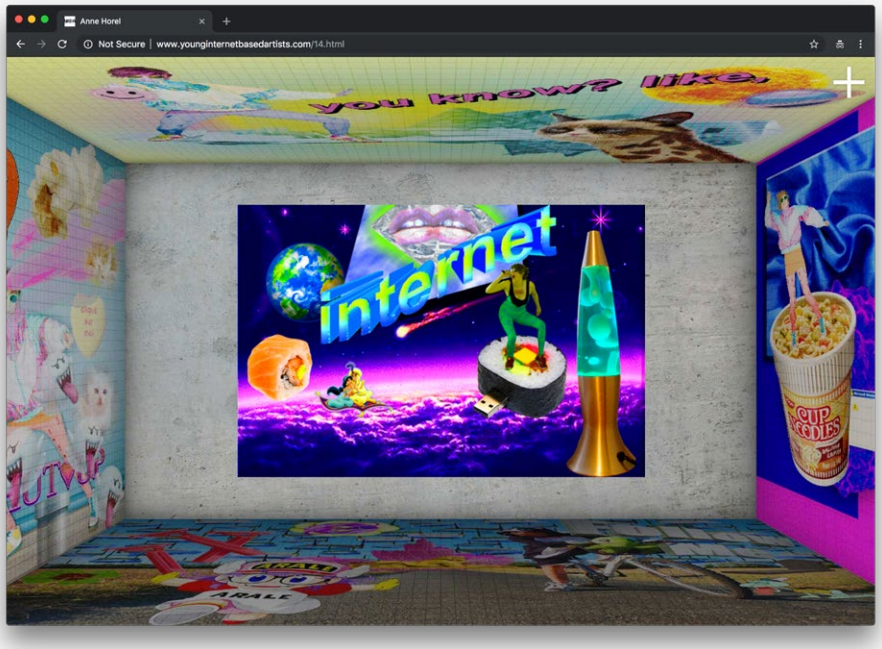
Landing view of the exhibition: In this screenshot the optional information overlay is switched on.



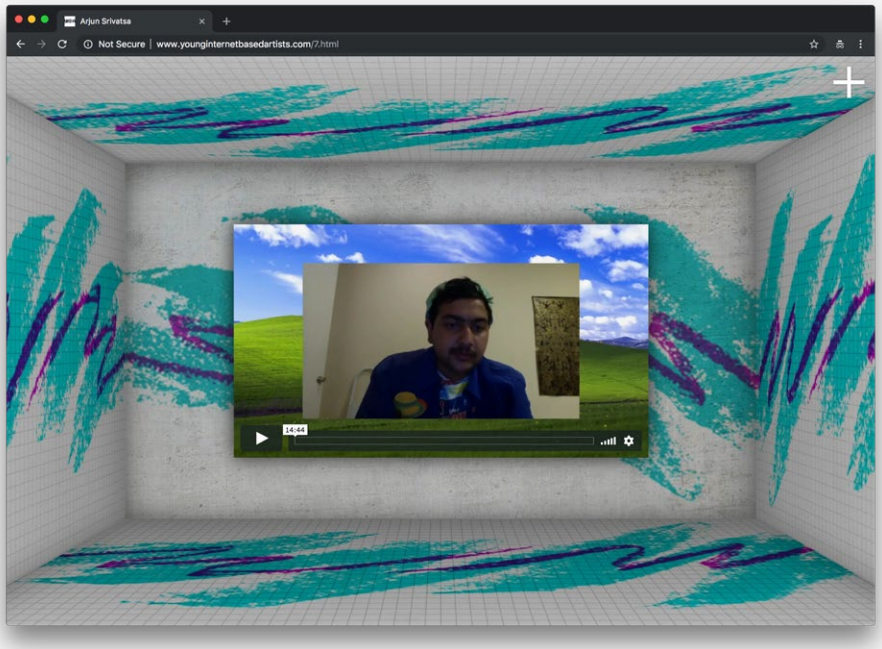
Example artwork view 1: In this screenshot the optional information overlay is switched on.

☆ **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.

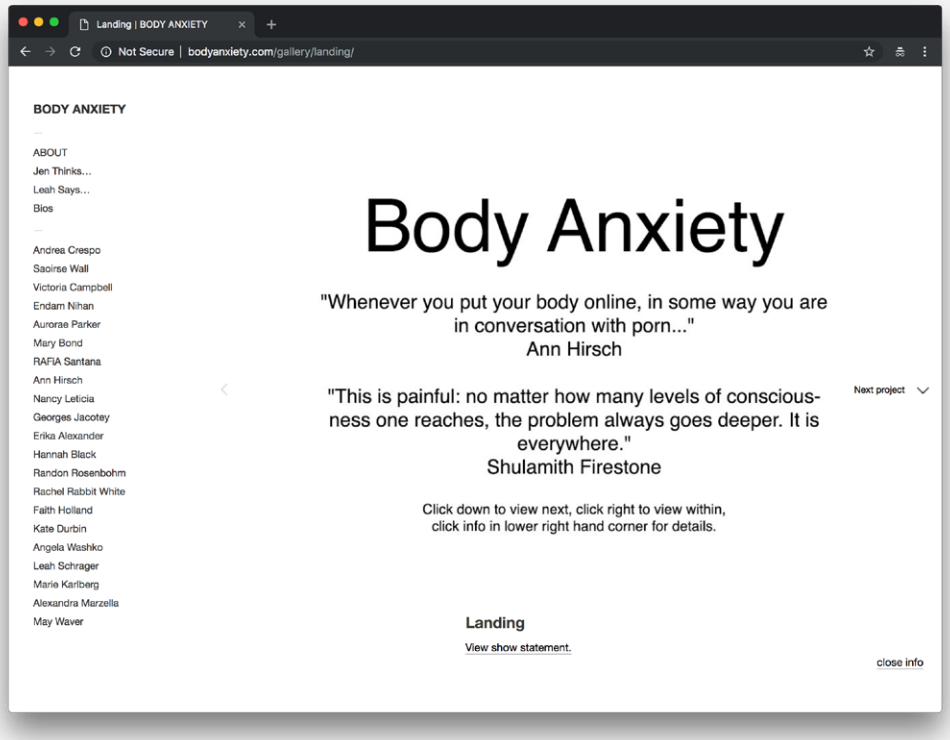


Example artwork view 3: This view features embedded video.

