Building a Library Knowledge Graph: Using Linked and Structured Data for Web-Scale Discovery of Library People, Resources, and Services

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Montana State University (MSU) Library

Dartmouth College Library
March 30, 2017

pinboard.in tag

pinboard.in/u:jasonclark/t:lod/

Overview

- What is a library knowledge graph?
- Discovery and Machine Definitions
- Linked, structured data
- Web-scale Cataloging
- Case Study: Linked Resources
- Questions

What happens to libraries and librarians when machines can read all the books?

Chris Bourg, Director of Libraries at MIT

https://chrisbourg.wordpress.com/2017/03/16/what-happens-to-libraries-and-librarians-when-machines-can-read-all-the-books/

What if we considered how to make this happen in our everyday work?

Can we create a Machine UX?

define library

Sign in 10

Web Images Videos Maps News

21,300,000 RESULTS Any time

li·brar·y

['lī,brerē, 'līb(ə)rē]

NOUN

a building or room containing collections of books, periodicals, and sometimes films and recorded music for people to read, borrow, or refer to:
"a school library" · [more]

- a collection of books and periodicals held in a library:
  "the Institute houses an outstanding library of 35,000 volumes on the fine arts"
- a collection of films, recorded music, genetic material, etc., organized systematically and kept for research or borrowing:
  "a record library"
- a series of books, recordings, etc., issued by the same company and similar in appearance.
- a room in a private house where books are kept.
- computing
  a collection of programs and software packages made generally available, often loaded and stored on disk for immediate use.

More translations and word origin

Library

A library is a collection of sources of information and similar resources, made accessible to a defined community for reference or borrowing. It provides physica… +

Wikipedia

People also search for

See all (10+)

Library of Alexandria

Archive

Museum

Paper

Data from: Wikipedia

Feedback

What is a library?

DBpedia Browse using Formats Faceted Browser Sparql Endpoint

About: Library

An Entity of Type : Area102735688, from Named Graph : http://dbpedia.org, within Data Space : dbpedia.org

A library is a collection of sources of information and similar resources, made accessible to a defined community for reference or borrowing. It provides physical or digital access to material, and may be a physical building or room, or a virtual space, or both. A library's collection can include books, periodicals, newspapers, manuscripts, films, maps, prints, documents, microform, CDs, cassettes, videotapes, DVDs, Blu-ray Discs, e-books, audiobooks, databases, and other formats. Libraries range in size from a few shelves of books to several million items. In Latin and Greek, the idea of bookcase is represented by Bibliotheca and Bibliothēkē (Greek: βιβλιοθήκη): derivatives of these mean library in many modern languages, e.g. French bibliothèque.

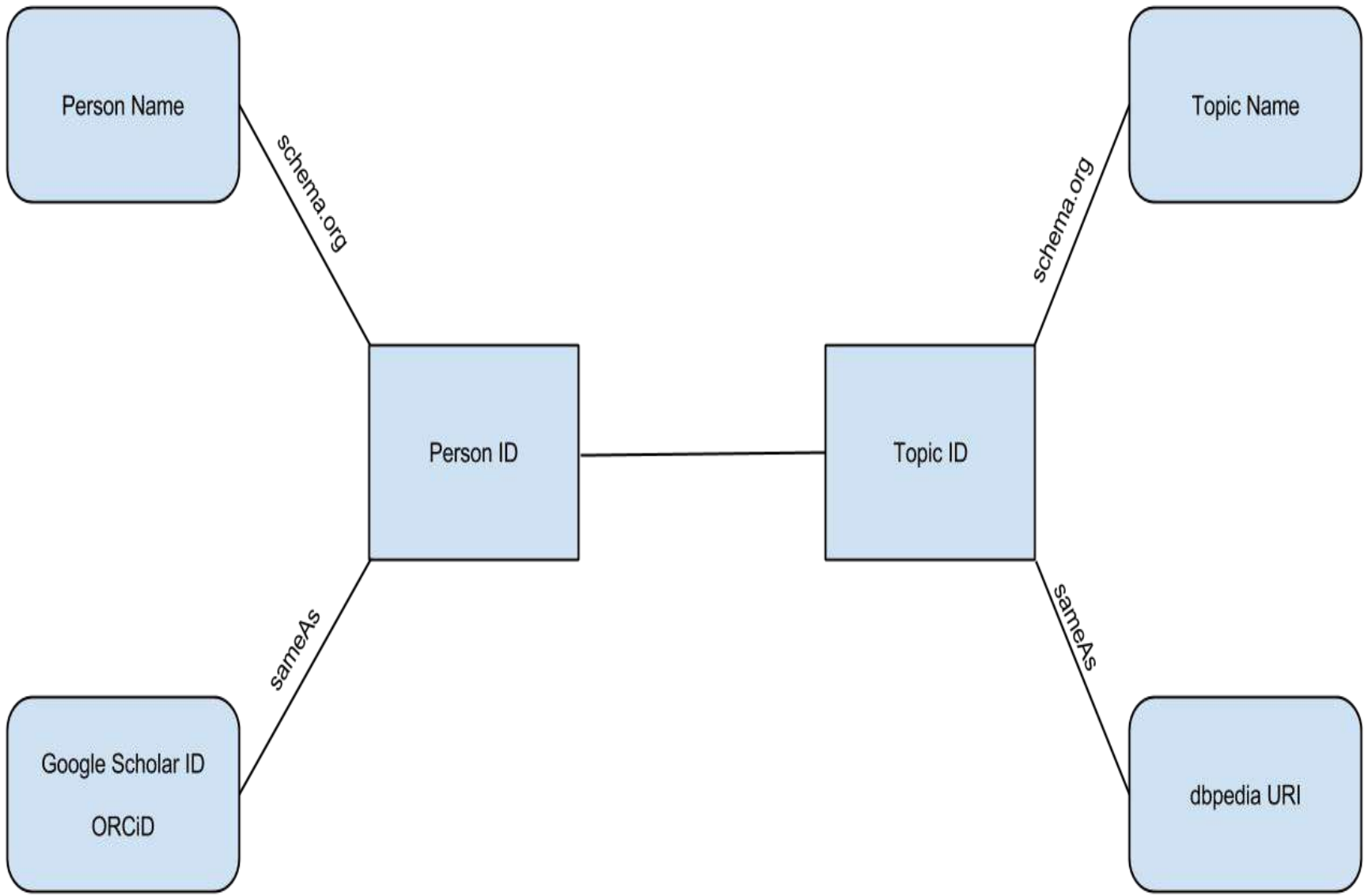
Property	Value
dbo:abstract	▪ A library is a collection of sources of information and similar resources, made accessible to a defined community for reference or borrowing. It provides physical or digital access to material, and may be a physical building or room, or a virtual space, or both. A library's collection can include books, periodicals, newspapers, manuscripts, films, maps, prints, documents, microform, CDs, cassettes, videotapes, DVDs, Blu-ray Discs, e-books, audiobooks, databases, and other formats. Libraries range in size from a few shelves of books to several million items. In Latin and Greek, the idea of bookcase is represented by Bibliotheca and Bibliothēkē (Greek: βιβλιοθήκη): derivatives of these mean library in many modern languages, e.g. French bibliothèque. The first libraries consisted of archives of the earliest form of writing—the clay tablets in cuneiform script discovered in Sumer, some dating back to 2600 BC. Private or personal libraries made up of written books

What is a library?

A Collection?

Or a network of sources, people, and services?

A Library Knowledge Graph


Person Name
schema.org
Person ID
Topic ID
schema.org
Topic Name
sameAs
Google Scholar ID
ORCiD
sameAs
dbpedia URI

An Expression of “Librariness”

The People

Dartmouth College Library

Search books, articles, library website ... Search More Options

Ask Us
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Email • Phone

Home
About
Research
Services
Help
A-Z Index of Library Site

Departments & Staff Directory

Search for Library staff by name, title, or department: Search

- Dean of Libraries
- Administration
- Departments
- Staff Directory
- Subject Librarians
- Organization Charts
- Committees and Working Groups

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Dartmouth College Library
Hanover, NH, USA 03755
Phone: (603) 646-2560
Library Departments

Send Feedback

The Resources

Dartmouth College Library Catalog

Borrow Direct | DartDoc
Browse for eJournals/eBooks | BrowZine
Research Guides
Browser widgets: LibX toolbar | search plugins

Dartmouth Digital Library Program
Finding Aids for Rauner Special Collections
New Acquisitions
Request a Purchase

Account Login: Dartmouth Faculty, Staff & Students | DHMC, Guest & Affiliated Borrowers

Keyword | Title | Author | Subject | Databases | Course Reserves

Browse Databases by Subject

Select a subject to view an annotated list of major article indexes and other sources (e.g., primary source & full-text collections, encyclopedias, image databases, datasets) in that discipline.

More Searches
- ISBN, Music Pub # & more
- Call #'s

Dartmouth Digital Collections
eBook Packages
Images
Newspapers and News
Reference (General)

African & African-American Studies
Anthropology
Art & Architecture
Asian Studies
Astronomy
Biology

Browse Databases By Name

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

Find a database by name

SUBMIT

The Services

Dartmouth College Library

Search books, articles, library website ... Search More Options

Ask Us
Chat • Text
Email • Phone

Home
About
Research
Services
Help
A-Z Index of Library Site

Services

- Circulation Services
- Printers, Copiers, & Scanners (Baker-Berry and Sherman Libraries) For information about printers, copiers, & scanners in other library locations, check each library's website.
- Media Services Help with multimedia equipment, training, software, and technical services.
- Off-Campus Access Configure your computer to access the Library's resources from anywhere in the world.
- Accessibility Services Library access for all members of the Dartmouth community.
- Workshops

Programs

- Records Management Providing consultation, guidance, policies, procedures, training, and storage solutions for the College's digital, microfilm and paper records.
- Scholarly Publishing & Communication Information about copyright, author rights, funding for open access publication, publishers' archiving policies, and publishers' contracts.

Library Spaces

- Book A Baker-Berry Group Study Room
  - Baker-Berry Study Spaces | All Library Study Spaces
- Reserving Space in the Libraries Instructional classrooms, scholar studies, and lockers are available.

Course Reserves

This network or graph can be expressed and encoded into our web site.

Discovery

Web-scale cataloging

SEO + Semantic Understanding

Google Search I'm Feeling Lucky

Google

dartmouth college library

dartmouth college **library**
dartmouth college **logo**
dartmouth college **law school**
dartmouth college **lacrosse**

Report offensive predictions

Sign in

Dartmouth College Library
https://library.dartmouth.edu/
The **Dartmouth College Library** fosters intellectual growth and advances the mission of Dartmouth College and affiliated communities by supporting excellence ...

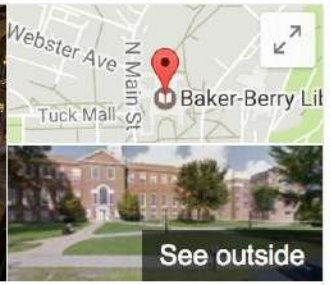
Libraries | Dartmouth College
dartmouth.edu/education/libraries
Dig deeper. The extensive print and digital collections of **Dartmouth's libraries** serve as vital extensions of the campus's teaching and research facilities.

