Semantic Modeling of Researcher Networks: Applying Linked Open Data for Discovery of Bioscience Faculty Profiles and Research

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Head, Special Collections & Archival Informatics
Montana State University (MSU) Library

Montana State University
November 28, 2016

pinboard.in tag

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

Overview

- Is There Magic in the Web?
- The Project and its Players
- Data mining + Ontology Creation
- Researcher Profiles + Machine Readability
- Working in the Open
- Results + Next Steps
- Questions + Demo

Project Overview

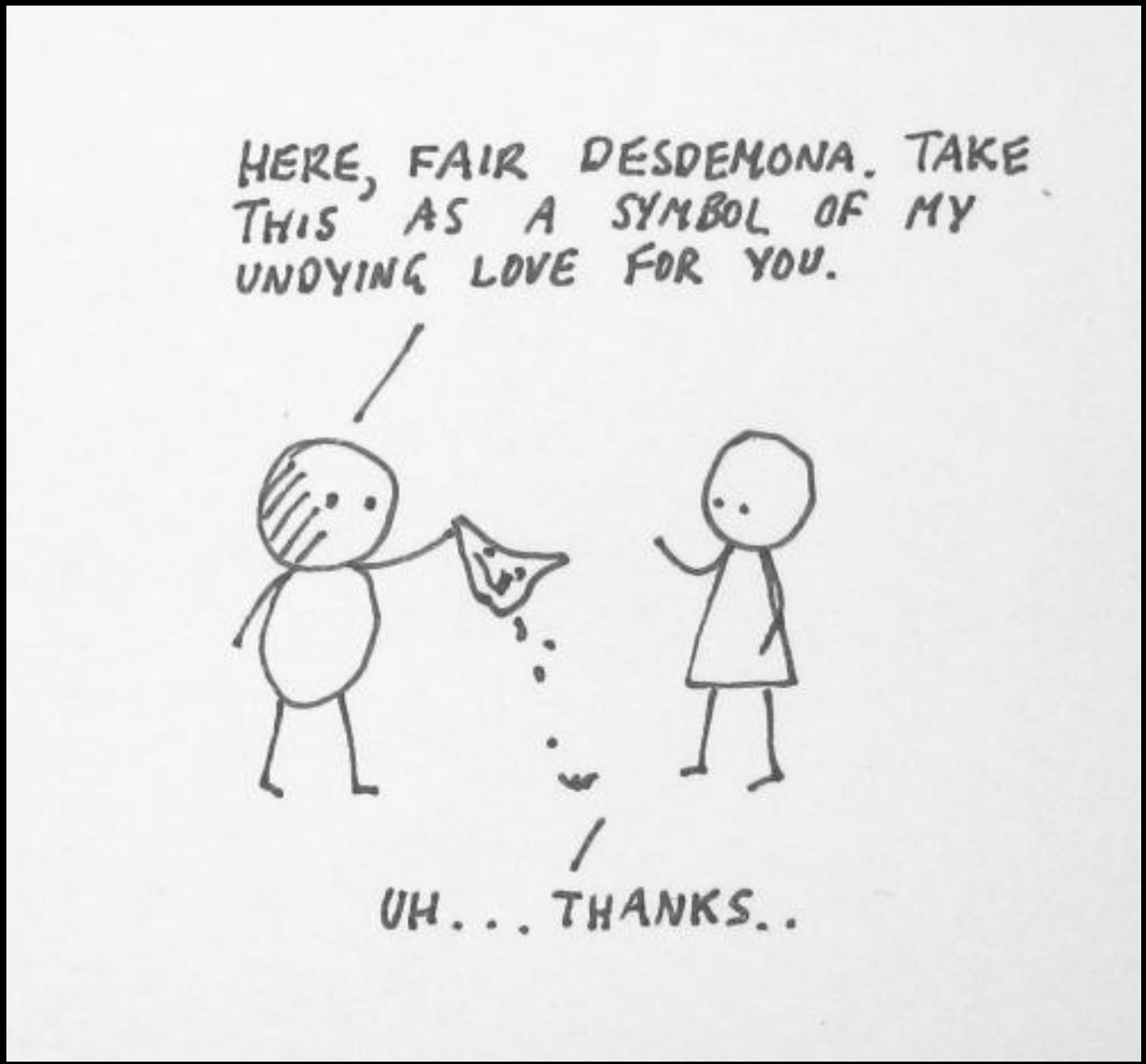
With this sabbatical project, I created discovery and visualization software based on linked data and Semantic Web principles. More specifically, I completed work on a prototype software project that allows one to visualize research and networks of expertise based on faculty interests and research collaborations. The current project uses faculty data embodied in the work and research of the Montana State University (MSU) - Center For Biofilm Engineering (CBE). You can find out more about the initial prototype at the live "Linked Bioscience" demo or in the GitHub repository. Within this prototype, one can search and browse on these linked data points centered around research and expertise allowing the application to work as a recommendation engine. Beyond this idea of a recommendation engine, I found that the additional Semantic Web work of associating people with research topics and collaborators has an impact on broader findability in search engines, such as Google and Bing. The net result of the project is three-fold:

1. Creation of a machine-readable, semantic understandings of the people in the CBE resulting in increased visibility within discovery settings and search engines.
2. Release of open-source software that provides new visualizations of CBE faculty and staff research networks and collaborations.
3. Publication of a linked open data (LOD) ontology for describing faculty that can be shared and reused across all higher education institutions.

This work developed a novel methodology for describing researcher's networks and profiles of expertise through the application of linked data and the early research around the project has garnered the support of local, national, and international partners like Mozilla. In this presentation, I'll be talking about the conception and realization of the prototype, the data mining processes behind building descriptions for faculty research and faculty profiles, the creation of linked data models and how they can be applied to describe all types of researchers, and the goal of working on the software release in the open.

Project Description

“Linked Bioscience” is a research project that connects researchers and the work they do by describing each of these objects/actions as discrete moments of discovery. The result is an application that works as a recommendation engine for discovering the topics, expertise, and research networks present in a particular discipline or subject. In this first phase of the project, I secured a partnership with the Montana State University (MSU)—Center For Biofilm Engineering (CBE) to describe Bioscience data practices and research networks. I’ve built indexing routines to mine scientific research data sources and “relink” this data in a search/browse interface using a linked data graph model associating researchers with research topics and collaborators along with an API interface for machines. The prototype software allows one to visualize research and networks of expertise based on researcher interests and research collaborations. Beyond the visualization component, I’m seeing an impact in how these researchers are found and indexed by search engines with the release of each researcher’s profile as JSON-LD (a structured data format used by search engines as a means to understand the semantics of a web page).



http://stallingsaplit.blogspot.com/2013/02/the-handkerchief.html

'Tis true. There’s magic in the web of it.
A sibyl, that had numbered in the world
the sun to course two hundred
compasses, in her prophetic fury sewed
the work.

Othello, Act III, Scene IV

This is not a tragedy.

It is a story about the magic inherent in the Web.