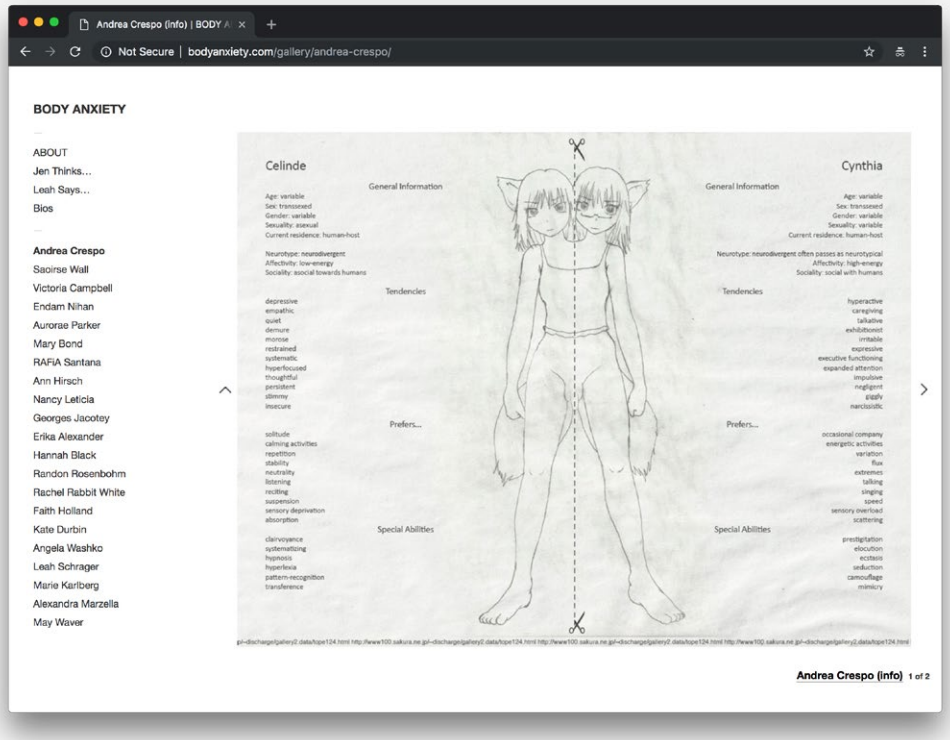


Reference URL: http://www.younginternetbasedartists.com/
Date of screenshots: 2018-11-25
Notes: This online exhibition utilizes Gallery 404—an open-source, browser-based 3D exhibition space tool—offering a virtual gallery wall for artists to display their work and to modify the surrounding wall surfaces. 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)



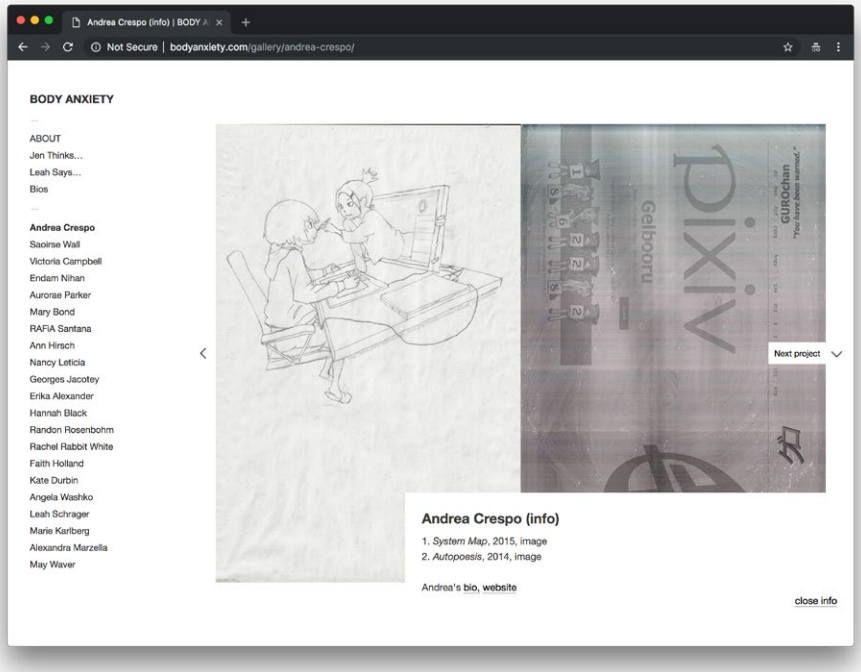
Landing view of the exhibition: A static sidebar on the left displays a list of all the exhibiting artists' names and functions as an index/ navigation menu.



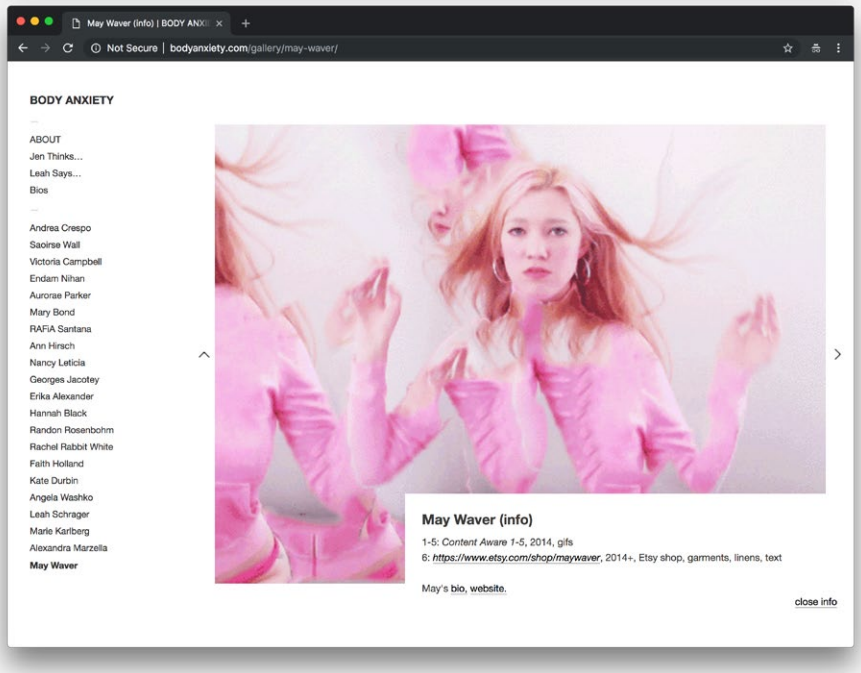
Example artwork view 1.

☆	☆	☆
'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.



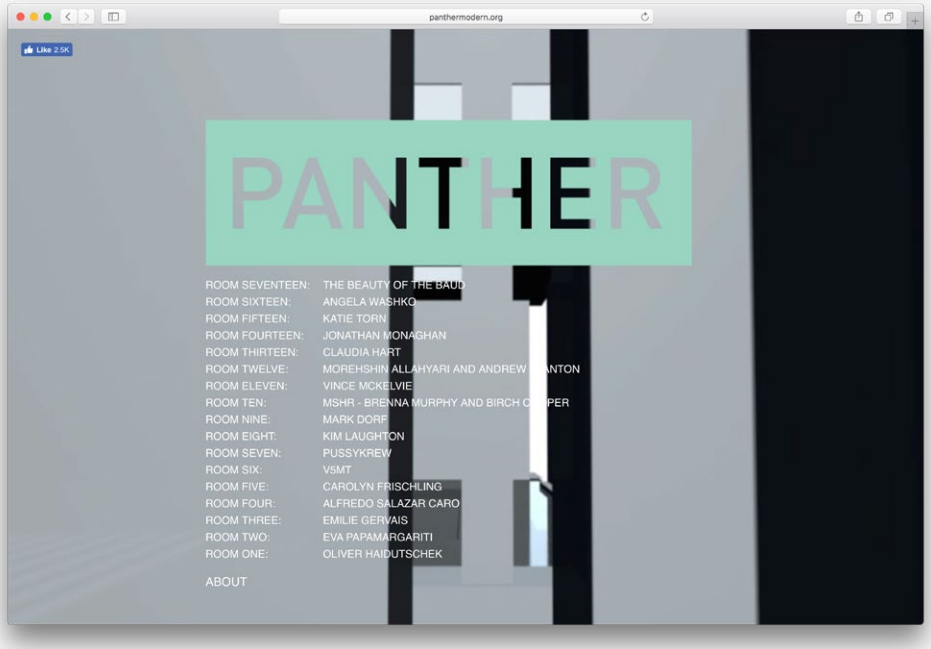
Example artwork view 3.