Dartmouth Web Authentication - Dartmouth College
https://libcat.dartmouth.edu/
Need more help? Email help@**dartmouth**.edu or call 603-646-2999. Alumni should call 603-646-3202 for help. Where do I enter my password?close.

About the Libraries - Dartmouth College
www.dartmouth.edu/~library/home/about/
Jan 12, 2017 - **Dartmouth College Library** - decoration only; no semantic or contextual value ... the Library. Novack Café - Located in Berry Library, north end.

Research - Dartmouth College
https://www.dartmouth.edu/~library/home/research/
Feb 1, 2017 - **Dartmouth College Library** - decoration only; no semantic or ... Dartmouth Library Catalog - The Library's books, journals, media, maps, scores, ...

Library Catalogs - Dartmouth College
https://www.dartmouth.edu › Help



Dartmouth College Library

Website | Directions

4.3 ★★★★½ 3 Google reviews
Library in Hanover, New Hampshire

Address: 6025 College St, Hanover, NH 03755
Hours: Open today · 8AM–2AM
Phone: (603) 646-2560

Suggest an edit

Reviews

Write a review | Add a photo

3 Google reviews

Profiles

Dartmouth College Library

Search books, articles, library website ... Search More Options

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Email • Phone

ABOUT

Libraries & Collections
Initiatives & Innovations
Maps, Directions, & Parking
Hours
Departments & Staff
Employment
More...

RESEARCH

Library Catalog (i)
Summon (i)
Research Guides (i)
BorrowDirect (i) DartDoc (i)
Audiobooks | eBooks
Browzine (i) | eJournals (i)
Databases
More...

SERVICES

Baker-Berry Study Spaces |
All Study Spaces
Access Course Reserves
Printers, Copiers, & Scanners
Media Services
Workshops
More...

HELP

Ask Us & FAQ
Borrow & Request Materials
My Library Accounts
Subject Librarians
Cite & Manage Sources
RWIT (i)
More...

Library Blogs

- Staring at the Sun
  (Source: Rauner Special Collections Library)

Yet another snowy day in late March on campus has us casting our eyes in desperation to the sky in the vain hope of seeing a warm and welcoming sun. It also brings to mind another sun-worshipper who got his start gazing heavenward in Hanover. Charles Augustus Young, the best and

Library News

- Exhibit: Pierogi Press: A Work of Art
- Music March Madness in Paddock
  Which artist will reign supreme?
- Lecture: Building a Library Knowledge Graph
  Using Linked and Structured Data for Web-Scale Discovery of Library People, Resources, and Services

My Library Accounts
Today's Hours
Book a Group Study Room

INFORMATION FOR...

- Students
- Faculty & Staff
- Alumni & Visitors

"Search engines continue to dominate, topping the list of electronic sources most used to find online content (93%), followed closely by Wikipedia (88%). The key difference in usage between search engines and Wikipedia is the frequency - 75% of students who use search engines do so daily, compared to 20% of those who use Wikipedia."

Perceptions of Libraries, 2010: Context and Community: a Report to the OCLC Membership. OCLC, 2011.

http://www.oclc.org/content/dam/oclc/reports/2010perceptions/2010perceptions_all_singlepage.pdf
http://www.oclc.org/content/dam/oclc/reports/2010perceptions/collegestudents.pdf

the ONION
America's Finest News Source

Website's Built-In Search Engine Just Pathetic

NEWS IN BRIEF · Science & Technology · Internet · ISSUE 49·30 · Jul 22, 2013

CHICAGO—Following several unsuccessful attempts to find a specific article on a national media website, readers confirmed Monday that the built-in search engine found in the upper-right-hand corner of the online publication is nothing short of useless. "For example, I wanted to find a story they did recently about Michael Bay, and so I typed in his name, but the first results that came up were articles about NASA, Jim Harbaugh, and aliens," said longtime reader Courtney Dunning, who admitted to reporters she was surprised that a website with two decades of backlogged content would have such a poorly designed and ineffective method for accessing its archived material. "Searching for 'Michael Bay's new movie' didn't get me anywhere, either. In fact, even when I typed in the exact headline of the article, it told me no results could be found." As of press time, Dunning had reportedly abandoned the website's search bar, Googled what she was looking for, and found it on her first attempt.

As of press time, Dunning had reportedly abandoned the website's search bar, Googled what she was looking for, and found it on her first attempt.

A Library Knowledge Graph at Montana State University (MSU) Library

Nodes in the Graph

1. Linked Resources (Open SESMO)
2. Linked People
3. Linked Digital Collections
4. Linked Services (pilot)

Machine Definitions

Library Things as Semantic Entities

How are people, resources, and services understood?

Applying the concept of linked data for our local community

Finding a real-world use-case for graph modeling using open source tools

What if our people, resources, and services could be discovered and understood?

A Case Study

Open SESMO Linked Resources

Using Linked Data to Reshape the Library Database List

www.lib.montana.edu/resources

Dartmouth College Library Catalog

Borrow Direct | DartDoc
Browse for eJournals/eBooks | BrowZine
Research Guides
Browser widgets: LibX toolbar | search plugins

Dartmouth Digital Library Program
Finding Aids for Rauner Special Collections
New Acquisitions
Request a Purchase

Account Login: Dartmouth Faculty, Staff & Students | DHMC, Guest & Affiliated Borrowers

Keyword | Title | Author | Subject | Databases | Course Reserves

Browse Databases by Subject

Select a subject to view an annotated list of major article indexes and other sources (e.g., primary source & full-text collections, encyclopedias, image databases, datasets) in that discipline.

More Searches
- ISBN, Music Pub # & more
- Call #'s

Dartmouth Digital Collections
eBook Packages
Images
Newspapers and News
Reference (General)

African & African-American Studies
Anthropology
Art & Architecture
Asian Studies
Astronomy
Biology

Browse Databases By Name

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

Find a database by name

SUBMIT

Articles & Research Databases

About

By Subject

Browse databases & guides by subject

By Format

Browse databases by format

Sitemap

View database title list

Browse by title

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

Suggested Popular Recently Added

Good Starting Points

- Academic Search Complete ...
- CatSearch ...
- Google Scholar ...
- InfoTrac PowerSearch ...
- Web of Science ...

Search for databases

Search Engine Optimization

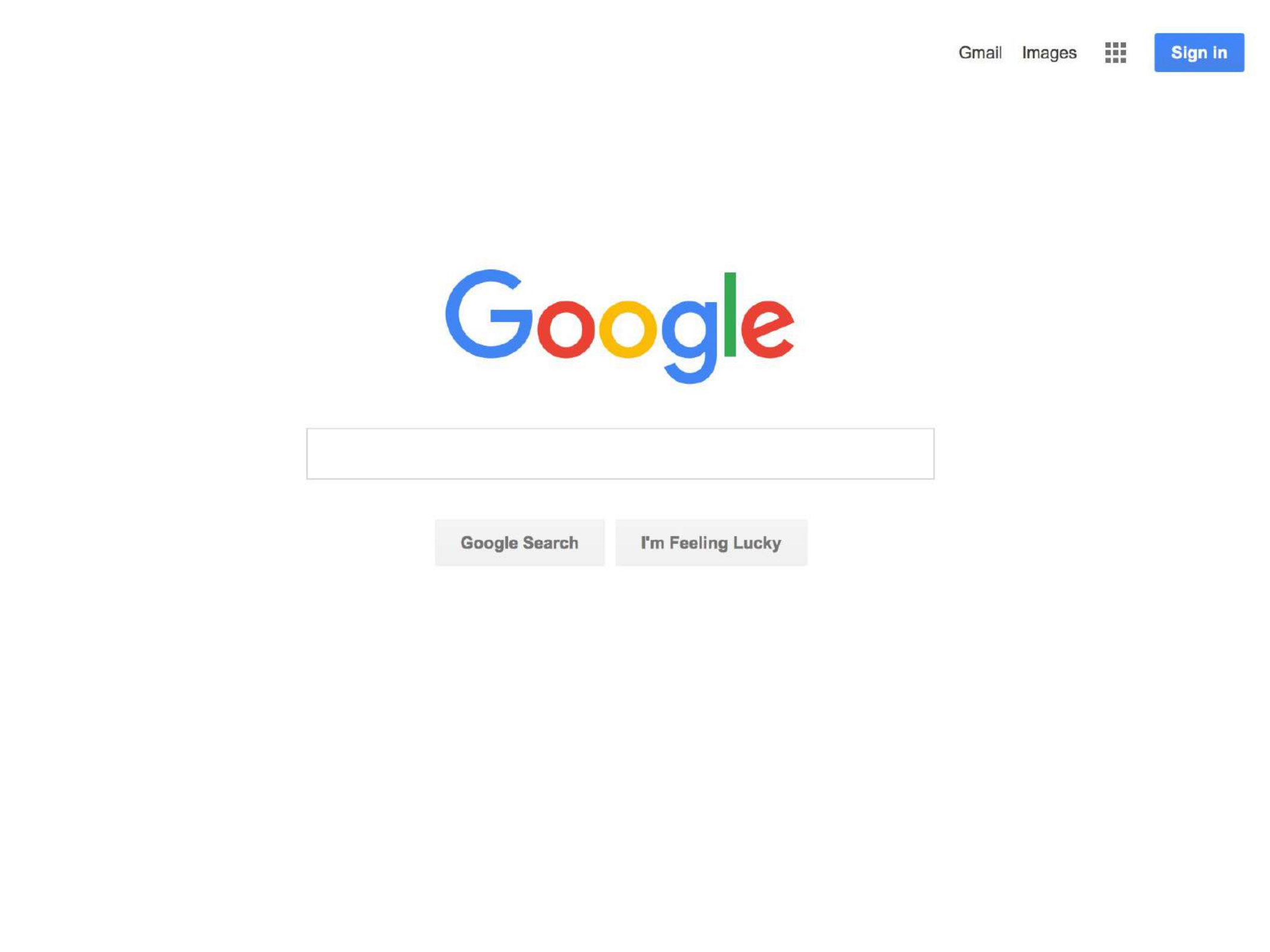
Social Media Optimization

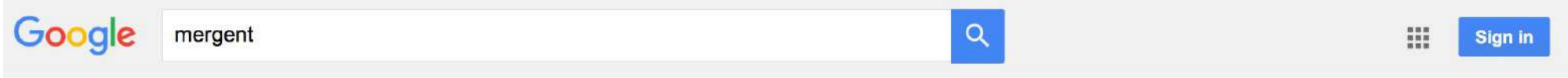
Linked, Structured Data

The Experiment

- Same collection
- Apply optimizations in stages
- Compare analytics over time
- Goal: increased traffic and more nuanced, semantic understanding of content by search engines

www.lib.montana.edu/resources


Gmail
Images
Sign in
Google
Google Search
I'm Feeling Lucky



All News Shopping Images Maps More Search tools

About 283,000 results (0.20 seconds)

Mergent - Creating Global Financial Solutions
www.**mergent**.com/
Mergent, Inc. is a leading provider of business and financial data on global publicly listed companies. Based in the U.S, the company maintains a strong global ...
Profile - Mergent Online - News Reports - Careers

Mergent Online
www.**mergent**online.com/
Mergent Online Content. U.S. Company Data. A fully searchable database with financials details of over 25,000 active and inactive companies ...
About Mergent Online - Forgot your Username/Password - Contact Us - Feedback

Mergent Online : Montana State University (MSU) Library
www.lib.montana.edu › Resources ▾ Montana State University Library ▾
★★★★½ 12,299 votes
Mergent Online provides access to company profiles and financial information with full text business profiles, quarterly and annual financials, EDGAR filings, and ...