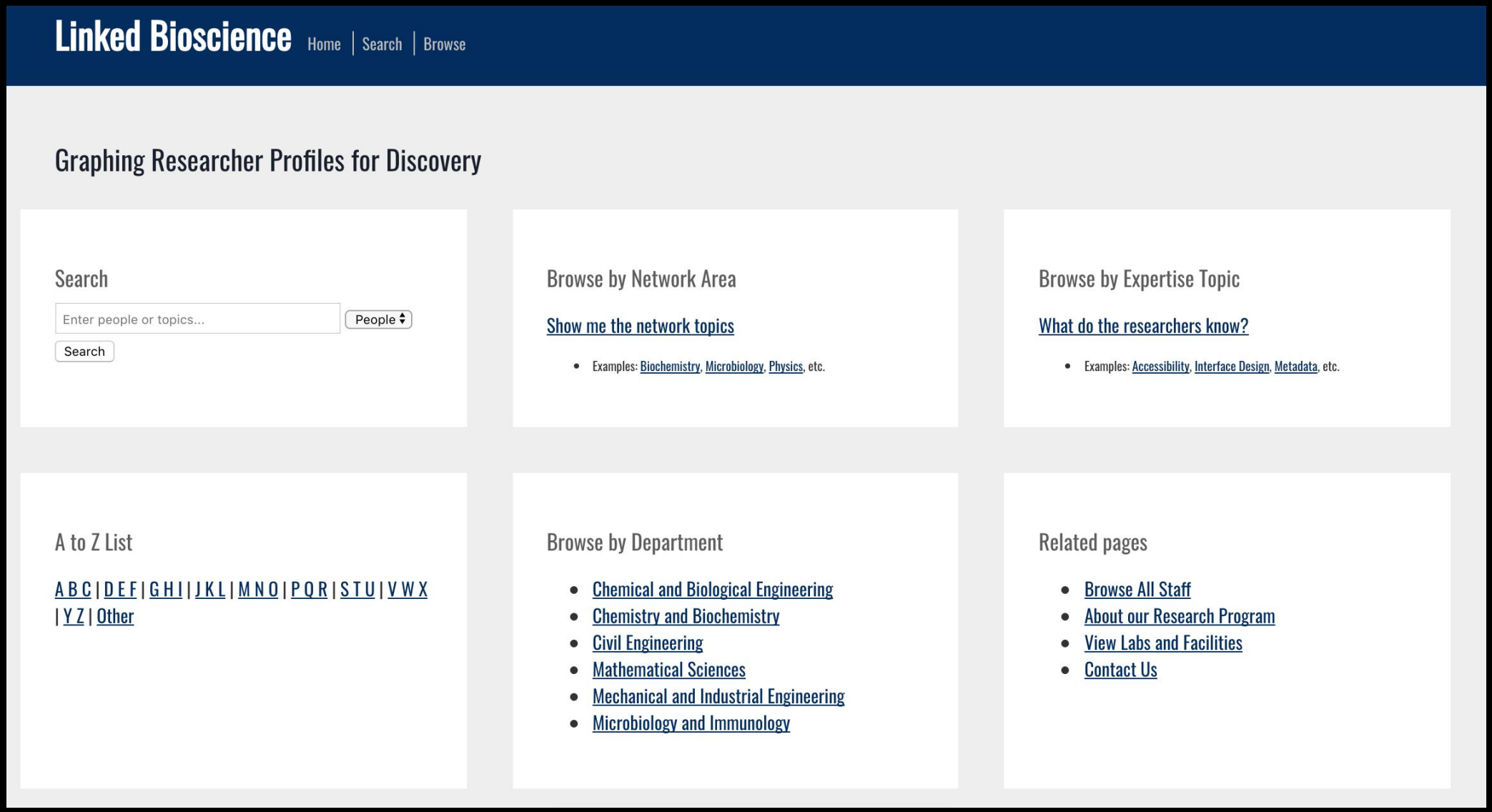
The Web of...

Scholarly Communications

Research Topics + Expertise

Scholarly Profiles

A project based on the idea of a Semantic Web Researcher Profile



Linked Bioscience - https://arc.lib.montana.edu/linked-bioscience/

Phil Stewart - Linked Bioscience (Demo)

Phil Stewart

Title Professor, Chemical and Biological Engineering

Department Chemical and Biological Engineering, Montana State University (MSU)

Phone 406-994-4242

Email phil_s@montana.edu

Room 307 Barnard Hall

Guides Subject and Course Help

Network subject(s)

- Chemical Engineering
- Biological Engineering
- Biochemistry
- Microbiology

Expertise and Skill(s)

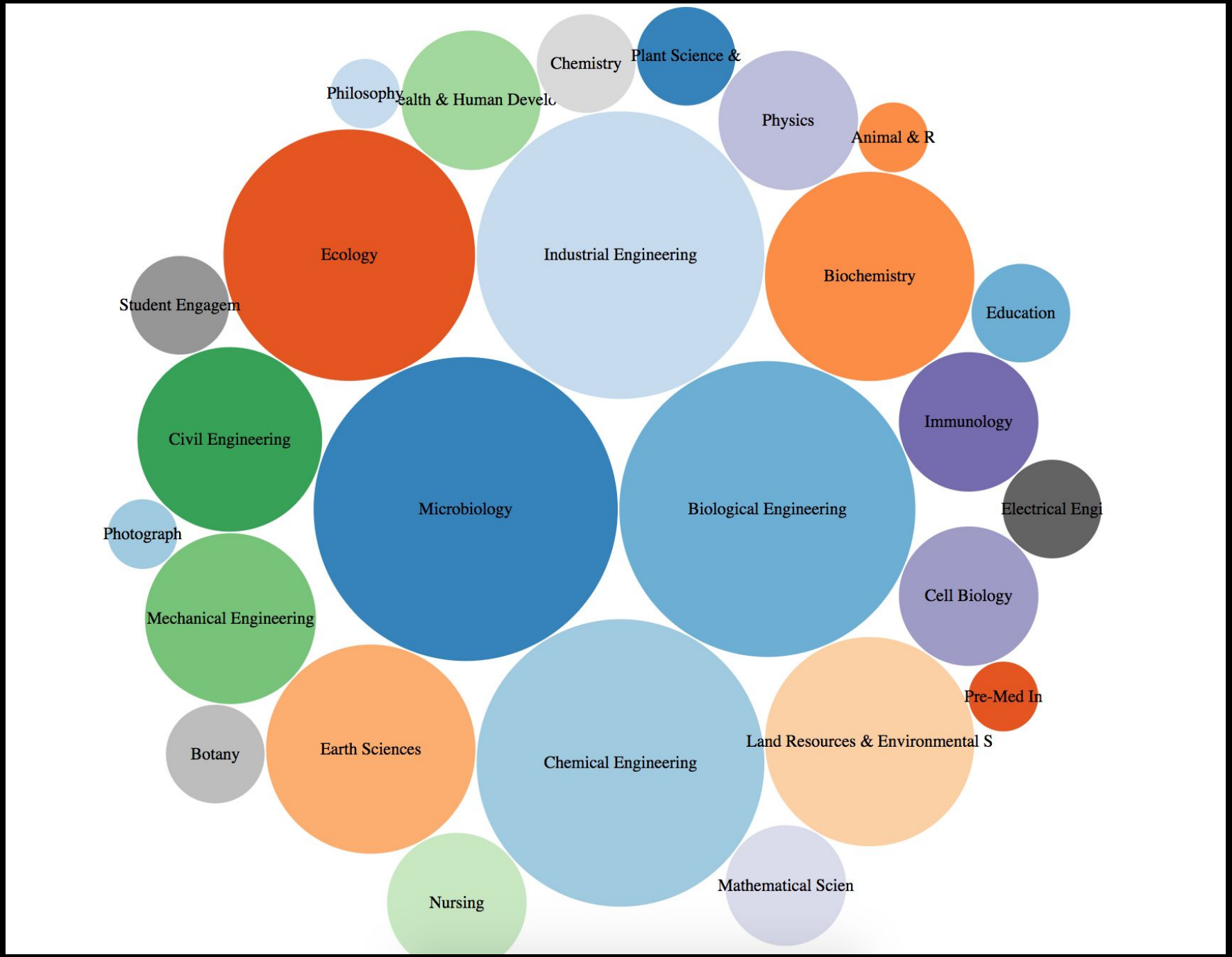
- Biochemistry
- Organic Matter
- Biometrics
- Biotechnology
- Transport Phenomena