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)

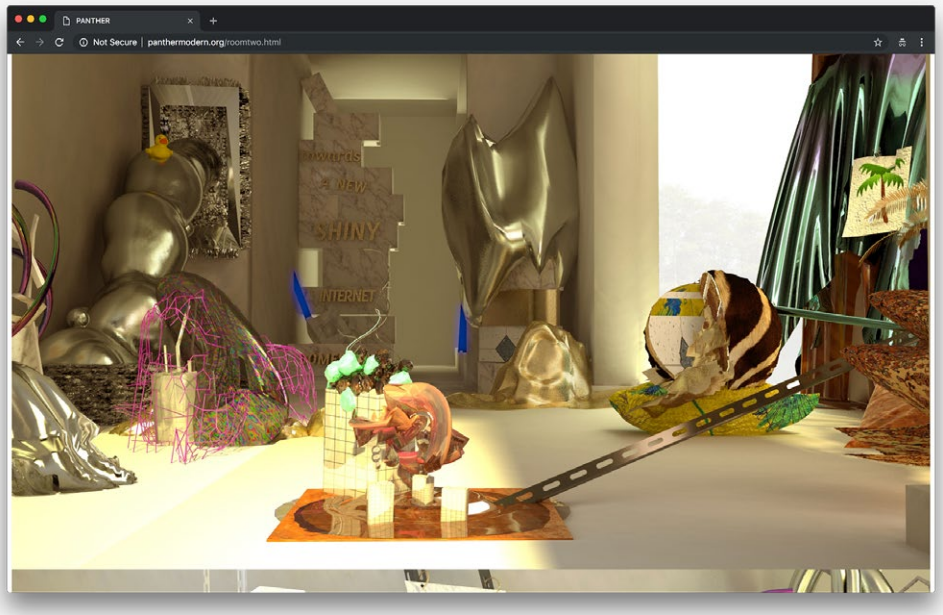


Landing view of the exhibition 1: Artists/ exhibition areas are listed in an index list format.

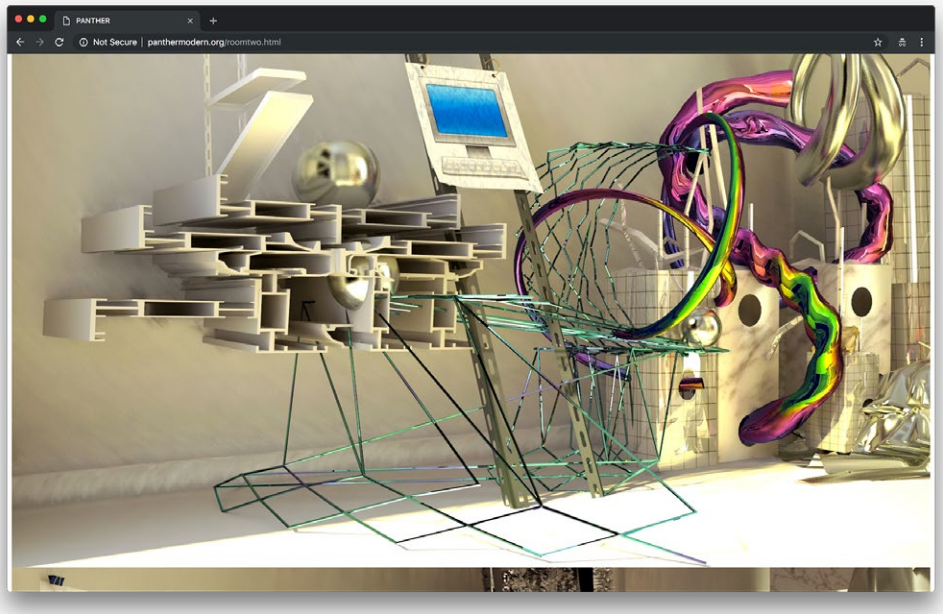
Landing view of the exhibition 2: A video pans around the 3D virtual space in the background (not available in all browsers).

☆	☆	☆
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.

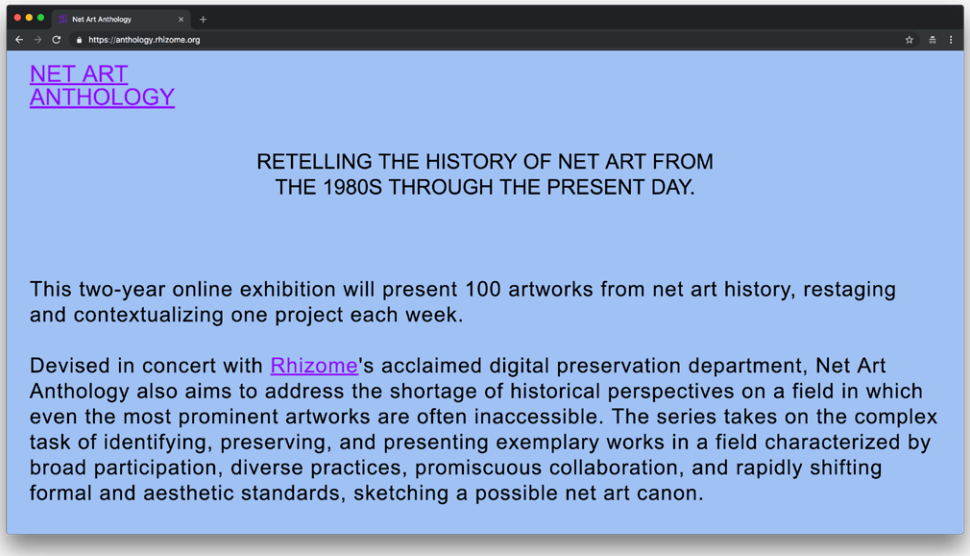


Example artwork view 2.

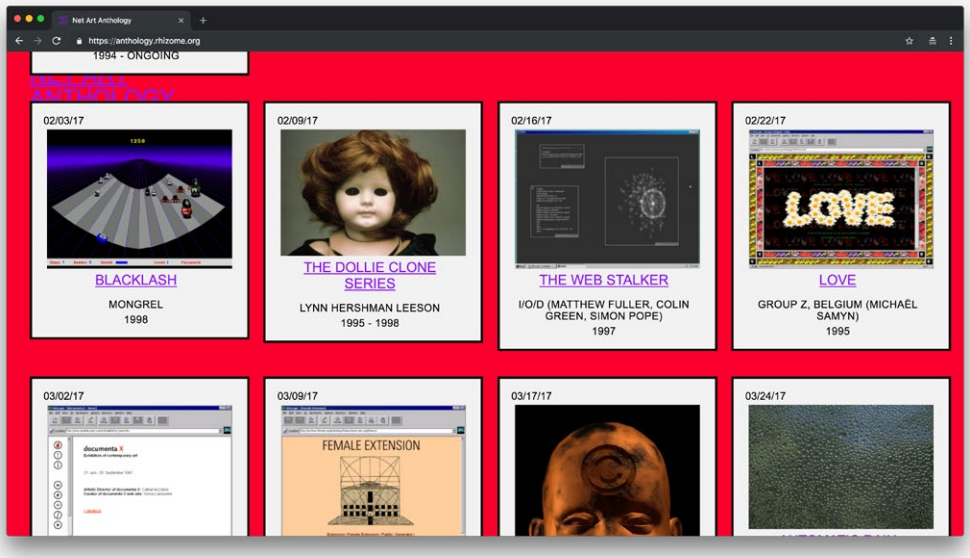


Reference URL: http://panthermodern.org/
Date of screenshots: 2018-11-25
Notes: Panther Modern is a file-based exhibition space. Each artist is allocated a ‘room’ to create a site-specific work. Rooms are linked visually in the images rendering the 3D-modelled space, but not structurally: i.e. users 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)