Mergent Archives
www.**mergent**archives.com/
Welcome to **Mergent** Archives™. **Mergent** Archives is an online database providing you with access to a vast, indexed collection of corporate and industry ...

Mergent Intellect
www.**mergent**intellect.com/
Intellect. Username. Forgot your **Mergent** Intellect ID ? Password. © 2016 **Mergent**, Inc. All rights reserved. EEO/AA/M/F/Vets/Disabled Version 3.0.24.

mergent msu

Sign in

All News Maps Images Shopping More Search tools

Come here often? Make Google your homepage.

Yes, show me

About 3,180 results (0.59 seconds)

Mergent Online : Montana State University (MSU) Library

www.lib.montana.edu › Resources ▾ Montana State University Library ▾

★★★★½ 12,357 votes

Mergent Online provides access to company profiles and financial information with full text business profiles, quarterly and annual financials, EDGAR filings, and ...

Mergent Online - LibGuides at Michigan State University ...

libguides.lib.**msu**.edu/c.php?g...p... ▾ Michigan State University Libraries ▾

Dec 8, 2015 - To search the ~23 million private companies, select D&B Private Company Database. Now includes **Mergent** Horizon and **Mergent** Bond ...

About our Mergent Databases - Mergent Databases ...

libguides.lib.**msu**.edu/**mergent** ▾ Michigan State University Libraries ▾

Dec 8, 2015 - ... to main content. **Michigan State University** ... What are the **Mergent** Databases? **Mergent** Archives (previously WebReports). This resource is ...

Mergent Online - LibGuides at Michigan State University ...

libguides.lib.**msu**.edu/c.php?g=206616 Michigan State University Libraries ▾

Mar 22, 2016 - Notice to users of licensed database: "**MERGENT** ONLINE" Prohibition of commercial use, and guidelines for acceptable use. The **MSU** ...

Wait, what… how?

New Markup and Website Architecture

1. Codify the relationship between the pages using the isPartOf and Web Page entity types of CollectionPage, ItemPage, and AboutPage from Schema.org.

2. Establish each item page for a library database or resource as a Product entity using the Product type from Schema.org.

3. Encode subject and topic vocabularies into all relevant pages for humans and machines using the External Enumerations (https://www.w3.org/wiki/WebSchemas/ExternalEnumerations), an extension that allows for external vocabularies to be encoded and referenced in an HTML page.

4. Establish URL patterns, set identifiers, and set canonical URL patterns along with XML sitemap for indexing.

Optimized Pages

- Collection Page [home page]
  - www.lib.montana.edu/resources/
- About Pages [about page, topics page]
  - www.lib.montana.edu/resources/about.php
  - www.lib.montana.edu/resources/topics.php
- Item Pages [individual record page]
  - www.lib.montana.edu/resources/about/31
- Sitemap and rel=canonical work
  - www.lib.montana.edu/resources/sitemap.xml

Articles & Research Databases

About

By Subject

Browse databases & guides by subject

By Format

Browse databases by format

Sitemap

View database title list

Browse by title

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

Suggested Popular Recently Added

Good Starting Points

- Academic Search Complete ...
- CatSearch ...
- Google Scholar ...
- InfoTrac PowerSearch ...
- Web of Science ...

Search for databases

CollectionPage

```
<link rel="canonical" href="http://www.lib.montana.edu/resources/" />

<body id="collection" class="fullWidth" typeof="CollectionPage" resource="http://www.lib.montana.edu/resources/#collection">
```

https://schema.org/CollectionPage, http://schema.org/AboutPage, https://schema.org/ItemPage

About: Library Articles and Research Databases Collection

The Montana State University (MSU) Library Articles and Research Database collection contains over 240 databases which include over 100,000 magazines, periodicals, serials and journals and more than 250,000 e-books. Additional materials include peer-reviewed articles, sound recordings, film and video recordings, newspapers, business and industry information, maps, data, tutorials, and book reviews. These resources cover subjects such as agriculture, architecture, art, biography, genealogy, biology, books, reading, business, chemical engineering, biological engineering, chemistry, biochemistry, children's literature, civil engineering, computer science, earth sciences, ecology, English, environmental science, film, photography, government information, health, human development, history, and law. Other topics found include math, statistics, mechanical engineering, industrial engineering, modern languages, music, Native American studies, nursing, medicine, philosophy, physics, political science, psychology, religious studies, sociology, criminal justice, women's studies, gender studies, sexuality studies, writing, composition, reference, and multidisciplinary areas.

These resources are made available to the faculty, staff, graduate students, and undergraduate students of Montana State University and Gallatin College. Additionally, individuals from the Bozeman area community may walk-in to the Renne Library to use these resources inside the library building.

MSU Library provides access to these resources in support of the teaching and research of its Gallatin County community. These items are made accessible on campus and anywhere with an Internet connection, whether from a dorm room, a coffee shop, a cell phone, or a wireless connection. These resource subscriptions are funded by Montana State University Library in support of the University's mission.

AboutPage

```
<body id="what" class="fullWidth" typeof="AboutPage" resource="http://www.lib.montana.edu/resources/what.php#what">
<meta property="isPartOf" typeof="CollectionPage" resource="http://www.lib.montana.edu/resources/"
content="http://www.lib.montana.edu/resources/" />
```

https://schema.org/CollectionPage, http://schema.org/AboutPage, https://schema.org/ItemPage

Mergent Online

What is it? Mergent Online provides access to company profiles and financial information with full text business profiles, quarterly and annual financials, EDGAR filings, and recent press releases and news wire reports. Updated daily.

Liaison(s):

Greg Notess

Linked Data Topics:

Accounting
Business

Related Databases:

Vault Career Library
Business Source Complete
EconLit
IBISWorld Industry Research Reports
LexisNexis Academic

Total interactions: 12330

Rank: 18 out of 248 (based on 12330 out of 1323353 total interactions with all of our databases)

ItemPage

```
<body id="item" class="fullWidth" typeof="ItemPage" resource="http://www.lib.montana.edu/resources/about/116#item">
<meta property="name" content="Mergent Online" />
<meta property="thumbnailUrl" content="http://www.lib.montana.edu/resources/meta/img/screenshots/thumb-116.jpg" />
<meta property="isPartOf" typeof="CollectionPage" resource="http://www.lib.montana.edu/resources/"
content="http://www.lib.montana.edu/resources/" />
```

https://schema.org/CollectionPage, http://schema.org/AboutPage, https://schema.org/ItemPage

ItemPage -> Product

```
<main id="product" typeof="Product" property="mainEntity" resource="https://www.lib.montana.edu/resources/about/238#product">
<h2 class="mainHeading" property="name">Web of Science</h2>
<img alt="Web of Science screenshot" property="image" src="/resources/meta/img/screenshots/thumb-238.jpg" />
```

https://www.lib.montana.edu/resources/about/238

Product

Thing > Product

Any offered product or service. For example: a pair of shoes; a concert ticket; the rental of a car; a haircut; or an episode of a TV show streamed online.

Usage: Over 1,000,000 domains

[more...]

Property	Expected Type	Description
Properties from Product		
additionalProperty	PropertyValue	A property-value pair representing an additional characteristics of the entitity, e.g. a product feature or another characteristic for which there is no matching property in schema.org. Note: Publishers should be aware that applications designed to use specific schema.org properties (e.g. http://schema.org/width, http://schema.org/color, http://schema.org/gtin13, ...) will typically expect such data to be provided using those properties, rather than using the generic property/value mechanism.
aggregateRating	AggregateRating	The overall rating, based on a collection of reviews or ratings, of the item.
audience	Audience	An intended audience, i.e. a group for whom something was created. Supersedes serviceAudience.
award	Text	An award won by or for this item. Supersedes awards.
brand	Brand or Organization	The brand(s) associated with a product or service, or the brand(s) maintained by an organization or business person.

External Enumerations

"We define here some specific integration points through which selected externally maintained vocabulary can be published as part of schema.org markup"

www.w3.org/wiki/WebSchemas/ExternalEnumerations

WIKIPEDIA
The Free Encyclopedia

Main page
Contents
Featured content
Current events
Random article
Donate to Wikipedia
Wikipedia store

Interaction
Help
About Wikipedia
Community portal
Recent changes
Contact page

Tools
What links here
Related changes
Upload file
Special pages
Permanent link
Page information
Wikidata item
Cite this page

Print/export
Create a book

Controlled vocabulary

From Wikipedia, the free encyclopedia

This article **needs additional citations for verification.** Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. *(June 2012)*

Controlled vocabularies provide a way to organize knowledge for subsequent retrieval. They are used in subject indexing schemes, subject headings, thesauri, taxonomies and other forms of knowledge organization systems. Controlled vocabulary schemes mandate the use of predefined, authorised terms that have been preselected by the designer of the vocabulary, in contrast to natural language vocabularies, where there is no restriction on the vocabulary.

Contents [hide]

1 In library and information science
2 Indexing languages
3 Applications
4 See also
5 References
6 External links

In library and information science [edit]

In library and information science controlled vocabulary is a carefully selected list of words and phrases, which are used to tag units of information (document or work) so that they may be more easily retrieved by a search.[1][2] Controlled vocabularies solve the problems of homographs, synonyms and polysemes by a bijection between concepts and authorized terms. In short, controlled vocabularies reduce ambiguity inherent in normal human languages where the same concept can be given different names and ensure consistency.