Visualizations + Data

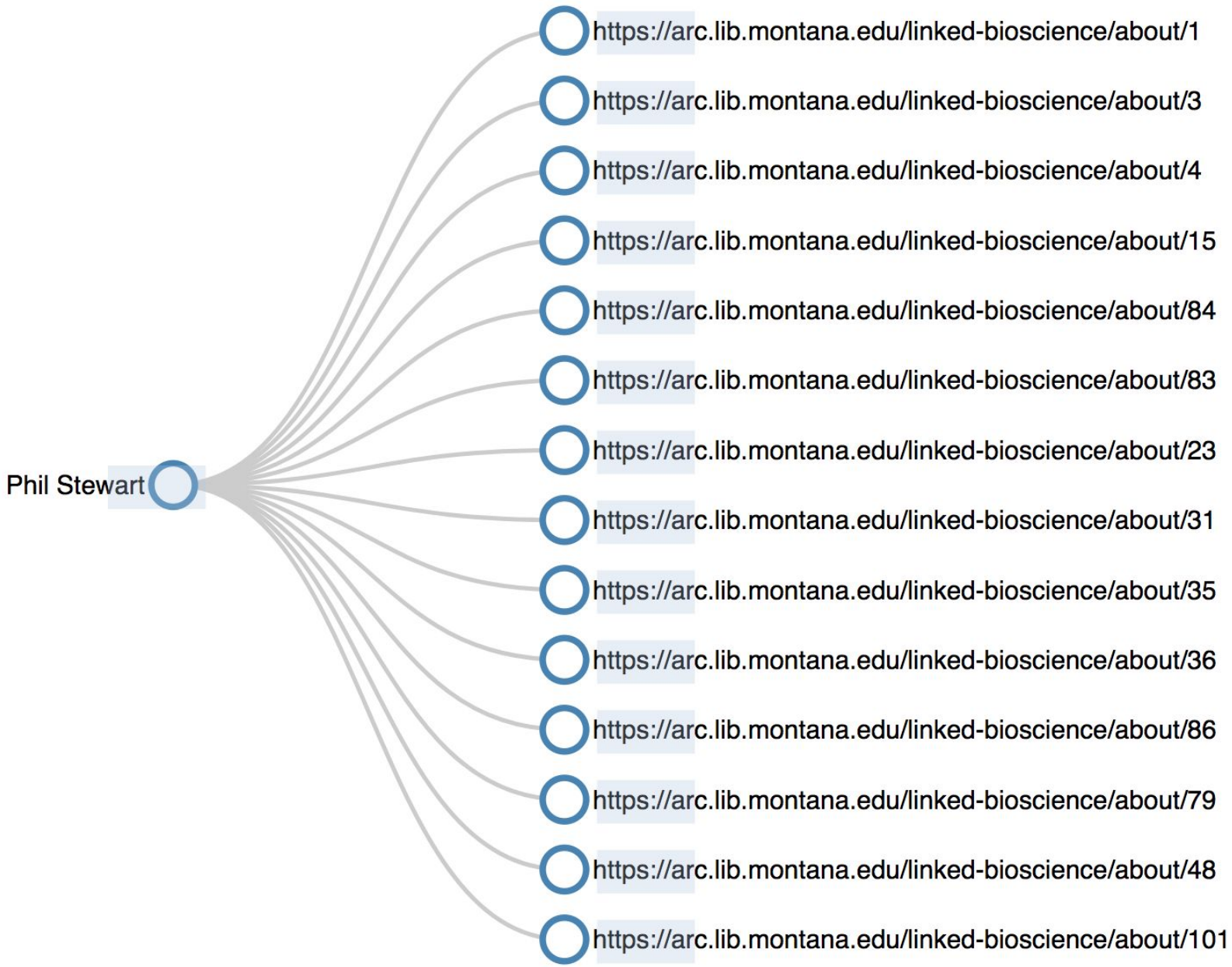
- Vita
- Homepage
- RDF
- Visualize network
- Visualize expertise

Example Profile - https://arc.lib.montana.edu/linked-bioscience/about.html?id=100

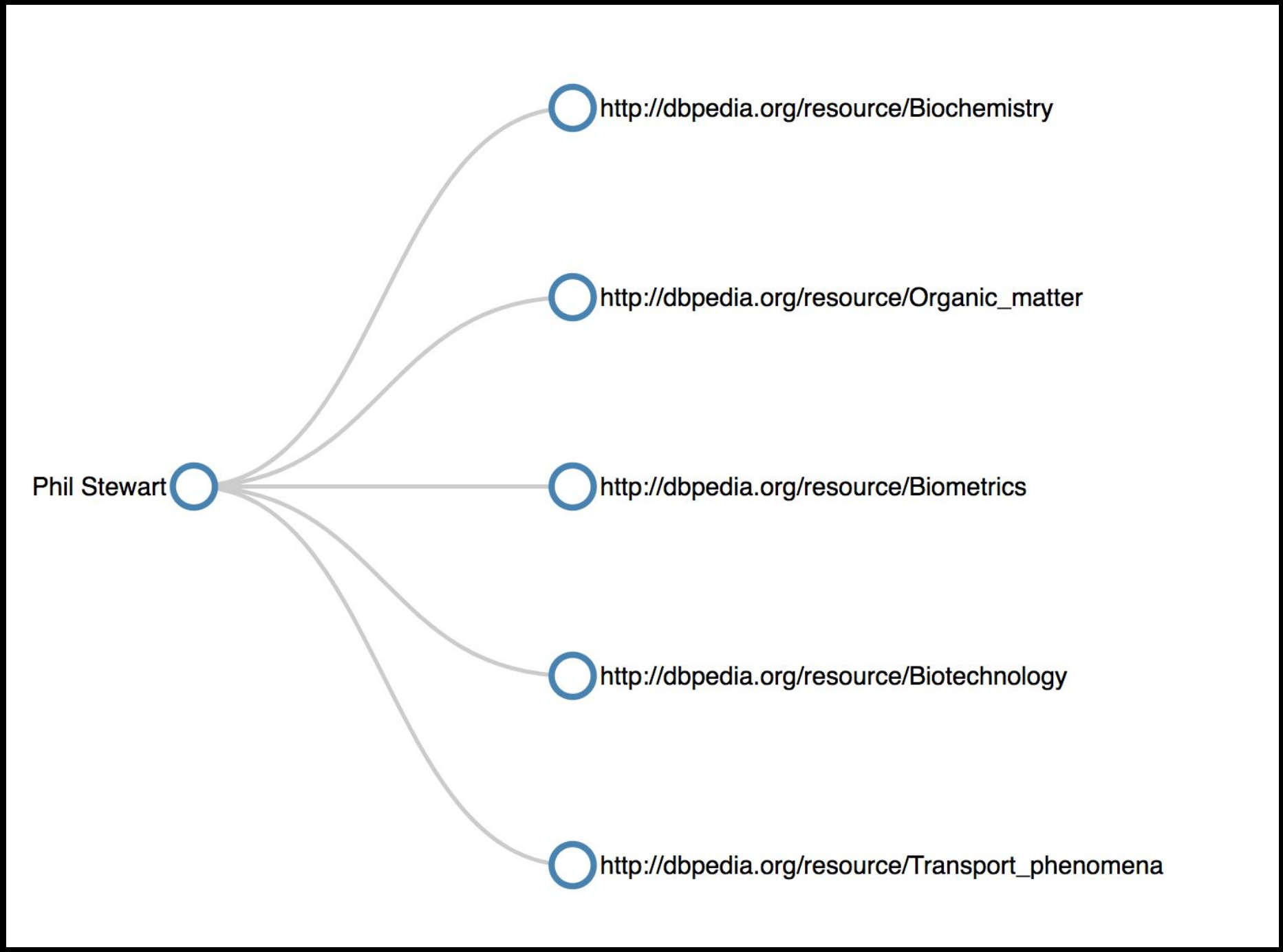
Mapping out the invisible Web of Research