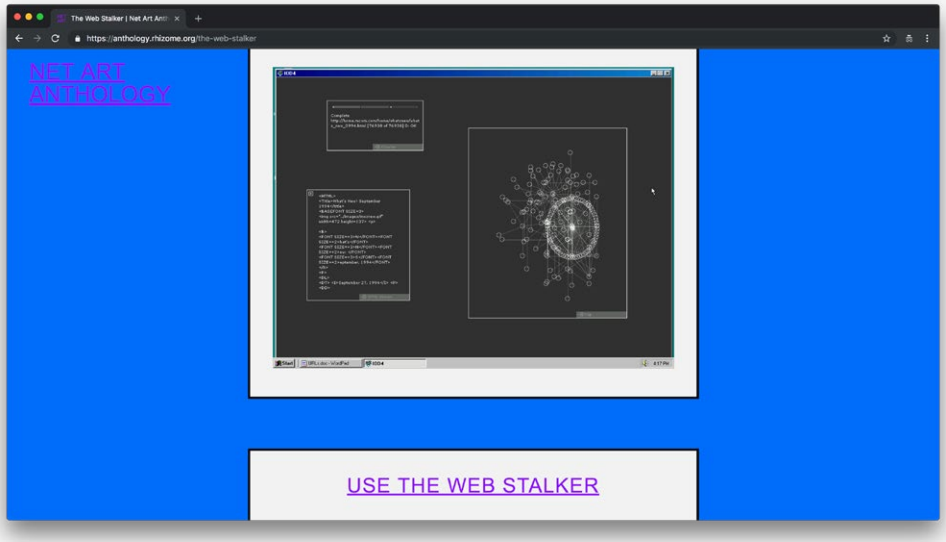
Landing view of the exhibition 1: A short text introduces the exhibition context.



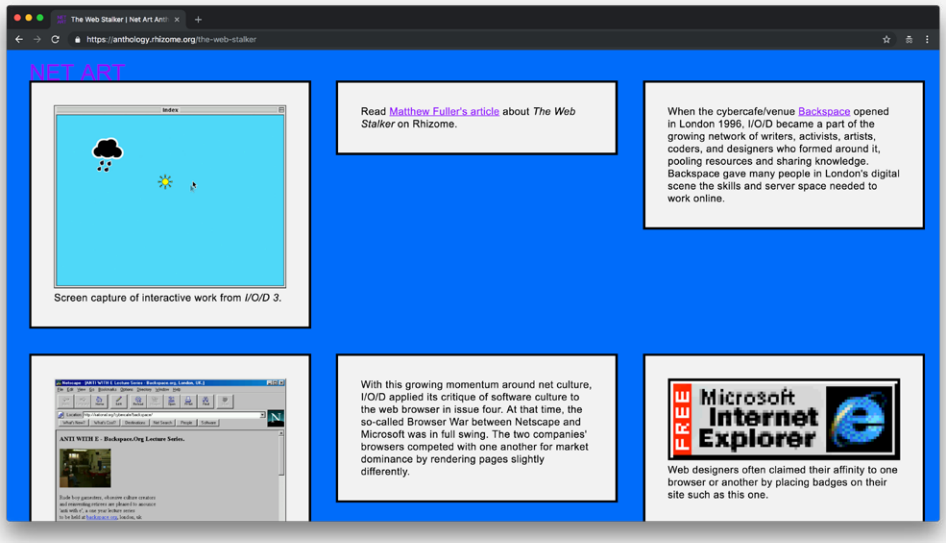
Landing view of the exhibition 2: An overview of the exhibition is provided via chapter divisions and previews of the artworks as thumbnail images.

☆ **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 occurences 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.**

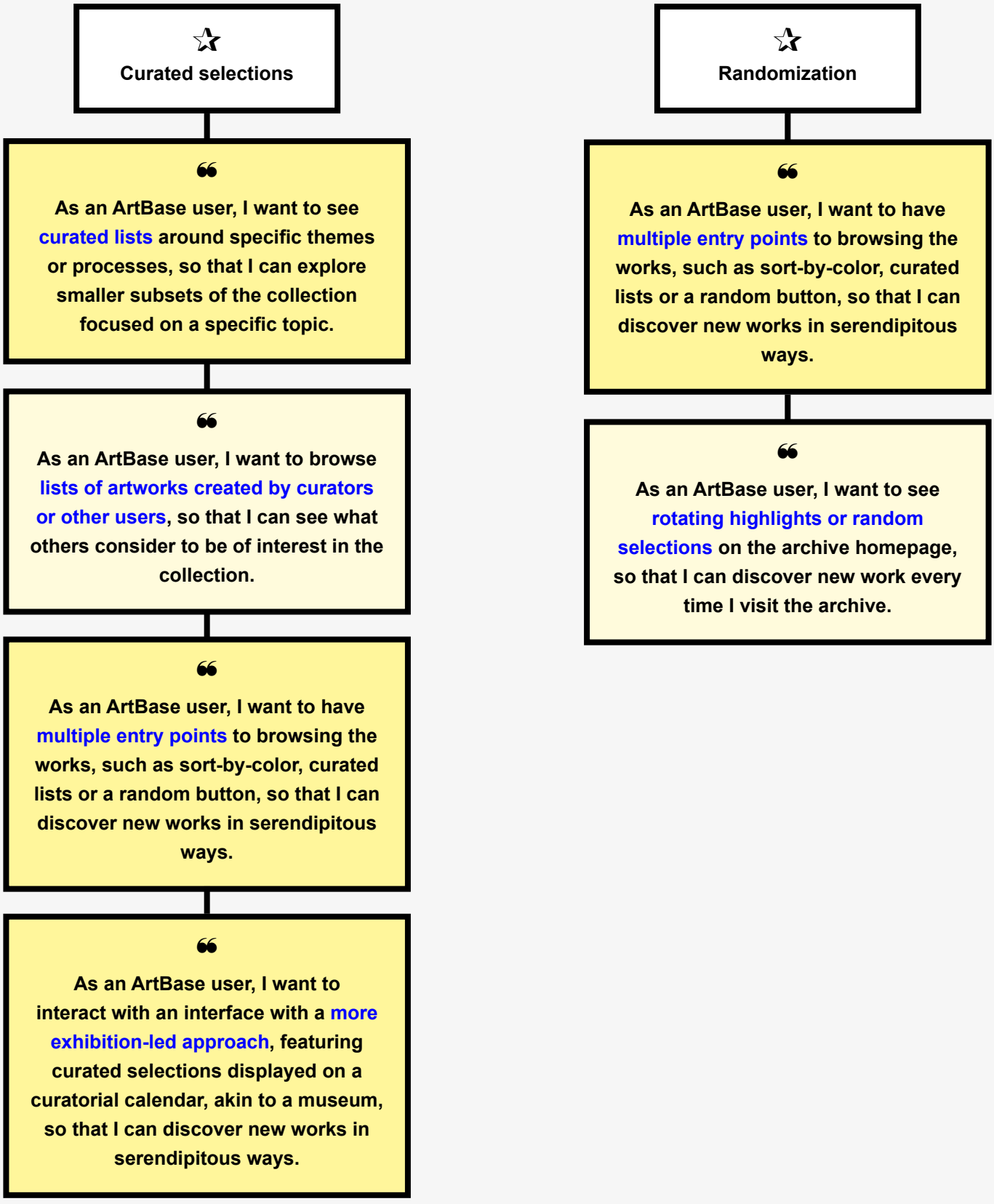
❝ **As an ArtBase user, I want to filter artworks by keywords or categories, so that I can gain an overview of what types of things are present in the collection.**

❝ **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

☆ **Links to related queries**

❝ As an ArtBase user, I want to see selections of related artworks, so that I can explore the collection through the relationships within it.