Wikipedia (DBpedia) as a Controlled Vocabulary

VIAF
Virtual International Authority File

Search

Select Field: Personal Names | Select Index: All VIAF | Search Terms: jason a clark | Search

2 headings found for *jason a clark*

	Heading	Type	Sample Title
1	Clark, Jason A.	Personal	Building mobile library applications
2	Clark, Jason A., 1975-	Personal	Florence

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Hosted by OCLC
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Send Us a Comment.
About VIAF

ORCID

Connecting Research and Researchers

FOR RESEARCHERS | FOR ORGANIZATIONS | ABOUT

SIGN IN | REGISTER FOR AN ORCID ID | LEARN MORE

Jason A. Clark

http://orcid.org/0000-0002-3588-6257

Country: United States

Keywords: machine learning - information architecture

Websites:

http://www.jasonclark.info

https://github.com/jasonclark

Personal Information

Biography

Associate Professor, Montana State University

Works

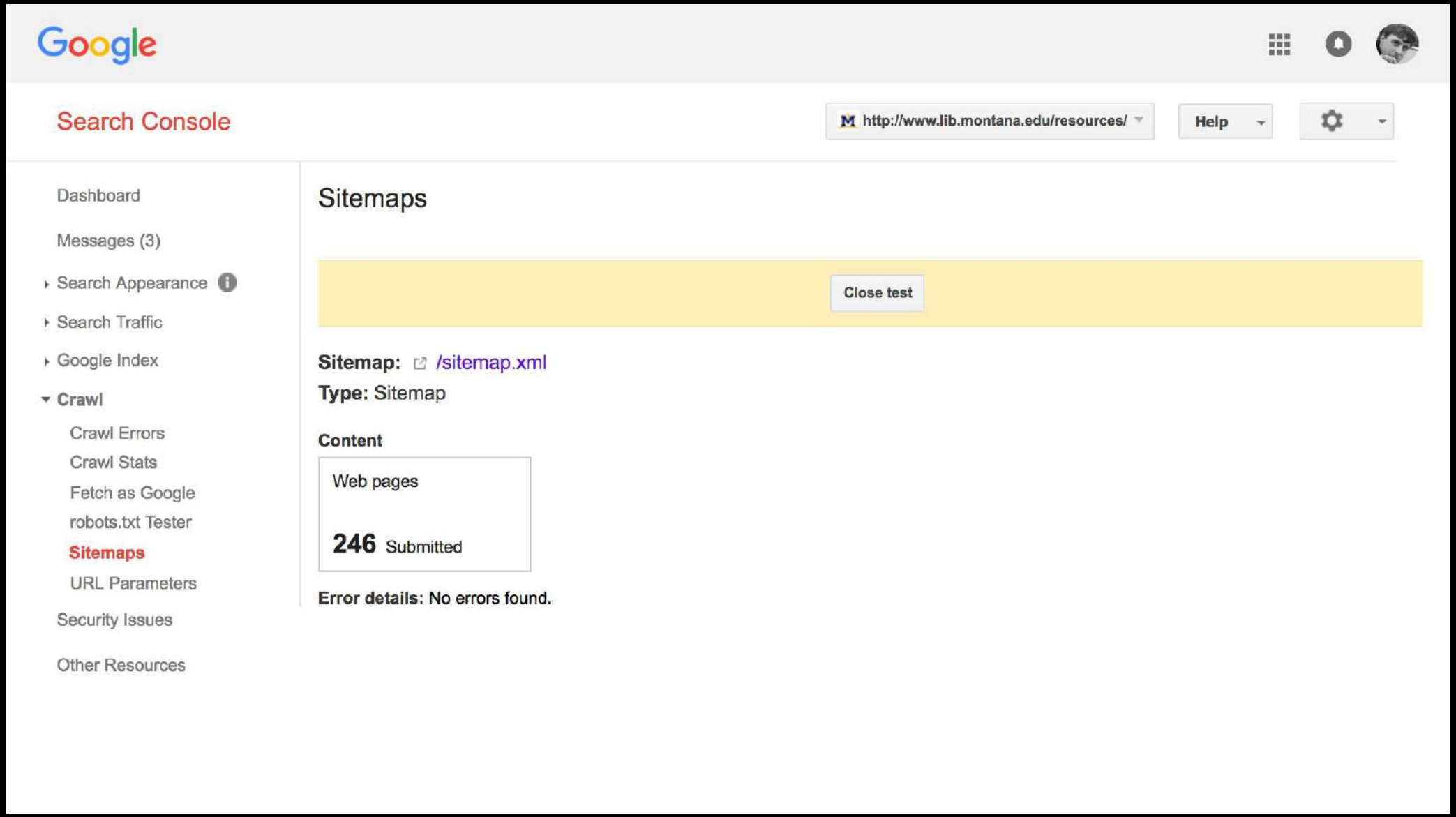
Building Mobile Library Applications (THE TECH Set #12), by Jason A. Clark: Chicago, IL: ALA TechSource, 2012. 114p. ISBN: 978-1-55570-783-5. $59.95. 2013-04

additionalTypes, category

```
<dd property="additionalType" resource="http://dbpedia.org/resource/Accounting"><a
property="additionalType" href="https://en.wikipedia.org/wiki/Accounting"><span
property="category">Accounting</span></a></dd>
<dd property="additionalType" resource="http://dbpedia.org/resource/Business"><a
property="additionalType" href="https://en.wikipedia.org/wiki/Business"><span
property="category">Business</span></a></dd>
```

https://schema.org/additionalType, http://schema.org/specialty

Technical SEO:
Sitemap and rel=canonical



Sitemap - https://www.lib.montana.edu/resources/sitemap.xml

Establish Preferred URL for Indexing

```
<link rel="canonical"
href="https://www.lib.montana.edu/resources/about/116" />
```

Further reading:
Using Canonical URLS
https://support.google.com/webmasters/answer/139066

Social Media Optimization

Twitter Card and Facebook Open Graph Tagging

```
<!--Begin social media tags and metadata-->
<meta name="twitter:title" content="Art Abstracts">
<meta name="twitter:description" content="Art Abstracts - Montana State University
(MSU) Library">
<meta name="twitter:image:src"
content="http://www.lib.montana.edu/resources/meta/img/screenshots/14.jpg">
<meta name="twitter:url" content="http://www.lib.montana.edu/resources/about/14">
<meta name="twitter:card" content="summary_large_image">
<meta name="twitter:site" content="@msulibrary">
<meta name="twitter:creator" content="@msulibrary">
<meta property="og:title" content="Art Abstracts">
<meta property="og:description" content="Art Abstracts - Montana State University
(MSU) Library">
<meta property="og:image"
content="http://www.lib.montana.edu/resources/meta/img/screenshots/14.jpg">
<meta property="og:url" content="http://www.lib.montana.edu/resources/about/14">
<meta property="og:type" content="website" />
<meta property="og:site_name" content="Art Abstracts - Montana State University
(MSU) Library"/>
<!-- End social media tags and metadata -->
```

Results

Semantic Understandings

Dashboard

Messages

Search Appearance

Structured Data

Data Highlighter

HTML Improvements

Sitelinks

Accelerated Mobile Pages

Search Traffic

Google Index

Crawl

Security Issues

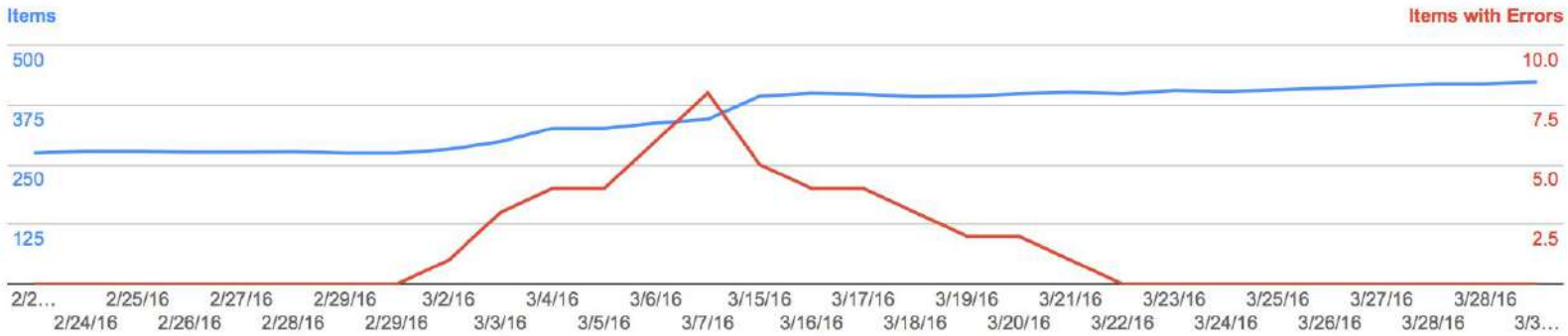
Other Resources

Structured Data

Status: 3/30/16

423 Items
on 147 pages

0 Items with Errors
on 0 pages



Download

Show 25 rows 1-6 of 6

Data Type	Source	Pages	Items	Items with Errors
WebPage	Markup: schema.org	147	147	–
ItemPage	Markup: schema.org	146	146	–
Person	Markup: schema.org	129	129	–
CollectionPage	Markup: schema.org	1	1	–
Product	Markup: schema.org	0	0	–
AboutPage	Markup: schema.org	0	0	–

1-6 of 6

Dashboard

Messages (3)

Search Appearance

Structured Data

Rich Cards

Data Highlighter

HTML Improvements

Accelerated Mobile Pages

Search Traffic

Google Index

Crawl

Security Issues

Other Resources

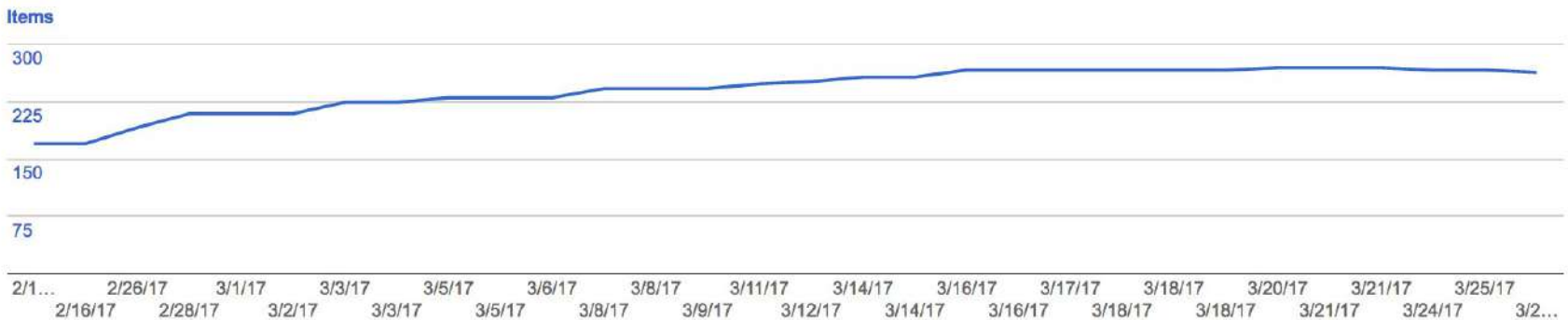
Jan-22: Search Console performed an infrastructure update that may cause a change in your data. Learn more about Search Console data anomalies.

Structured Data

Status: 3/27/17

263 Items
on 88 pages

0 Items with Errors
on 0 pages



Download

Show 25 rows 1-4 of 4

Data Type	Source	Pages	Items	Items with Errors
WebPage	Markup: schema.org	88	88	–
Person	Markup: schema.org	87	87	–
ItemPage	Markup: schema.org	87	87	–
CollectionPage	Markup: schema.org	1	1	–

1-4 of 4

Database Recommendations

Mergent Online

What is it? Mergent Online provides access to company profiles and financial information with full text business profiles, quarterly and annual financials, EDGAR filings, and recent press releases and news wire reports. Updated daily.

Liaison(s):

Greg Notess

Linked Data Topics:

Accounting
Business

Related Databases:

Vault Career Library
Business Source Complete
EconLit
IBISWorld Industry Research Reports
LexisNexis Academic

Total interactions: 12330

Rank: 18 out of 248 (based on 12330 out of 1323353 total interactions with all of our databases)

Search Engine Result Pages

Mergent Online

What is it? Mergent Online provides access to company profiles and financial information with full text business profiles, quarterly and annual financials, EDGAR filings, and recent press releases and news wire reports. Updated daily.