Example Visualization - https://arc.lib.montana.edu/linked-bioscience/graph/network-bubble.html



Example Individual Network Visualization -
https://arc.lib.montana.edu/linked-bioscience/graph/network-bubble.html



Example Individual Expertise Visualization -
https://arc.lib.montana.edu/linked-bioscience/graph/network-bubble.html

The Project and its Players

Phil Stewart - Linked Bioscience (Demo)

Phil Stewart

Title Professor, Chemical and Biological Engineering

Department Chemical and Biological Engineering, Montana State University (MSU)

Phone 406-994-4242

Email phil_s@montana.edu

Room 307 Barnard Hall

Guides Subject and Course Help

Network subject(s)

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- Biological Engineering
- Biochemistry
- Microbiology

Expertise and Skill(s)

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- Organic Matter
- Biometrics
- Biotechnology
- Transport Phenomena

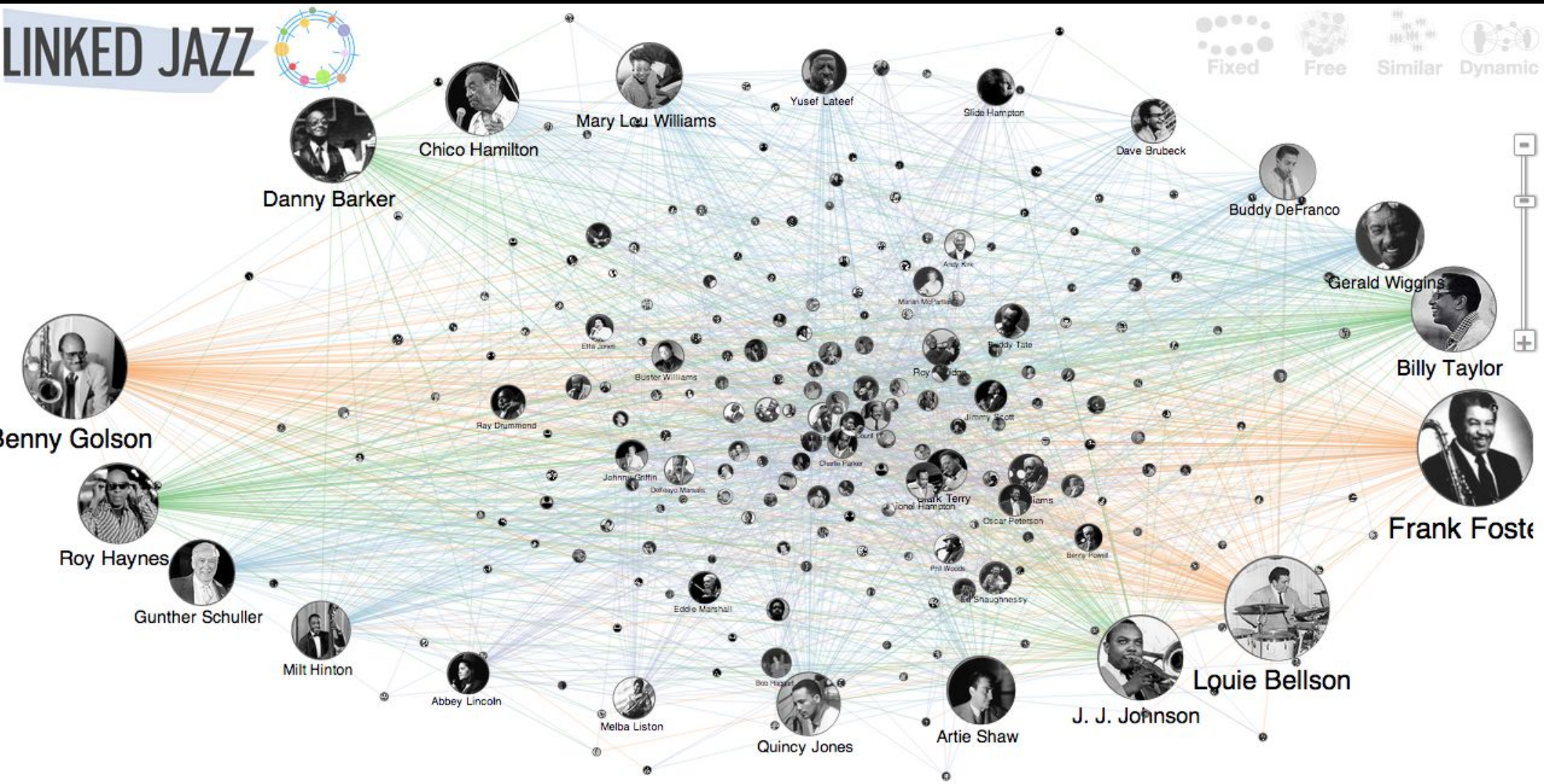
Visualizations + Data

- Vita
- Homepage
- RDF
- Visualize network
- Visualize expertise

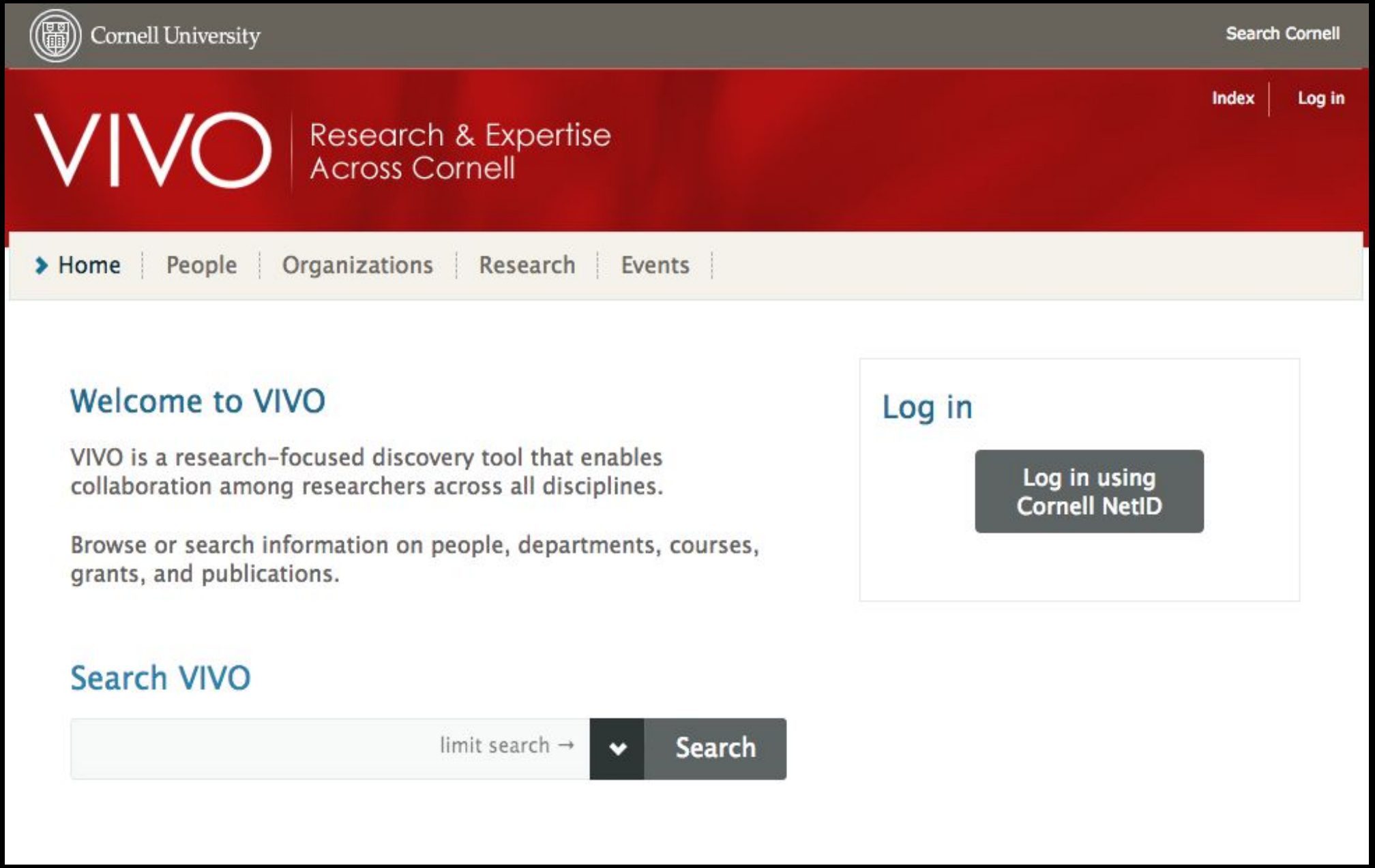
Phil Stewart

Former Director of Center for Biofilm Engineering and Professor of Chemical and Biological Engineering

https://arc.lib.montana.edu/linked-bioscience/about.html?id=100



http://linkedjazz.org/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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

Linked Data is People

Article: http://journal.code4lib.org/articles/12320

Using Linked Data to Reshape
the Library Staff Directory

www.lib.montana.edu/people

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 of Collection Development at Montana State University Library @doralyn

Data Mining + Ontology Creation

Sources for Mining

ORCID

Connecting Research and Researchers

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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

Google Scholar

Connie B. Chang

FOLLOW

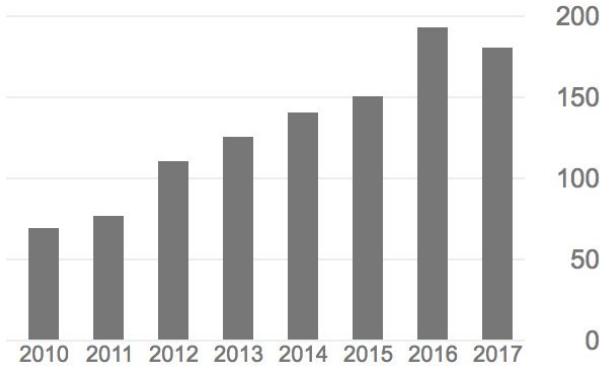
Assistant Professor, Montana State University
Verified email at seas.harvard.edu

Physics of Viruses - Biofilm…

TITLE	CITED BY	YEAR
Nanoemulsions: formation, structure, and physical properties TG Mason, JN Wilking, K Meleson, CB Chang, SM Graves Journal of Physics: Condensed Matter 18 (41), R635	673	2006
Nanoscale double emulsions stabilized by single-component block copolypeptides JA Hanson, CB Chang, SM Graves, Z Li, TG Mason, TJ Deming Nature 455 (7209), 85-88	185	2008
Curvature dependence of viral protein structures on encapsidated nanoemulsion droplets CB Chang, CM Knobler, WM Gelbart, TG Mason Acs Nano 2 (2), 281-286	57	2008
Dense cluster formation during aggregation and gelation of attractive slippery nanoemulsion droplets JN Wilking, SM Graves, CB Chang, K Meleson, MY Lin, TG Mason Physical review letters 96 (1), 015501	43	2006
Quantification of methylene blue aggregation on a fused silica surface and resolution of individual absorbance spectra SM Ohline, S Lee, S Williams, C Chang Chemical physics letters 346 (1), 9-15	42	2001