❝ As a researcher, I want to be able to see related artwork sets, so that I can find more work relevant to my research even if I'm not aware of it.

❝ As a researcher, I want to see the artworks in sets, such as exhibition histories, or make my own sets, so that I can also contextualise artworks and not only look at them in isolation.

❝ As a researcher, I want to see bi-directional relationships between objects and creators, so that I can find all works created by a person on their record page.

☆ **Multi-object timeline**

❝ As a researcher, I want the archive to have a clearer chronology of materials, which involves a position of historicisation by the institution, so that I can study the archive, as well as the relationships between the institution and the archive.

❝ As a researcher, I want to be able to interact with timelines of collection materials, so that I can study the development of themes or movements over time.

☆ **Sort by color**

❝ 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 be able to search by color in the archive, so that I can discover new works in serendipitous ways.

Features related to entry points and discovery

☆
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.

❝
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 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.

Features related to single record-level pages

☆
Single-object timeline

❝
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 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

☆ **Rich context**

❝ **As an artist, I want to see a reenactment or an emulation or just see the actual work, and besides that a richer context available in a wiki form, so that I can access (or contribute to) that context if I choose to.**

❝ **As a net art exhibition visitor, I want to access more information about conservation and preservation actions, so that I can better understand the limitations of what I'm looking at.**

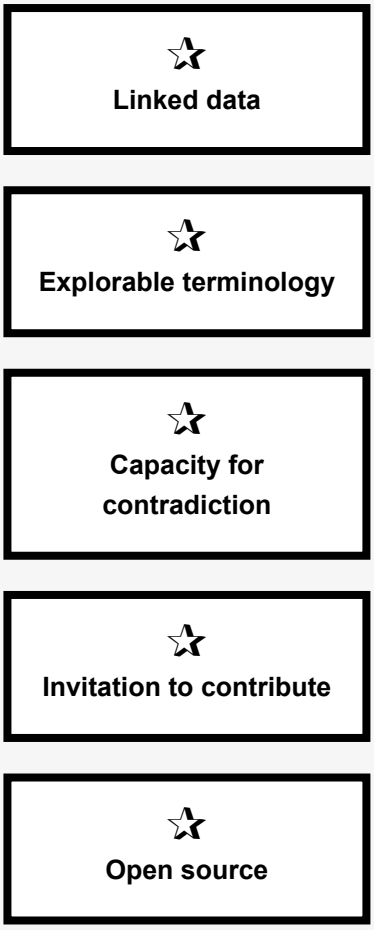
❝ **As a researcher, I want to be able to see a form of versioning in the archive, so that I can study how artworks change over time, which actors are involved in changes over time, the relationship to authorship, and also the role of the audience.**

☆ **Emulated environments**

❝ **As a net art exhibition visitor, I want to access artworks in their native environment, so that I can interact with them the same way as when they were originally developed.**

❝ **As a researcher, I want to access artworks in their native environment, so that I can interact with them the same way as when they were originally developed.**

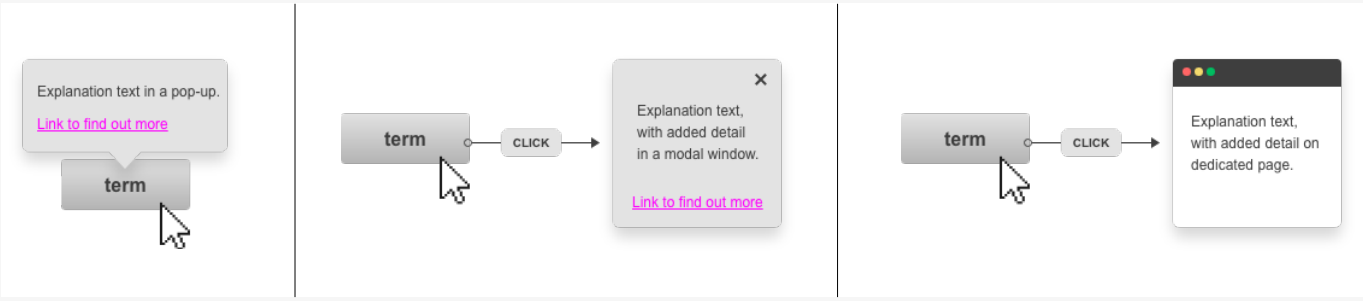
Recommended features



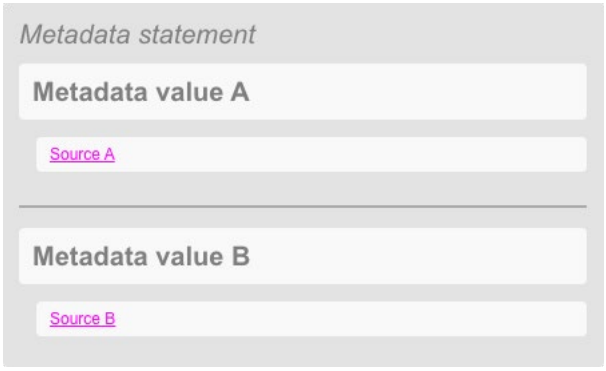
Features related to database setup and data structure

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** can be particularly useful to providing richer metadata pertaining to conservation procedures or technical dependencies, which has been requested by users. The **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. 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. The idea of **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.