Liaison(s):

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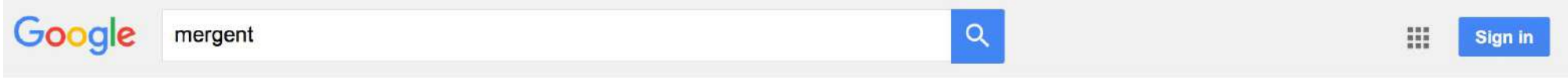


All News Shopping Images Maps More Search tools

About 283,000 results (0.20 seconds)

Mergent - Creating Global Financial Solutions
www.**mergent**.com/
Mergent, Inc. is a leading provider of business and financial data on global publicly listed companies. Based in the U.S, the company maintains a strong global ...
Profile - Mergent Online - News Reports - Careers

Mergent Online
www.**mergent**online.com/
Mergent Online Content. U.S. Company Data. A fully searchable database with financials details of over 25,000 active and inactive companies ...
About Mergent Online - Forgot your Username/Password - Contact Us - Feedback

Mergent Online : Montana State University (MSU) Library
www.lib.montana.edu › Resources ▾ Montana State University Library ▾
★★★★½ 12,299 votes
Mergent Online provides access to company profiles and financial information with full text business profiles, quarterly and annual financials, EDGAR filings, and ...

Mergent Archives
www.**mergent**archives.com/
Welcome to **Mergent** Archives™. **Mergent** Archives is an online database providing you with access to a vast, indexed collection of corporate and industry ...

Mergent Intellect
www.**mergent**intellect.com/
Intellect. Username. Forgot your **Mergent** Intellect ID ? Password. © 2016 **Mergent**, Inc. All rights reserved. EEO/AA/M/F/Vets/Disabled Version 3.0.24.

MSU Library
@msulibrary

Looking for high-quality art images? ArtStor includes architecture, painting, sculpture, photography, design, & more
lib.montana.edu/resources/abou…

MSU Library
@msulibrary

Looking for high-quality art images? ArtStor includes architecture, painting, sculpture, photography, design, & more
lib.montana.edu/resources/abou…

ARTstor
ARTstor - Montana State University (MSU) Library
lib.montana.edu

RETWEETS 3 LIKE 1

2:20 PM - 15 Oct 2015

Social Media Analytics

MSU Library
@msulibrary

Looking for high-quality art images? ArtStor includes architecture, painting, sculpture, photography, design, & more
lib.montana.edu/resources/abou…

ARTstor
ARTstor - Montana State University (MSU) Library
lib.montana.edu

RETWEETS 3 LIKE 1

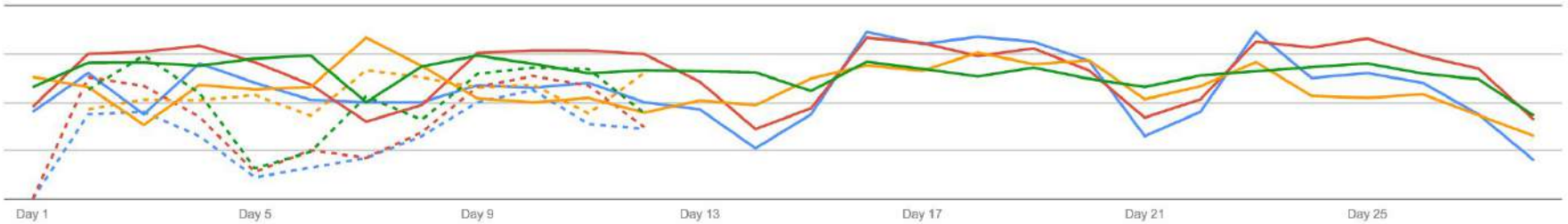
2:20 PM - 15 Oct 2015

Impressions	1,715
Total engagements	11
Link clicks	4
Retweets	3
Detail expands	2
Likes	1
Profile clicks	1

Organic Search Statistics

Queries No filter | **Pages** No filter | Countries No filter | Devices No filter | Search Type **Web** | Dates **Comparison**

Total clicks		**Total impressions**		**Avg. CTR**		**Avg. position**	
1,276	307	55,292	14,273	2.31%	2.15%	6.8	8.6
Sep 13 - Oct 10	Aug 16 - Sep 12	Sep 13 - Oct 10	Aug 16 - Sep 12	Sep 13 - Oct 10	Aug 16 - Sep 12	Sep 13 - Oct 10	Aug 16 - Sep 12



	Pages	Sep 13 - Oct 10 Clicks▼	Aug 16 - Sep 12 Clicks	Sep 13 - Oct 10 Impressions	Aug 16 - Sep 12 Impressions	Sep 13 - Oct 10 CTR	Aug 16 - Sep 12 CTR	Sep 13 - Oct 10 Position	Aug 16 - Sep 12 Position
1	/about/120	352	28	10,538	862	3.34%	3.25%	4.8	5.4
2	/about/315	317	42	25,407	3,747	1.25%	1.12%	3.0	3.2
3	/	312	85	9,676	2,978	3.22%	2.85%	3.0	3.3
4	/about/102	27	3	209	18	12.92%	16.67%	3.7	2.7
5	/about/156	27	5	471	84	5.73%	5.95%	9.5	7.7
6	/about/214	16	3	193	47	8.29%	6.38%	4.5	10.5
7	/about/107	15	0	180	24	8.33%	0%	30.8	9.5

Initial snapshot

August 16, 2015 to September 12, 2015
versus
September 13, 2015 to October 10, 2015

13,881 total impressions to 54,172 total impressions

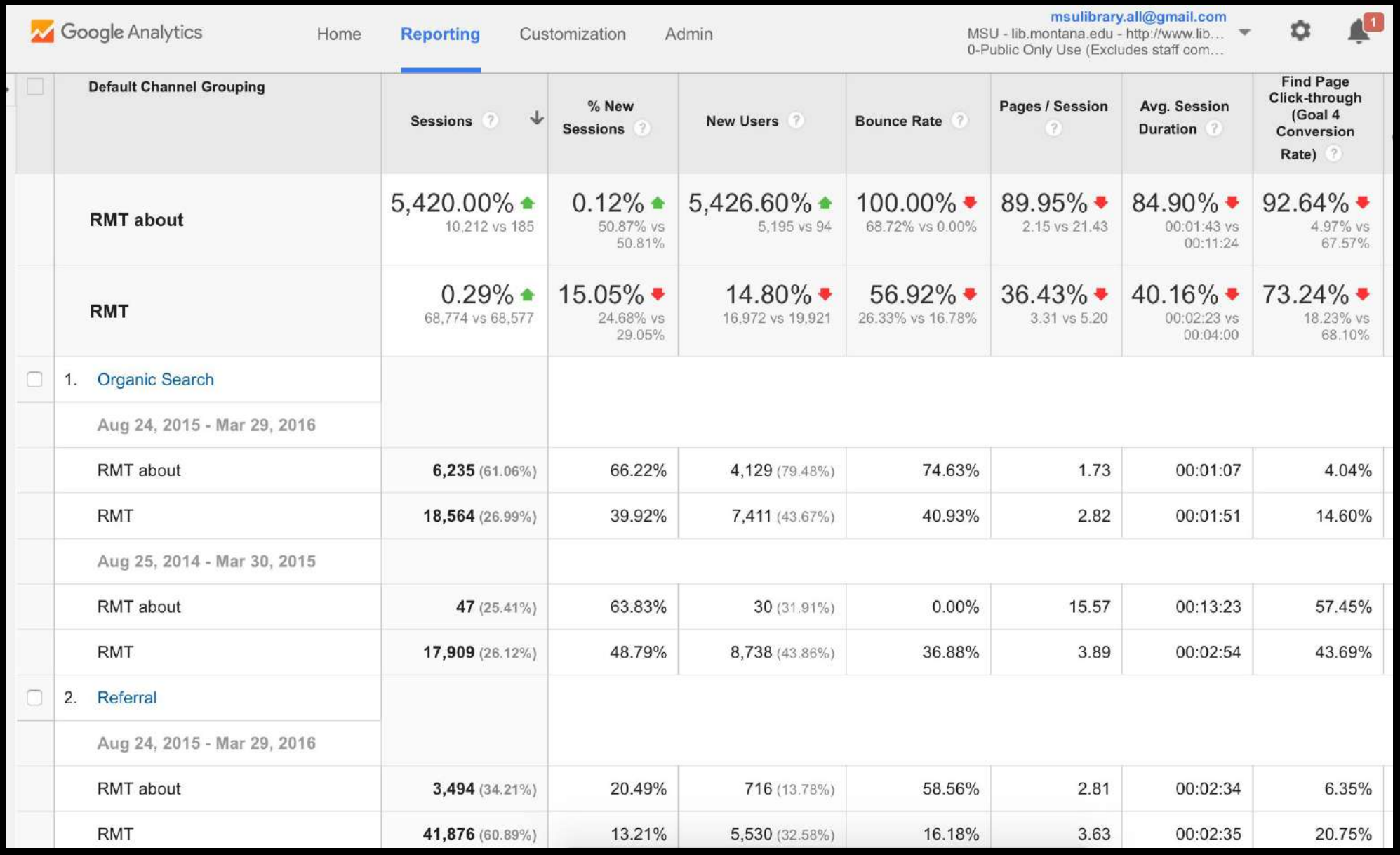
“Clickthrough Rates” and “Search Position” show growth

User Growth

August 22, 2014 to November 4, 2016

Total users (audience - overview)

2014 - 11,833
2015 - 13,128
2016 - 24,657



Default Channel Grouping	Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration	Find Page Click-through (Goal 4 Conversion Rate)
RMT about	5,420.00% ▲ 10,212 vs 185	0.12% ▲ 50.87% vs 50.81%	5,426.60% ▲ 5,195 vs 94	100.00% ▼ 68.72% vs 0.00%	89.95% ▼ 2.15 vs 21.43	84.90% ▼ 00:01:43 vs 00:11:24	92.64% ▼ 4.97% vs 67.57%
RMT	0.29% ▲ 68,774 vs 68,577	15.05% ▼ 24.68% vs 29.05%	14.80% ▼ 16,972 vs 19,921	56.92% ▼ 26.33% vs 16.78%	36.43% ▼ 3.31 vs 5.20	40.16% ▼ 00:02:23 vs 00:04:00	73.24% ▼ 18.23% vs 68.10%
1. Organic Search							
Aug 24, 2015 - Mar 29, 2016							
RMT about	**6,235** (61.06%)	66.22%	4,129 (79.48%)	74.63%	1.73	00:01:07	4.04%
RMT	**18,564** (26.99%)	39.92%	7,411 (43.67%)	40.93%	2.82	00:01:51	14.60%
Aug 25, 2014 - Mar 30, 2015							
RMT about	**47** (25.41%)	63.83%	30 (31.91%)	0.00%	15.57	00:13:23	57.45%
RMT	**17,909** (26.12%)	48.79%	8,738 (43.86%)	36.88%	3.89	00:02:54	43.69%
2. Referral							
Aug 24, 2015 - Mar 29, 2016							
RMT about	**3,494** (34.21%)	20.49%	716 (13.78%)	58.56%	2.81	00:02:34	6.35%
RMT	**41,876** (60.89%)	13.21%	5,530 (32.58%)	16.18%	3.63	00:02:35	20.75%