Cited by VIEW ALL

	All	Since 2012
Citations	1161	899
h-index	12	11
i10-index	13	13



Connie B. Chang • 2nd

Assistant Professor at Montana State University

Montana State University • University of California, Los Angeles

Bozeman, Montana • 500+

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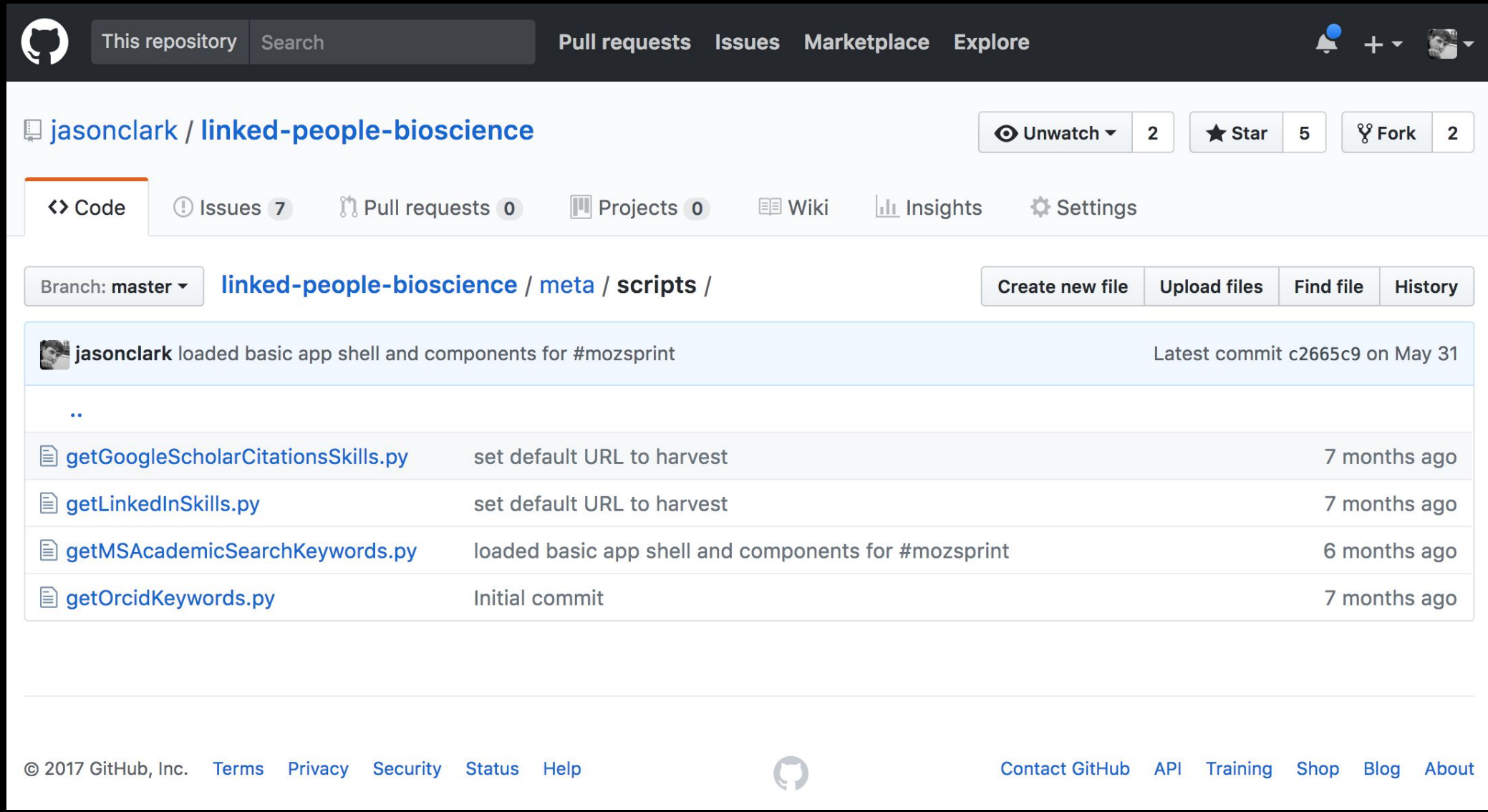
My area of research is in complex fluids and soft matter science, which lies at the interface of chemistry, biology, physics, and engineering. Topics of interest include bacterial biofilms, viral self-assembly, evolution, and recombination, biomaterials, and ultrahigh-throughput assaying and screening using drop-based microfluidics.

Affiliated Faculty

Name	Department	Specialty
Barnhart, Elliott	Center for Biofilm Engineering	Environmental biotechnology
Brown, Jennifer	Chemical & Biological Engineering	Rheology and biofilm mechanics
Camper, Anne	Civil Engineering	Biofilms in environmental systems; water distribution
Carlson, Ross	Chemical & Biological Engineering	Metabolic engineering, metabolic networks; chronic wounds
Chang, Connie	Chemical & Biological Engineering	Microfluidics
Codd, Sarah	Mechanical & Industrial Engineering	Magnetic resonance imaging
Cook, Kevin	Mechanical & Engineering Technology	Tool and machine design
Cunningham, Al	Civil Engineering	Subsurface biotechnology and bioremediation
Dieser, Markus	Chemical & Biological Engineering	Ecology



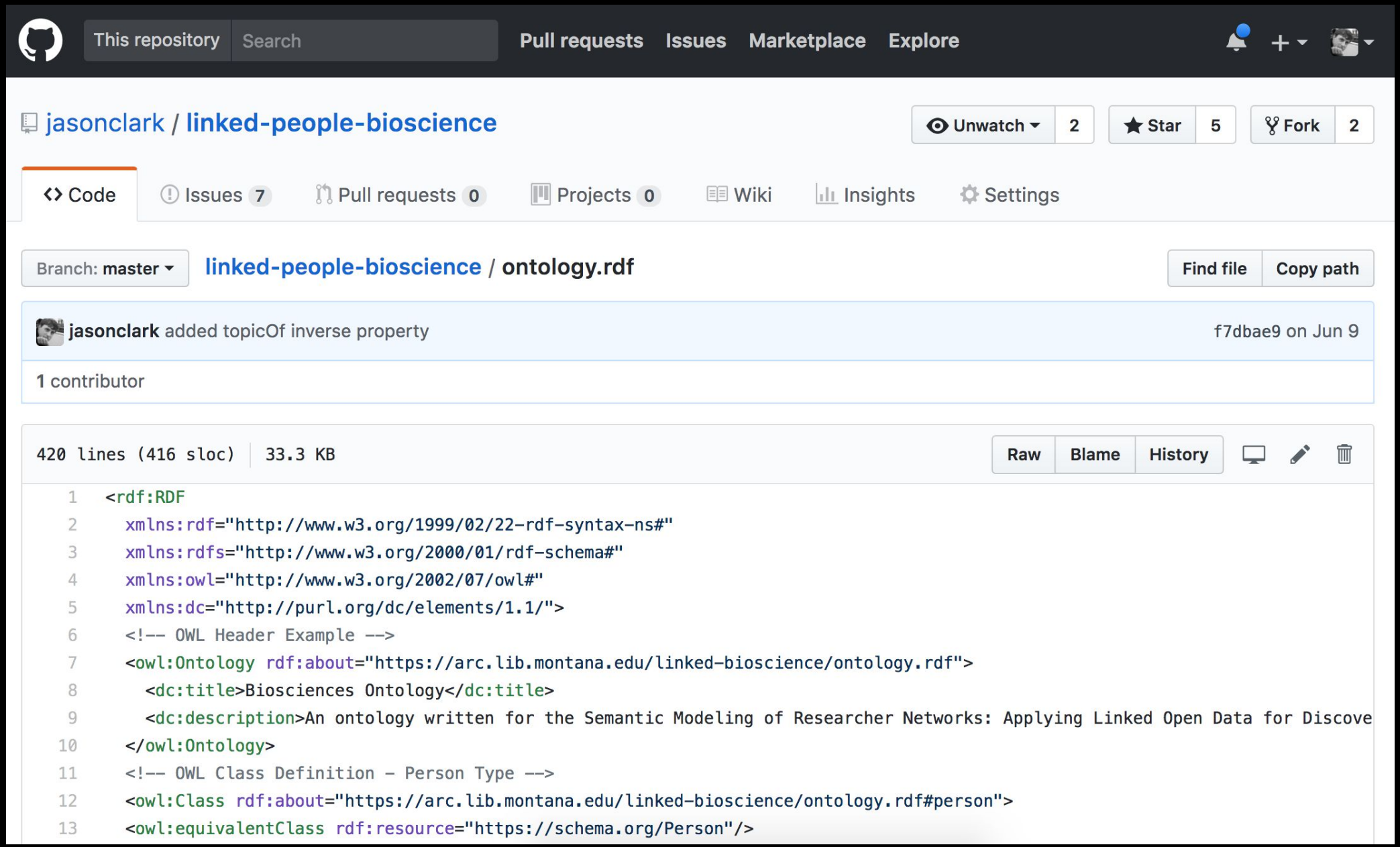
Web Scraping and Text Mining - https://github.com/jasonclark/linked-people-bioscience/tree/master/meta/scripts

What do (or can) machines know about the Center for Biofilm Engineering?