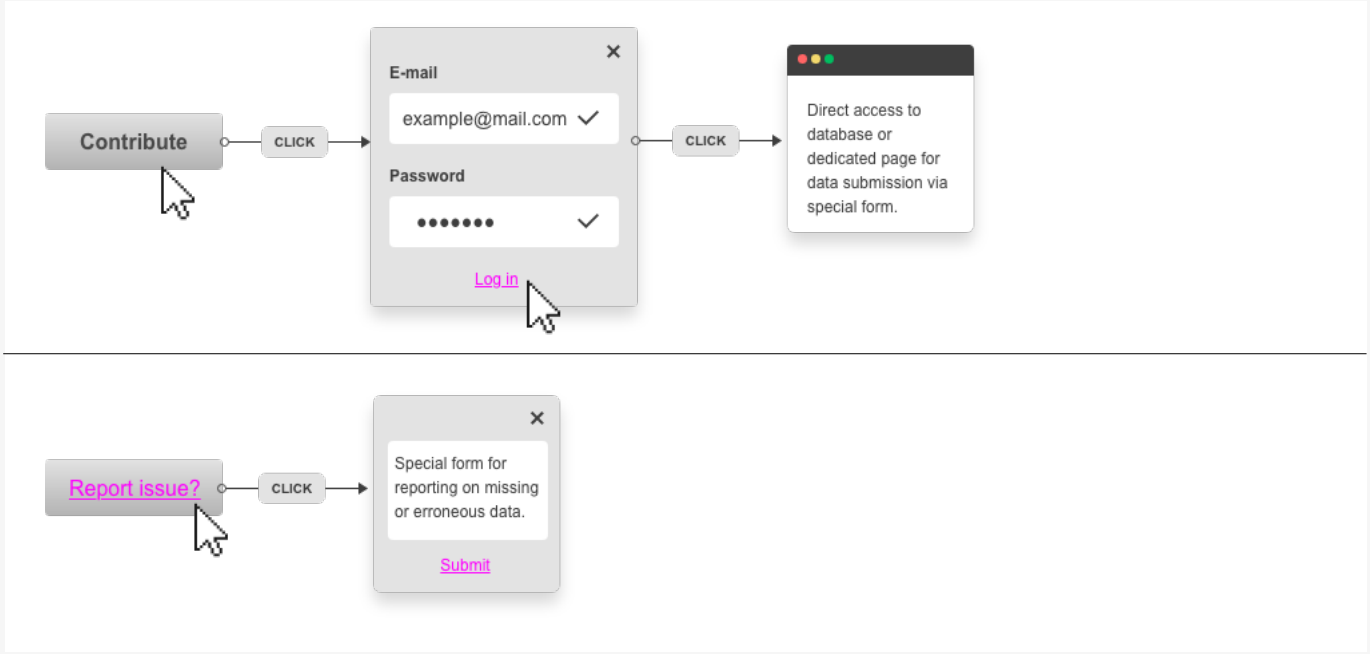
Wireframe mock-ups



Explorable terminology

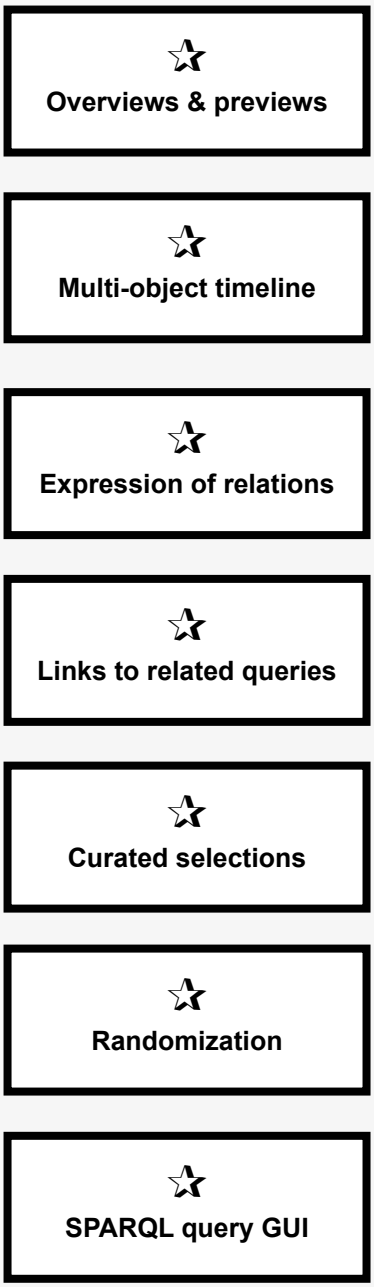


Capacity for contradiction



Invitation to contribute

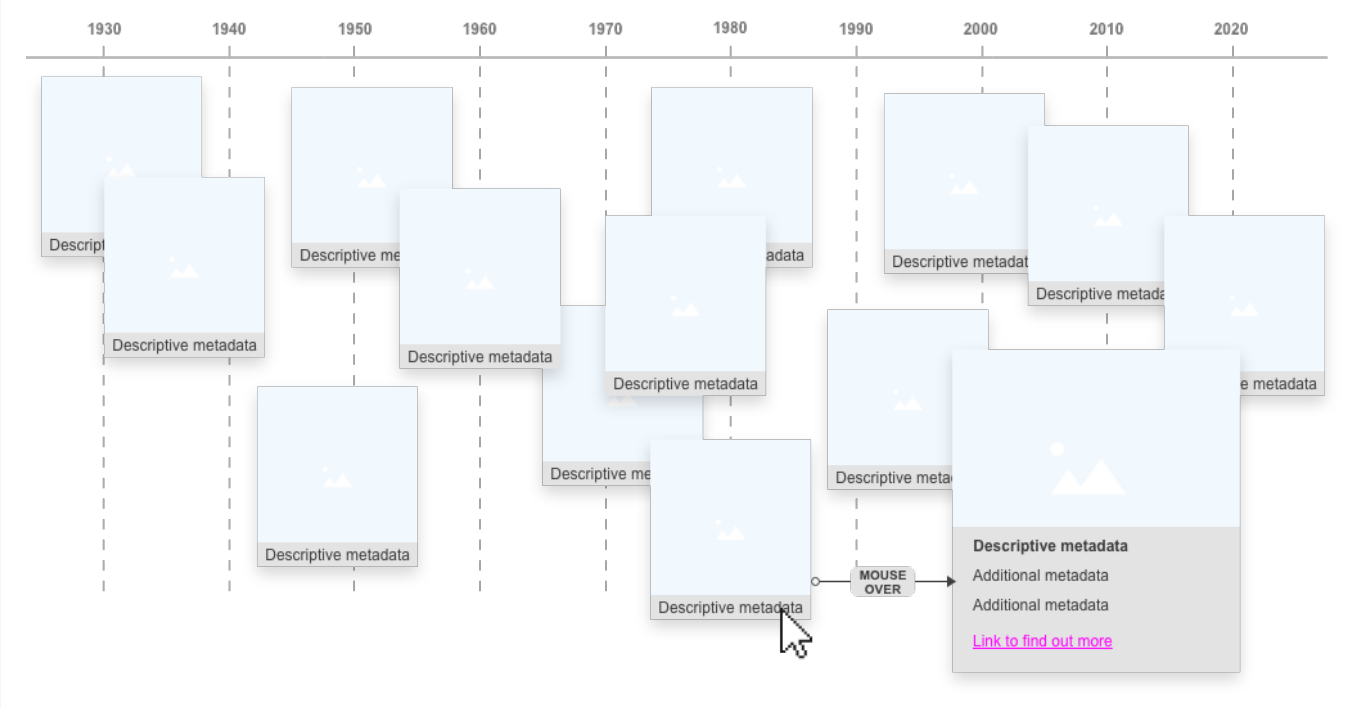
Recommended features



Features related to entry points and discovery

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. 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. 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). 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 interfaced 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.