Organic Search Growth

August 22, 2015 to March 29, 2016

Search/Referrals for all resource pages
(acquisition - source/medium)

68,742 sessions
to
78,986 sessions

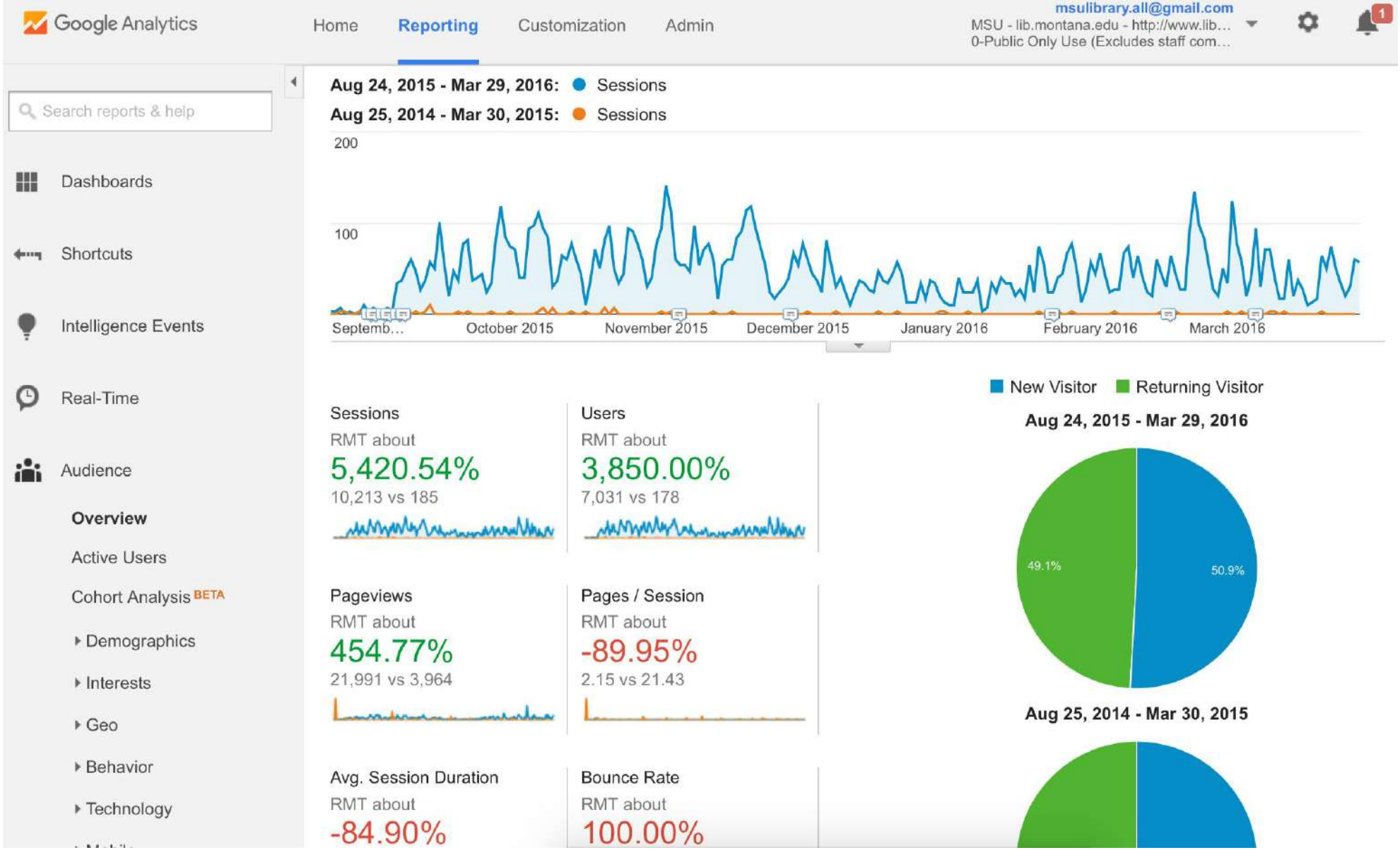
Organic Search Growth

August 22, 2014 to November 4, 2016

Search/Referrals for about/item pages
(acquisition - source/medium)

2014 - 94
2015 - 3,659
2016 - 3,580

Overall Page Metrics


Google Analytics
Home
Reporting
Customization
Admin
msulibrary.all@gmail.com
MSU - lib.montana.edu - http://www.lib...
0-Public Only Use (Excludes staff com...
Search reports & help
Dashboards
Shortcuts
Intelligence Events
Real-Time
Audience
Overview
Active Users
Cohort Analysis BETA
Demographics
Interests
Geo
Behavior
Technology
Aug 24, 2015 - Mar 29, 2016: Sessions
Aug 25, 2014 - Mar 30, 2015: Sessions
200
100
Septemb...
October 2015
November 2015
December 2015
January 2016
February 2016
March 2016
Sessions
RMT about
5,420.54%
10,213 vs 185
Users
RMT about
3,850.00%
7,031 vs 178
Pageviews
RMT about
454.77%
21,991 vs 3,964
Pages / Session
RMT about
-89.95%
2.15 vs 21.43
Avg. Session Duration
RMT about
-84.90%
Bounce Rate
RMT about
100.00%
New Visitor
Returning Visitor
Aug 24, 2015 - Mar 29, 2016
49.1%
50.9%
Aug 25, 2014 - Mar 30, 2015

Item Pages

August 24, 2015 to March 29, 2016
(compared to previous year)

185 total impressions
to
10,200 total impressions

Item Pages

August 22, 2014 to November 4, 2016

2014 - 2,924
2015 - 7,807
2016 - 13,191

Item Pages - Exit Rates

August 22, 2014 to November 4, 2016

Pages per/session decrease
and
3% to 45% to 50% exit rate

What about those other nodes in the graph?

Linked Data is People

Using Linked Data to Reshape
the Library Staff Directory

www.lib.montana.edu/people

Dartmouth College Library

Search books, articles, library website ... Search More Options

Ask Us
Chat • Text
Email • Phone

Home
About
Research
Services
Help
A-Z Index of Library Site

Departments & Staff Directory

Search for Library staff by name, title, or department: Search

- Dean of Libraries
- Administration
- Departments
- Staff Directory
- Subject Librarians
- Organization Charts
- Committees and Working Groups

Copyright © Trustees of Dartmouth College • Privacy Policy

Dartmouth College Library
Hanover, NH, USA 03755
Phone: (603) 646-2560
Library Departments

Send Feedback

MONTANA STATE UNIVERSITY | LIBRARY

Home Find Request Services Help Site Search

People in the library - individual results

Jan Zauha

Title: Outreach Librarian [Professor]

Department: Learning and Research Services, Montana State University

Phone: 406-994-6554

Email: jzauha@montana.edu

Calendar: Schedule Appointment

Room: 117C

Vita

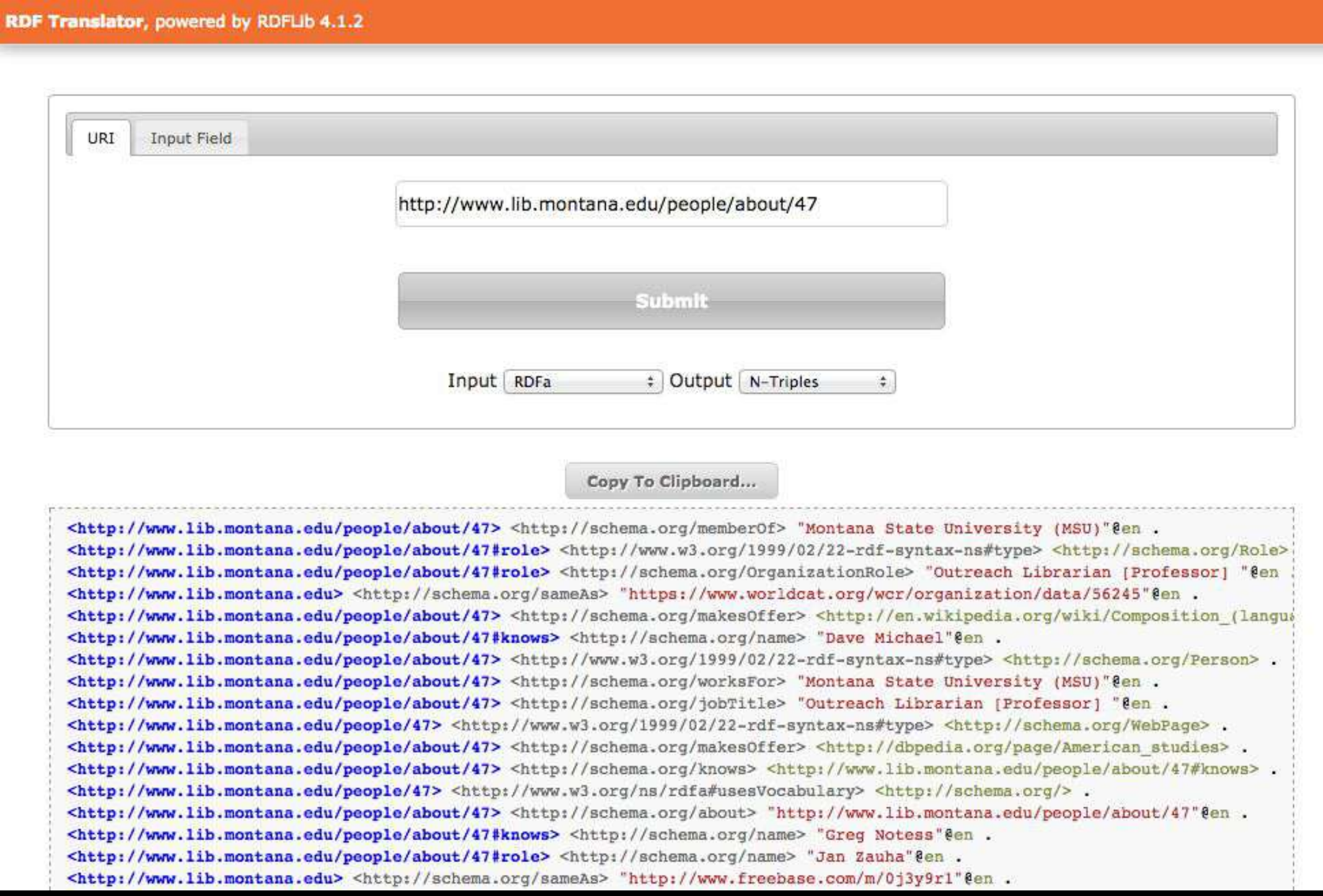
Get QR Embed Code

<img src="http://chart.apis.google.com/char

Back to Staff Home page

http://www.lib.montana.edu/people/about/47#person

```
<script type="application/ld+json">
{
  "@context": "http://schema.org",
  "@type": "Person",
  "name": "Jan Zauha",
  "jobTitle": "Outreach Librarian [Professor] ",
  "workLocation": "Learning and Research Services",
  "email": "jzauha@montana.edu",
  "image": "http://shelf.lib.montana.edu/people/meta/img/photos/janzauha-thumb.jpg",
  "telephone": "406-994-6554",
  "address": {
    "@type": "PostalAddress",
    "addressLocality": "Bozeman",
    "addressRegion": "MT",
    "postalCode": "59717-3320",
    "streetAddress": "P.O. Box 173320"
  },
  "colleague": [
    "shelf.lib.montana.edu/people/2",
    "shelf.lib.montana.edu/people/4",
    "shelf.lib.montana.edu/people/17",
    "shelf.lib.montana.edu/people/28",
    "shelf.lib.montana.edu/people/33",
    "shelf.lib.montana.edu/people/40",
    "shelf.lib.montana.edu/people/79",
    "shelf.lib.montana.edu/people/47",
    "shelf.lib.montana.edu/people/82",
    "shelf.lib.montana.edu/people/88",
    "shelf.lib.montana.edu/people/101",
    "shelf.lib.montana.edu/people/135",
    "shelf.lib.montana.edu/people/138",
  ],
  "sameAs" : [
  "http://scholar.google.com/citations?user=htx7S9oAAAAJ&hl=en",
  ""
  ],
  "worksFor": "Montana State University (MSU)"
}
</script>
```