Work of reconciling mined topics and descriptions for …

A Biosciences Ontology

The formal naming and definition of the types, properties, and interrelationships of the entities that exist in a particular domain. In this case, the domain of research objects, scholars, and their networks as practiced by the Center for Biofilm Engineering.



Release of Version 1 Biosciences Ontology
https://github.com/jasonclark/linked-people-bioscience/blob/master/ontology.rdf

Schema.org + DbPedia.org

controlled vocabulary

What is Schema.org?

This site provides a collection of schemas that webmasters can use to markup HTML pages in ways recognized by major search providers, and that can also be used for structured data interoperability (e.g. in JSON). Search engines including Bing, Google, Yahoo! and Yandex rely on this markup to improve the display of search results, making it easier for people to find the right Web pages.

Many sites are generated from structured data, which is often stored in databases. When this data is formatted into HTML, it becomes very difficult to recover the original structured data. Many applications, especially search engines, can benefit greatly from direct access to this structured data. On-page markup enables search engines to understand the information on web pages and provide richer search results in order to make it easier for users to find relevant information on the web. Markup can also enable new tools and applications that make use of the structure.

A shared markup vocabulary makes it easier for webmasters to decide on a markup schema and get the maximum benefit for their efforts. So, in the spirit of sitemaps.org, search engines have come together to provide a shared collection of schemas that webmasters can use.

We invite you to get started!

View our blog at blog.schema.org.

About: Le Seigneur des anneaux

An Entity of Type : 1950sFantasyNovels, from Named Graph : http://dbpedia.org, within Data Space : dbpedia.org

Le Seigneur des anneaux (The Lord of the Rings) est un roman en trois volumes de J. R. R. Tolkien paru en 1954 et 1955.L'histoire reprend certains des personnages présentés dans Le Hobbit, premier roman de l'auteur paru en 1937, mais l'œuvre est plus complexe et plus sombre. Tolkien entreprend sa rédaction à la demande de son éditeur, Allen & Unwin, à la suite du succès critique et commercial du Hobbit.