Wireframe mock-ups



Overviews & previews / Multi-object timeline

Expression of relation / Related queries

Recommended features

☆ **Single-object timeline**

☆ **Metadata related to literature & events**

☆ **Metadata clustering**

☆ **Metadata in collapsible element**

☆ **Metadata in collapsed sidepanel**

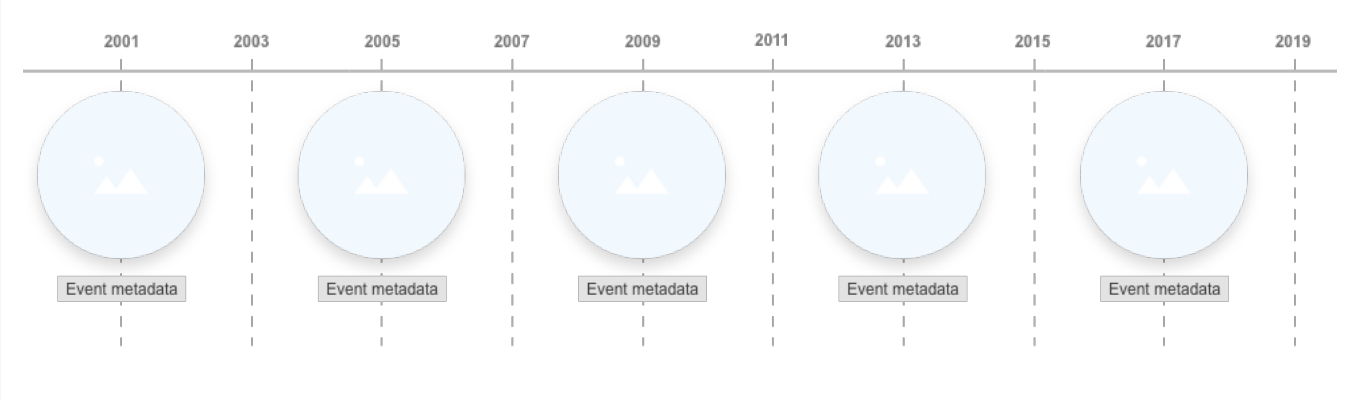
☆ **Metadata richness indicator**

☆ **Access statement**

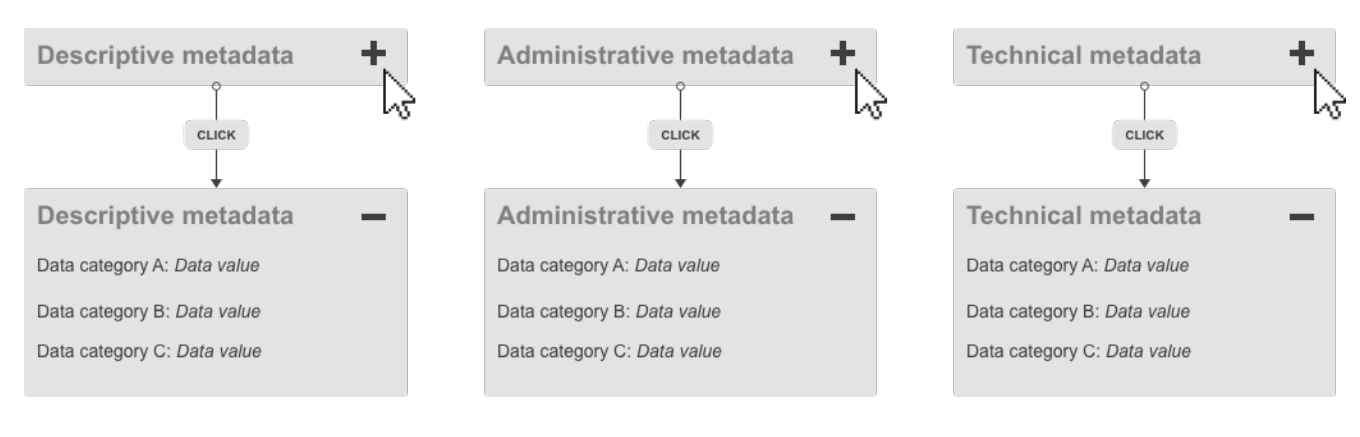
Features related to single record-level pages

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. 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 fo 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. 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' on not.

Wireframe mock-ups

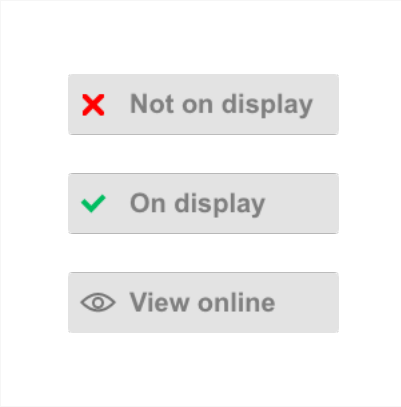


Single-object timeline



Metadata clustering / Metadata in collapsible element

Metadata richness indicator



Access statement

Recommended features

☆ **Emulated environments**

☆ **Rich context**

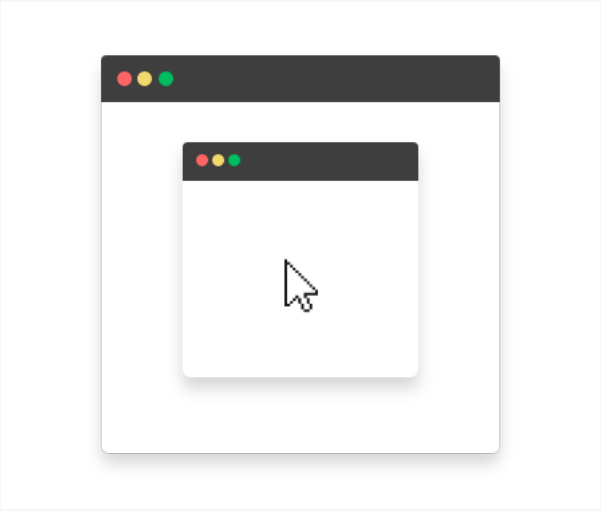
☆ **Overlay state for contextual information**

☆ **Browser frame included in previews**

Features related to net art presentation

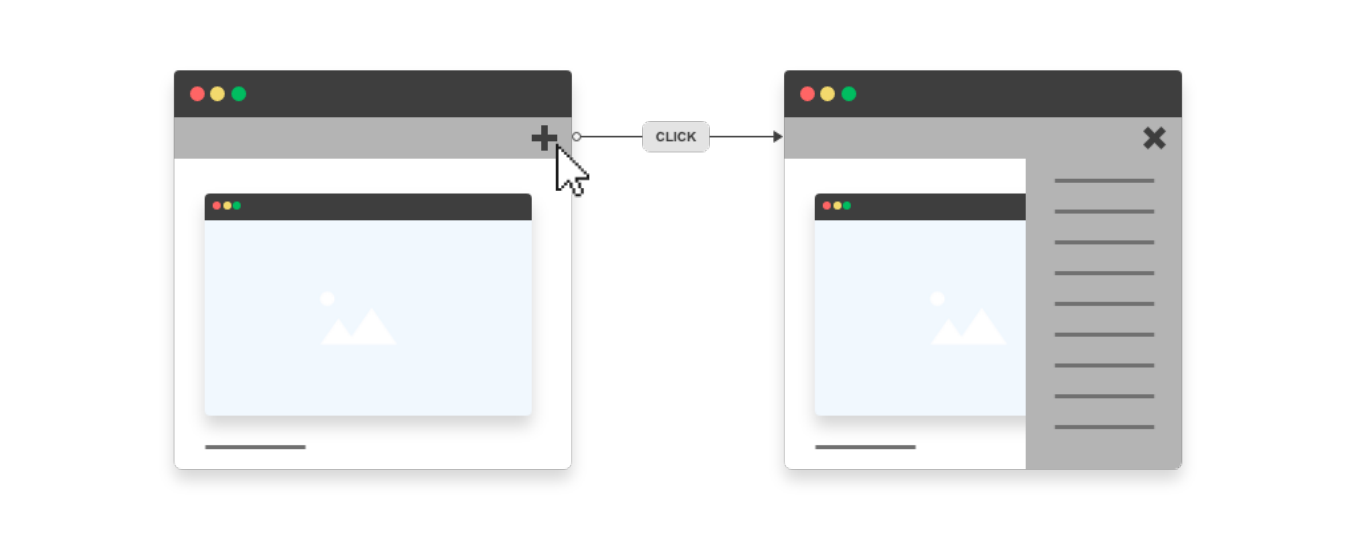
The ArtBase will not only be an archival repository for metadata, but also an archive which enables its users to access functional versions of the artworks. Therefore, its redesign must also be informed by interaction patterns relating to exhibiting net art online. The primary feedback in connection 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

Bibliography

Bates, M. J. (2007) What is browsing - Really? A model drawing from behavioural science research, *Information Research*, 12 (4), pp. 1–13.