Jan Zauha is defined/understood as an entity

Similar Impact and Results

“Google Analytics reporting shows an increase in key metrics for our staff directory when comparing the Fall academic term of 2013 (August 26-December 13) with the Fall academic term of 2014 (August 25-December 12), representing pre and post periods for this project. Overall sessions increased by 280% (601 in Fall 2013 to 2,288 in Fall 2014) and overall visitors increased by 240% (530 to 1,801); inbound sessions from organic search increased by 436% (221 to 1,131), and inbound sessions specifically from Google Search increased by 441% (203 to 1,099). Google Analytics reporting from the Fall academic terms in 2015 (August 24-December 11) and 2016 (August 29-December 16) show that the gains in sessions, visitors, and search traffic have been sustained.”

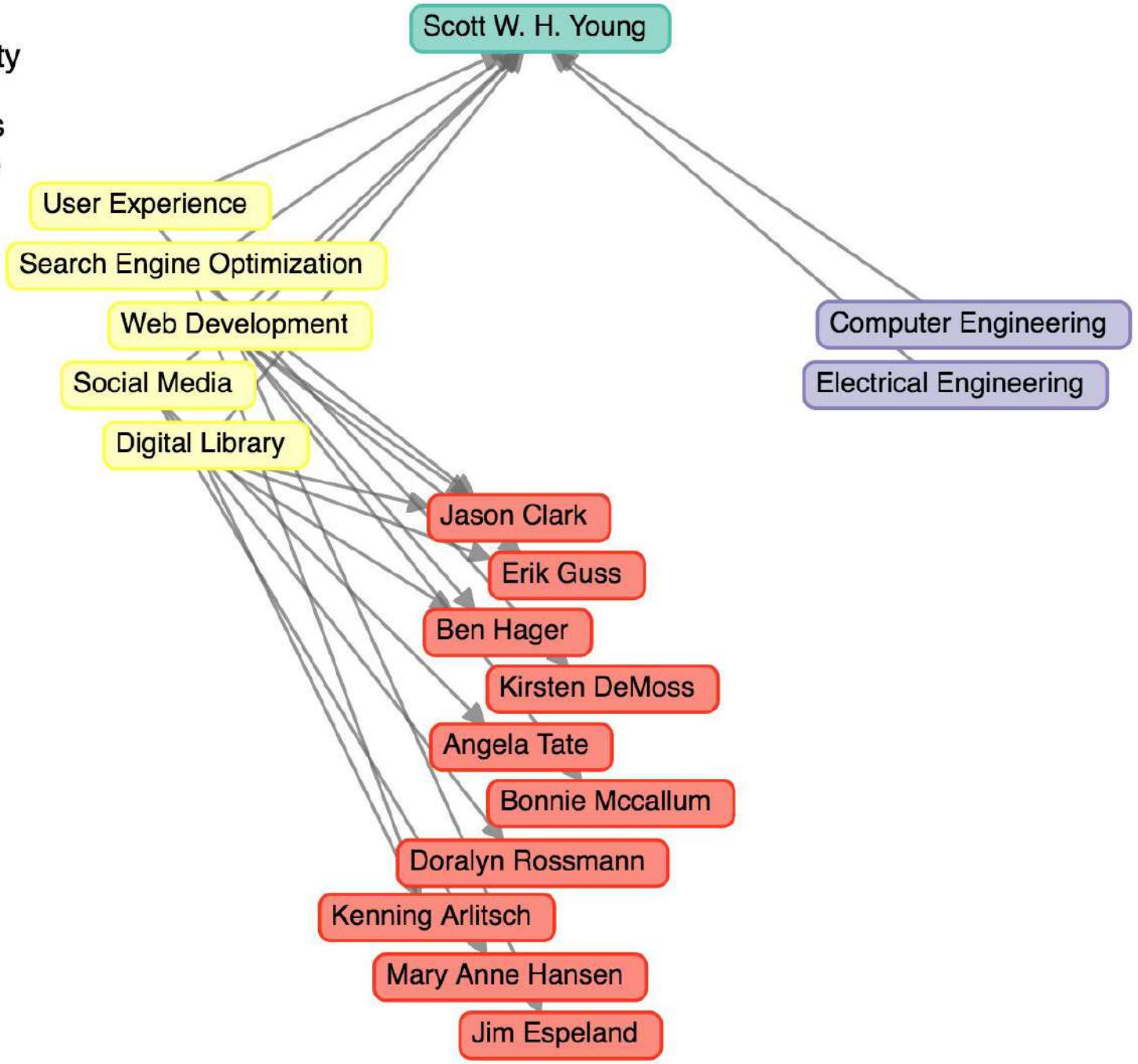
From: “Linked Data is People: Building a Knowledge Graph to Reshape the Library Staff Directory” Code4lib Journal, April 2017

New Search and Browse

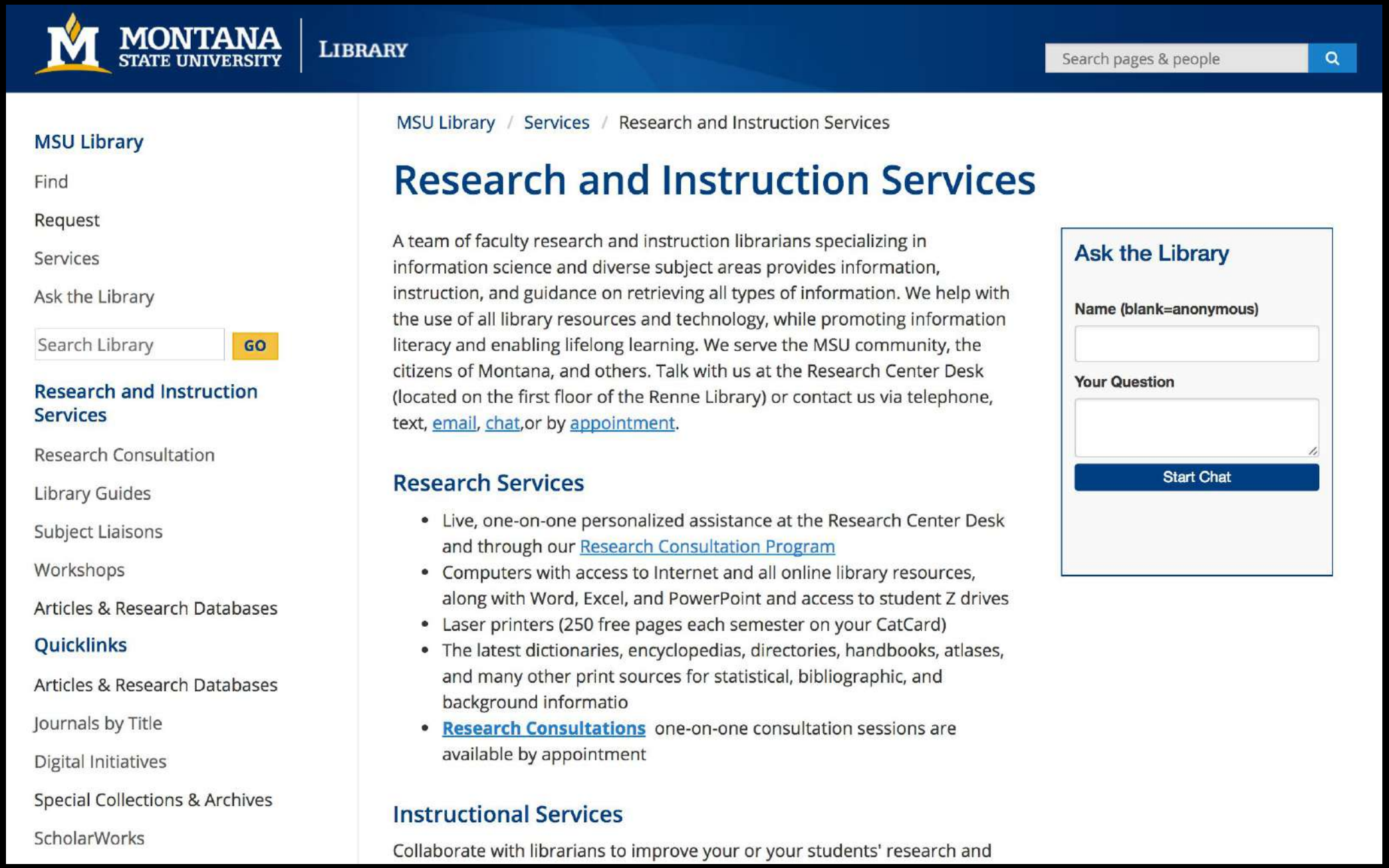
www.lib.montana.edu/people/network/graph.php?dataset=99

View list

Library Faculty
Expertise
Liaison Areas
Collaborators



Connecting our Services to the Library Knowledge Graph



https://www.lib.montana.edu/services/research-and-instruction

```
<div vocab="https://schema.org" typeof="EducationalOrganization Service" resource="https://www.lib.montana.edu/services/research-and-instruction/#service">
  <div class="row">
      ...
    <div property="name" class="col-sm-12 page-header clearfix">
      <h1>Research and Instruction Services</h1>
    </div>
  </div>
  <div class="row">
      ...
          <div class="col-sm-8">
            <p property="description">A team of faculty research and instruction librarians specializing in information science and diverse subject areas provides information, instruction, and guidance on retrieving all types of information. We help with the use of all library resources and technology, while promoting information literacy and enabling lifelong learning. We serve the MSU community, the citizens of Montana, and others. Talk with us at the Research Center Desk (located on the first floor of the Renne Library) or contact us via telephone, text, <a href="http://ask.lib.montana.edu/ask">email</a>, <a href="/ask/chat.html">chat</a> ,or by <a href="/forms/rapreq.html">appointment</a>.</p>
            <h3 class="mainHeading">Research Services</h3>
            <ul>
              <li property="offers">Live, one-on-one personalized assistance at the Research Center Desk and through our <a href="/services/research-and-instruction/consultation.html">Research Consultation Program</a></li>
              <li property="offers">Computers with access to Internet and all online library resources, along with Word, Excel, and PowerPoint and access to student Z drives</li>
              <li property="offers">Laser printers (250 free pages each semester on your CatCard)</li>
              <li property="offers">The latest dictionaries, encyclopedias, directories, handbooks, atlases, and many other print sources for statistical, bibliographic, and background informatio</li>
              <li property="offers"><strong><a href="/services/research-and-instruction/consultation.html">Research Consultations</a></strong>  one-on-one consultation sessions are available by appointment</li>
            </ul>
          </div>
      ...
  </div>
</div>
```

```
2  <div vocab="https://schema.org" typeof="EducationalOrganization Service" resource=
   "https://www.lib.montana.edu/services/research-and-instruction/#service">
```

A machine address that can be referenced and linked in other applications.