Property	Value
dbpedia-owl:abstract	▪ The Lord of the Rings is an epic high fantasy novel written by English author J. R. R. Tolkien. The story began as a sequel to Tolkien's 1937 children's fantasy novel The Hobbit, but eventually developed into a much larger work. It was written in stages between 1937 and 1949, much of it during World War II. It is the second best-selling novel ever written, with over 150 million copies sold.The title of the novel refers to the story's main antagonist, the Dark Lord Sauron, who had in an earlier age created the One Ring to rule the other Rings of Power as the ultimate weapon in his campaign to conquer and rule all of Middle-earth. From quiet beginnings in the Shire, a hobbit land not unlike the English countryside, the story ranges across northwest Middle-earth, following the course of the War of the Ring through the eyes of its characters, the hobbits Frodo Baggins, Samwise "Sam" Gamgee, Meriadoc "Merry" Brandybuck and Peregrin "Pippin" Took, but also the hobbits' chief allies and travelling companions: the Men Aragorn, a Ranger of the North and Boromir, a Captain of Gondor; Gimli, a Dwarf warrior; Legolas, an Elven prince; and Gandalf, a Wizard.The work was initially intended by Tolkien to be one volume of a two-volume set, the other to be The Silmarillion, but this idea was dismissed by his publisher. For economic reasons The Lord of the Rings was published in three volumes over the course of a year from 29 July 1954 to 20 October 1955. The three volumes were titled The Fellowship of the Ring, The Two Towers, and The Return of the King. Structurally, the novel is divided internally into six books, two per volume, with several appendices of background material included at the end of the third volume. Some editions combine the entire work into a single volume. The Lord of the Rings has since been reprinted numerous times and translated into many languages.Tolkien's work has been the subject of extensive analysis of its themes and origins. Although a major work in itself, the story was only the last movement of a larger epic Tolkien had worked on since 1917, in a process he described as mythopoeia.[citation needed] Influences on this earlier work, and on the story of The Lord of the Rings, include philology, mythology, religion and the author's distaste for the effects of industrialization, as well as earlier fantasy works and Tolkien's experiences in World War I. The Lord of the Rings in its turn is considered to have had a great effect on modern fantasy; the impact of Tolkien's works is such that the use of the words "Tolkienian" and "Tolkienesque" have been recorded in the Oxford English Dictionary.The enduring popularity of The Lord of the Rings has led to numerous references in popular culture, the founding of many societies by fans of Tolkien's works, and the publication of many books about Tolkien and his works. The Lord of the Rings has inspired, and continues to inspire, artwork, music, films and television, video games, and subsequent literature. Award-winning adaptations of The Lord of the Rings have been made for radio, theatre, and film. ▪ Le Seigneur des anneaux (The Lord of the Rings) est un roman en trois volumes de J. R. R. Tolkien paru en 1954 et 1955.L'histoire reprend certains des personnages présentés dans Le Hobbit, premier roman de l'auteur paru en 1937, mais l'œuvre est plus complexe et plus sombre. Tolkien entreprend sa rédaction à la demande de son éditeur, Allen & Unwin, à la suite du succès critique et commercial du Hobbit. Il lui faut douze ans pour parvenir à achever ce nouveau roman qu'il truffe de références et d'allusions au monde du Silmarillion, la Terre du Milieu, sur lequel il travaille depuis 1917 et dans lequel Le Hobbit a été attiré de son auteur.C'est une des œuvres fondamentales de la littérature dite de fantasy, terme que Tolkien explicite dans son essai Du conte de fées de 1939. Tolkien lui-même considérait son livre comme , écrit .Cette œuvre