Coburn, J. (2016) I don't know what I'm looking for: Better understanding public usage and behaviours with Tyne & Wear Archives & Museums online collections, in: Proceedings of MW2016: Museums and the Web 2016, Los Angeles, CA, USA, April 6–9, 2016.

Dijkshoorn, C., Jongma, L., Aroyo, L., Ossenbruggen, J. Van and Schreiber, G. (2018) The Rijksmuseum Collection as Linked Data, *Semantic Web – Interoperability, Usability, Applicability*, 9 (2), pp. 221–230.

Dörk, M., Carpendale, S. and Williamson, C. (2011) The Information Flaneur : A Fresh Look at Information Seeking, in: Proceedings of CHI 2011, Vancouver, BC, Canada, May 7–12, 2011.

Dörk, M., Pietsch, C. and Credico, G. (2017) One view is not enough, *Information Design Journal*, 23 (1), pp. 39–47. DOI:10.1075/idj.23.1.06dor.

Drucker, J. (2013) Performative Materiality and Theoretical Approaches to Interface, *Digital Humanities Quarterly*, 7 (1). Available from: http://www.digitalhumanities.org/dhq/vol/7/1/000143/000143.html [Accessed 1 Dec 2018]

Glinka, K., Pietsch, C. and Dörk, M. (2017) Past Visions and Reconciling Views : Visualizing Time , Texture and Themes in Cultural Collections, *Digital Humanities Quarterly*, 11 (2).

Greene, S., Marchionini, G., Plaisant, C. and Shneiderman, B. (2000) Previews and overviews in digital libraries: Designing surrogates to support visual information seeking, *Journal of the American Society for Information Science and Technology*, 51 (4), pp. 380–393.

Hibberd, G. (2016) Metaphors for discovery : how interfaces shape our relationship with library collections, in: Proceedings of Digital Humanities Australasia 2014, Perth, Australia, March 18-21, 2014.

Hill, T., Charles, V., Stiller, J. and Isaac, A. (2016) Searching for Inspiration: User Needs and Search Architecture in Europeana Collections, in: Proceeings of ASIST 2016, Copenhagen, Denmark, October 14-18, 2016.

Hinchcliffe, G. and Whitelaw, M. (2015) Colouring digital collections: Challenges and opportunities for the use of colour metadata in cultural collections, in: Proceedings of MWA2015: Museums and the Web Asia 2015, Melbourne, Australia, October 5-8, 2015.

Hogarty, S. B., Winesmith, K., Hrudka, M. and Schechter, B. (2015) Art + Data: Building the SFMOMA Collection API, in: Proceedings of MW2015: Museums and the Web 2015, Chicago, IL, USA, April 8-11, 2015.

Kräutli, F. (2016) Visualising Cultural Data: Exploring Digital Collections Through Timeline Visualisations. PhD Thesis, Royal College of Art.

Kreiseler, S., Brüggemann, V. and Dörk, M. (2017) Tracing exploratory modes in digital collections of museum Web sites using reverse information architecture, *First Monday*, 22 (4). Available from: https://firstmonday.org/ojs/index.php/fm/article/view/6984 [Accessed 1 Dec 2018]

Oates, G. and Whitelaw, M. (2018) Making and Remaking Collections Online, Open Library of Humanities, 4 (1), pp. 1–22. DOI:https://doi.org/10.16995/olh.325 [Accessed 1 Dec 2018]

Ruecker, S., Radzikowska, M. and Sinclair, S. (2011) *Visual interface design for digital cultural heritage: A guide to richprospect browsing*. Farnham, Surrey, England: Ashgate.

Sherratt, T. (2015) Seams and edges: Dreams of aggregation, access & discovery in a broken world, in: Proceedings of ALIA Online 2015, Sydney, Australia, February 3, 2015.

Stack, J. (2018) Exploring museum collections online: Some background reading, Science Museum Group Digital Lab. Available from: https://lab.sciencemuseum.org.uk/exploring-museum-collections-online-some-background-reading-da5a332fa2f8 [Accessed 1 Dec 2018]

Thornton, K., Cochrane, E., Ledoux, T., Caron, B. and Wilson, C. (2017) Modeling the Domain of Digital Preservation in Wikidata, in: Proceedings of iPRES'17, Kyoto, Japan, September 25–29, 2017.

Thornton, K., Seals-nutt, K., Cochrane, E. and Wilson, C. (2018) Wikidata for Digital Preservation, in: Proceedings of iPRES'18, Cambridge, MA, USA, September 24–27, 2018.

Vane, O. (2017) Exploring the Cooper Hewitt collection with timelines and tags, Cooper Hewitt Labs. Available from: https://labs.cooperhewitt.org/2017/exploring-the-cooper-hewitt-collection-with-timelines-and-tags-guest-post-by-olivia-vane/ [Accessed 1 Dec 2018]

Vane, O. (2018) Visualising the Royal Photographic Society collection, V&A Blog. Available from: https://www.vam.ac.uk/blog/digital/visualising-the-royal-photographic-society-collection [Accessed 1 Dec 2018]

Whitelaw, M. (2015) Escaping the Search Box: Contexts and Precedents for Generous Interfaces, *Digital Humanities Quarterly*, 9 (1). Available from: http://www.digitalhumanities.org/dhq/vol/9/1/000205/000205.html [Accessed 1 Dec 2018]

Whitelaw, M. (2018) Mashups and Matters of Concern: Generative Approaches to Digital Collections, *Open Library of Humanities*, 4 (1), pp. 1–28. DOI:https://doi.org/10.16995/olh.291 [Accessed 1 Dec 2018]

Whitelaw, M. (2015) Representing Digital Collections, in: Carlin, D. and Vaughan, L. (eds.) *Performing Digital: Multiple Perspectives on a Living Archive*. Farnham, Surrey, England: Ashgate, pp. 77–96.

Windhager, F., Federico, P., Glinka, K., Marian, D., Miksch, S. and Mayr, E. (2018) Visualization of Cultural Heritage Collection Data : State of the Art and Future Challenges, *IEEE Transactions on Visualization and Computer Graphics*. DOI:10.1109/TVCG.2018.2830759.

Windhager, F., Federico, P., Mayr, E., Schreder, G. and Smuc, M. (2016) A Review of Information Visualization Approaches and Interfaces to Digital Cultural Heritage Collections, in: Proceedings of the 9th Forum Media Technology 2016, St. Pölten, Austria, November 24 2016. pp. 74–81.