MONTANA STATE UNIVERSITY | LIBRARY

Home Find Request Services Help Site Search

People in the library - individual results

Jan Zauha

Title: Outreach Librarian [Professor]

Department: Learning and Research Services, Montana State University

Phone: 406-994-6554

Email: jzauha@montana.edu

Calendar: Schedule Appointment

Room: 117C

Vita

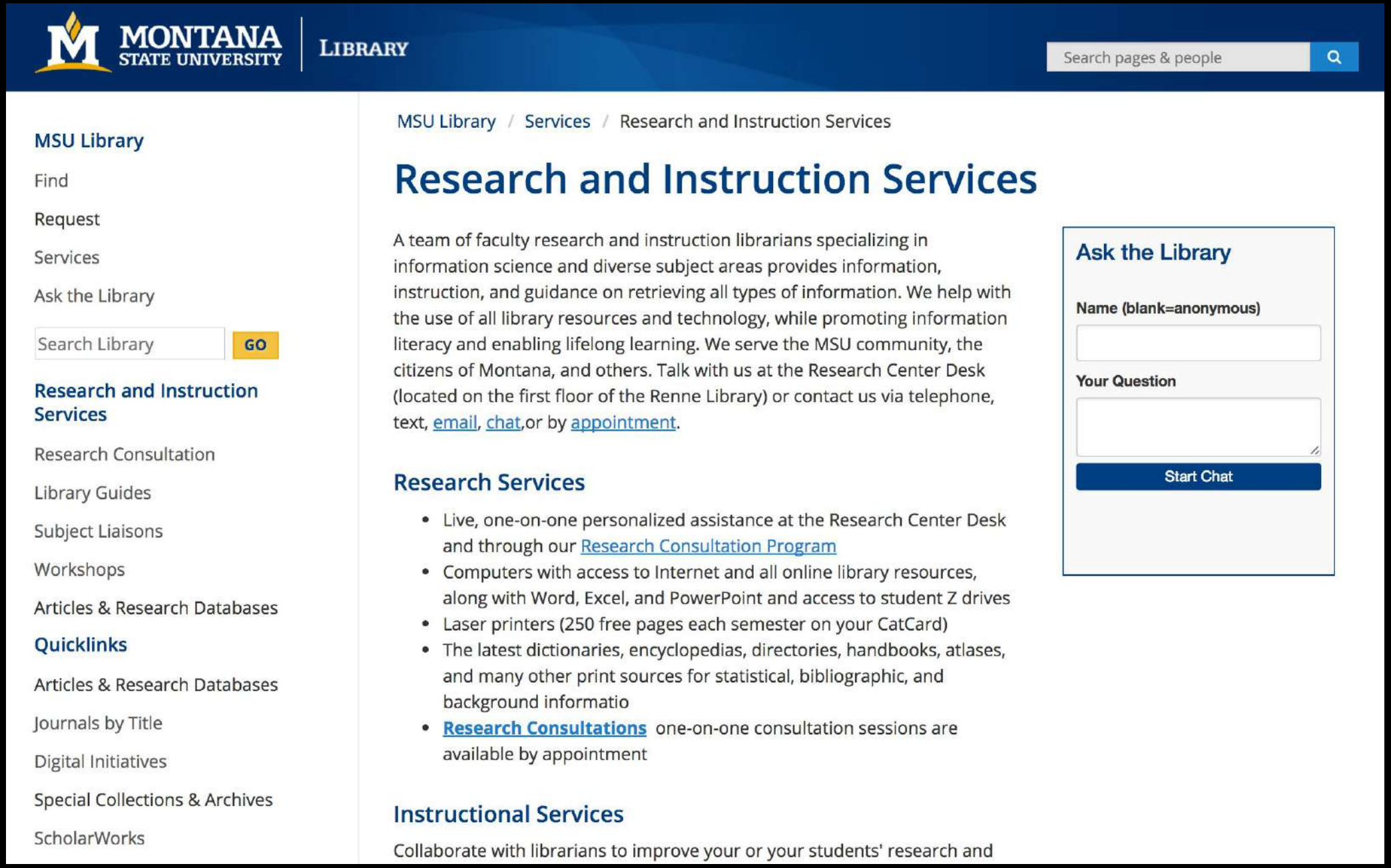
Get QR Embed Code

<img src="http://chart.apis.google.com/char

Back to Staff Home page

http://www.lib.montana.edu/people/about/47#person

makesOffer



https://www.lib.montana.edu/services/research-and-instruction/#service

Where to start?

Humans + Bots

A teaching moment

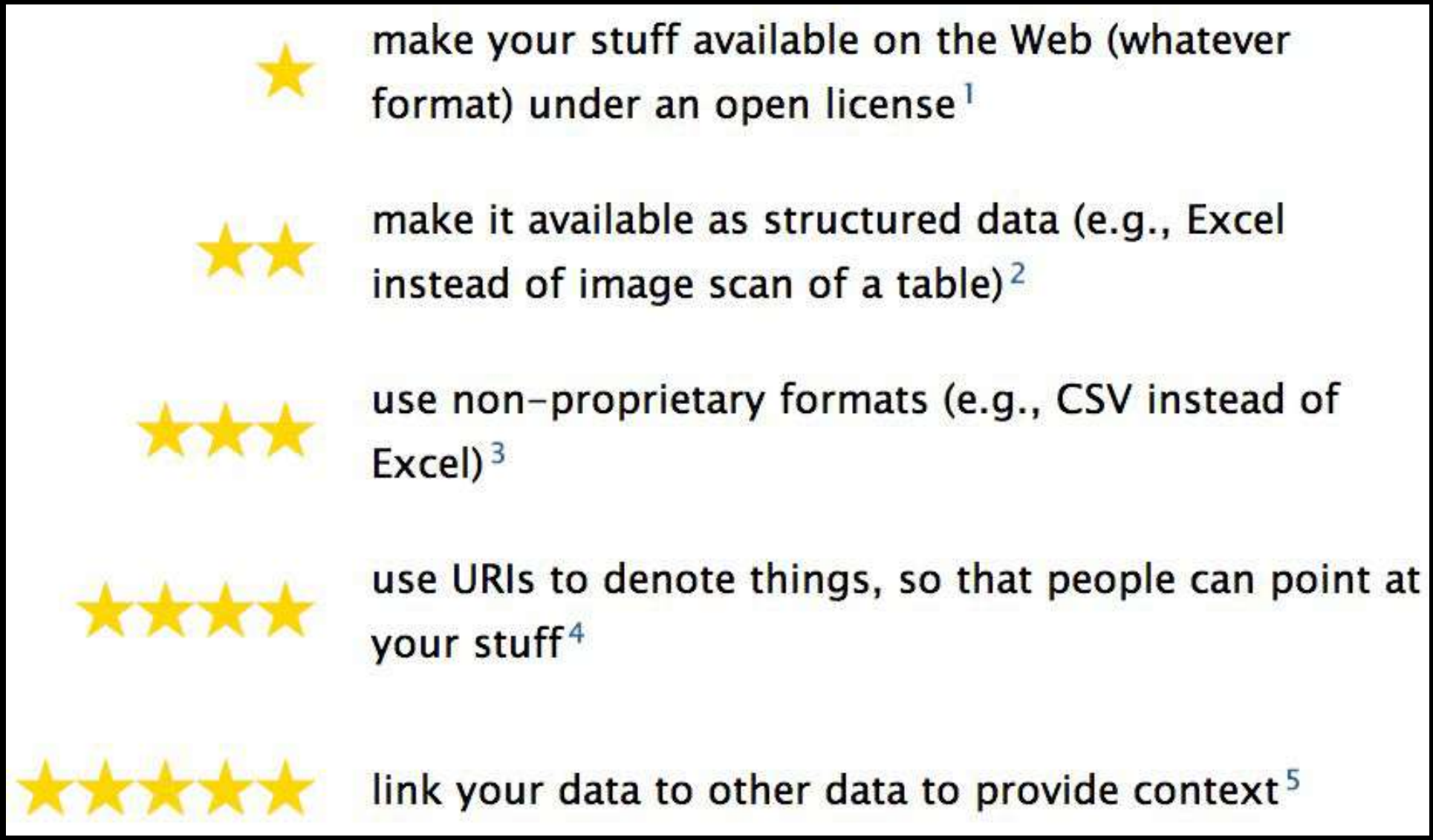
A cataloging moment

A discovery moment

What happens to libraries if machines can read all representations of the library?

Hat tip: Chris Bourg @mchris4duke

5 Star Linked Open Data



http://5stardata.info/

Why Linked Open Data?

- Libraries as publishers in Web of Data
- Reuse of our data = Significance
- Can improve findability in search engines (search engine optimization)
- Levels of description in LOD enable entirely new applications

A Machine UX Program?

getSEMantic [beta]

jason a. clark

Feed me a URL

Get Analysis

Key: Demo App What is this? View Code @jaclark Credit

The opportunity to (re)define ourselves and our work

Acknowledgements

I would like to thank Alison Hitchens for her excellent work in explaining and teaching linked data concepts and definitions.

http://www.accessola2.com/olita/insideolita/wordpress/?p=60029

She was also gracious enough to distribute her work under the Attribution-Noncommercial-Share Alike 3.0 Unported license. And I am doing the same.

A Research Team Effort

Scott Young: Digital Initiatives Librarian at Montana State University. @hei_scott

Jason Clark: Head of Library Informatics & Computing at Montana State University Library @jaclark

Patrick O'Brien: Semantic Web Research Director at Montana State University Library.

Kenning Arlitsch: Dean of the Library at Montana State University @kenning_msu

Doralyn Rossmann
Head, Collection Development
Montana State University Library
https://doralyn.org/
@doralyn

Resources

Harper, Corey. Library linked data: tuning library metadata for the semantic web. An ALCTS webcast, March 16. 2011. (open access) http://www.ala.org/alcts/confevents/upcoming/webinar/cat/031611

Berners-Lee, Tim. The next web. A TED talk, February 2009. (open access) http://www.ted.com/talks/tim_berners_lee_on_the_next_web

Koster, Lukas (2011) Brief Introduction to Linked Data (open access) https://docs.google.com/document/d/1W6UOCLgxTyM0BlPfd5hs58dh4k6CUdLW354AjjtnJfk/edit

*See also LODLAM - Linked Open Data in Libraries, Archives & Museums at http://lodlam.net/

Questions?

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www.lib.montana.edu/~jason/talks.php