est composée de six livres, qui ne portent pas de titres. À l'origine, Tolkien souhaite publier Le Seigneur des anneaux en un seul volume, mais le prix du papier étant trop élevé en cette période d'après-guerre, l'œuvre est divisée en trois volumes : La Communauté de l'anneau (The Fellowship of the Ring), Les Deux Tours (The Two Towers) et Le Retour du roi (The Return of the King). On fait souvent référence à cette œuvre comme à « la trilogie du Seigneur des anneaux », terme techniquement incorrect car l'œuvre fut écrite et conçue d'un seul tenant. Néanmoins, Tolkien lui-même reprend dans ses lettres, de temps à autres, le terme de « trilogie » lorsqu'il est employé par ses correspondants.
dbpedia-owl:wikiPageExternalLink	▪ http://www.houghtonmifflinbooks.com/features/lordoftheringstrilogy/ ▪ http://www.glyphweb.com/arda/ ▪ http://www.tolkien.co.uk ▪ http://www.tolkienlibrary.com
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dbpprop:genre	▪ *High fantasy *Adventure
dbpprop:hasPhotoCollection	▪ http://wifo5-03.informatik.uni-mannheim.de/flickrwrappr/photos/The_Lord_of_the_Rings
dbpprop:imageCaption	▪ The original cover designs for each volume as illustrated by Tolkien. They were later used for the 50th anniversary edition covers.
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Discovery project based on a partnership with the Montana State University (MSU) - Center For Biofilm Engineering (CBE) to
describe Bioscience data</dc:description>
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    <rdfs:comment>The person and subject of the research act including roles</rdfs:comment>
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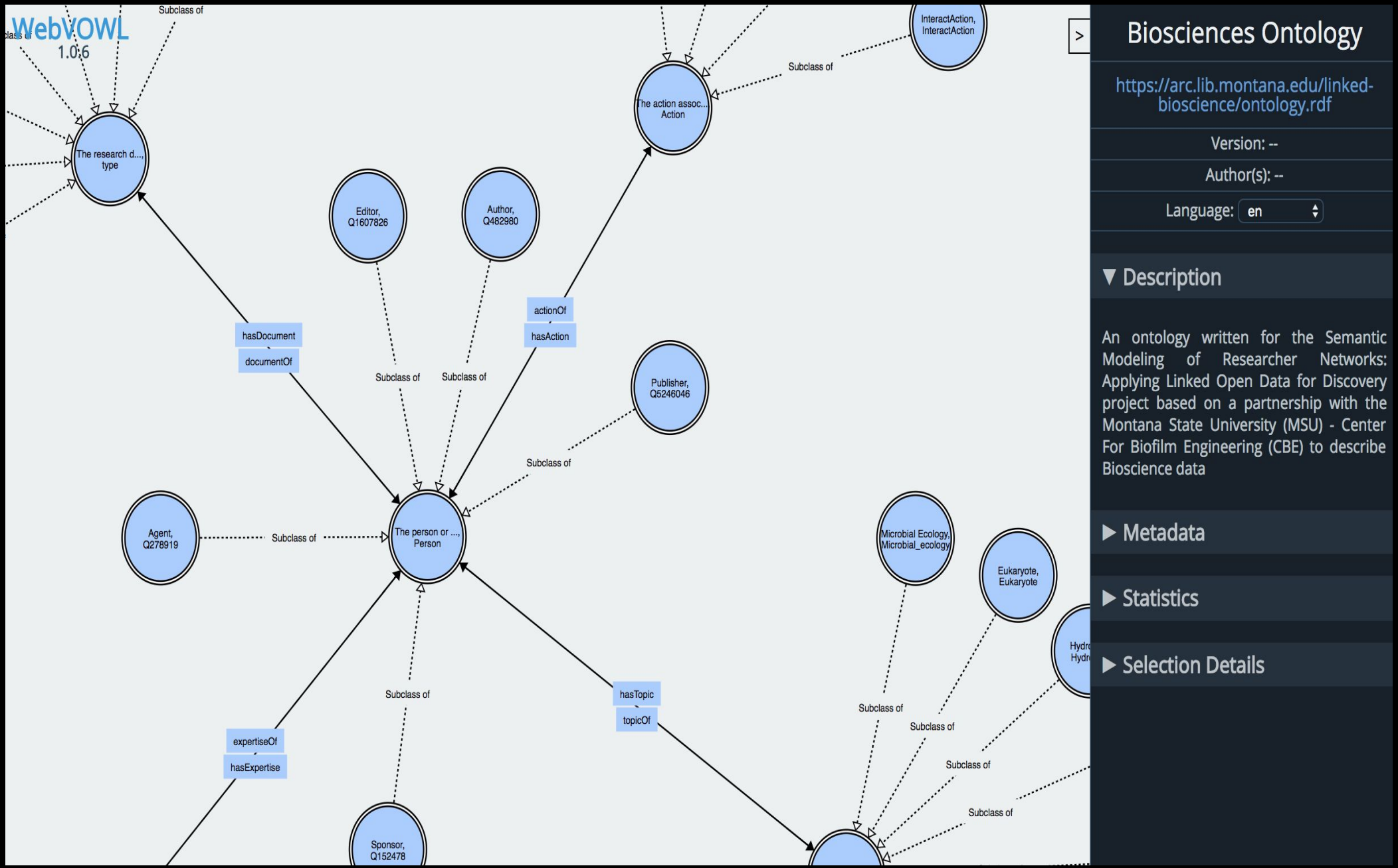
    <rdfs:label>Author</rdfs:label>
    <rdfs:comment>The creator of an original spoken or written work</rdfs:comment>
  </owl:Class>
```

Release of Version 1 Biosciences Ontology
https://github.com/jasonclark/linked-people-bioscience/blob/master/ontology.rdf



Visualization of Abridged Version of Biosciences Ontology

http://visualdataweb.de/webvowl/#iri=https://raw.githubusercontent.com/jasonclark/linked-people-bioscience/master/ontology.rdf

Researcher Profiles + Machine Readability

Structured Data

Data Model + Machine Readability

Constructing each profile as a machine-readable endpoint

Matthew W. Fields - Linked Bioscience (Demo)

Matthew W. Fields

Title Professor, Microbiology and Immunology; Director, Center for Biofilm Engineering; Biofilm Physiology & Ecology Team Leader

Department Microbiology and Immunology, Montana State University (MSU)

Phone 406-994-7164

Email matthew.fields@montana.edu

Room 366 Barnard Hall

Guides Subject and Course Help

Network subject(s)

- Ecology
- Microbiology
- Immunology

Expertise and Skill(s)

- DNA Extraction
- Genetics
- Biofuel
- Biotic Component
- Abiotic Component
- Microbial Fuel Cell

Visualizations + Data

- Vita
- Homepage
- RDF
- Visualize network
- Visualize expertise

Example Profile - https://arc.lib.montana.edu/linked-bioscience/about.html?id=14

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  "mainEntity": {
    "@id": "https://arc.lib.montana.edu/linked-bioscience/about/14#person",
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    "jobTitle": "Professor, Microbiology and Immunology;  Director, Center for Biofilm
Engineering; Biofilm Physiology &amp;amp; Ecology Team Leader",
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    "email": "matthew.fields@montana.edu",
    "image": "https://arc.lib.montana.edu/linked-bioscience/meta/img/photos/fiem-F_08.jpg",
    "telephone": "406-994-7164",
    "url": "http://www.biofilm.montana.edu/people/faculty/fields-matthew.html",
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        "roleName": "Professor, Microbiology and Immunology;  Director, Center for Biofilm
```


Structured Data (JSON-LD) -
https://arc.lib.montana.edu/linked-bioscience/about.json?id=14

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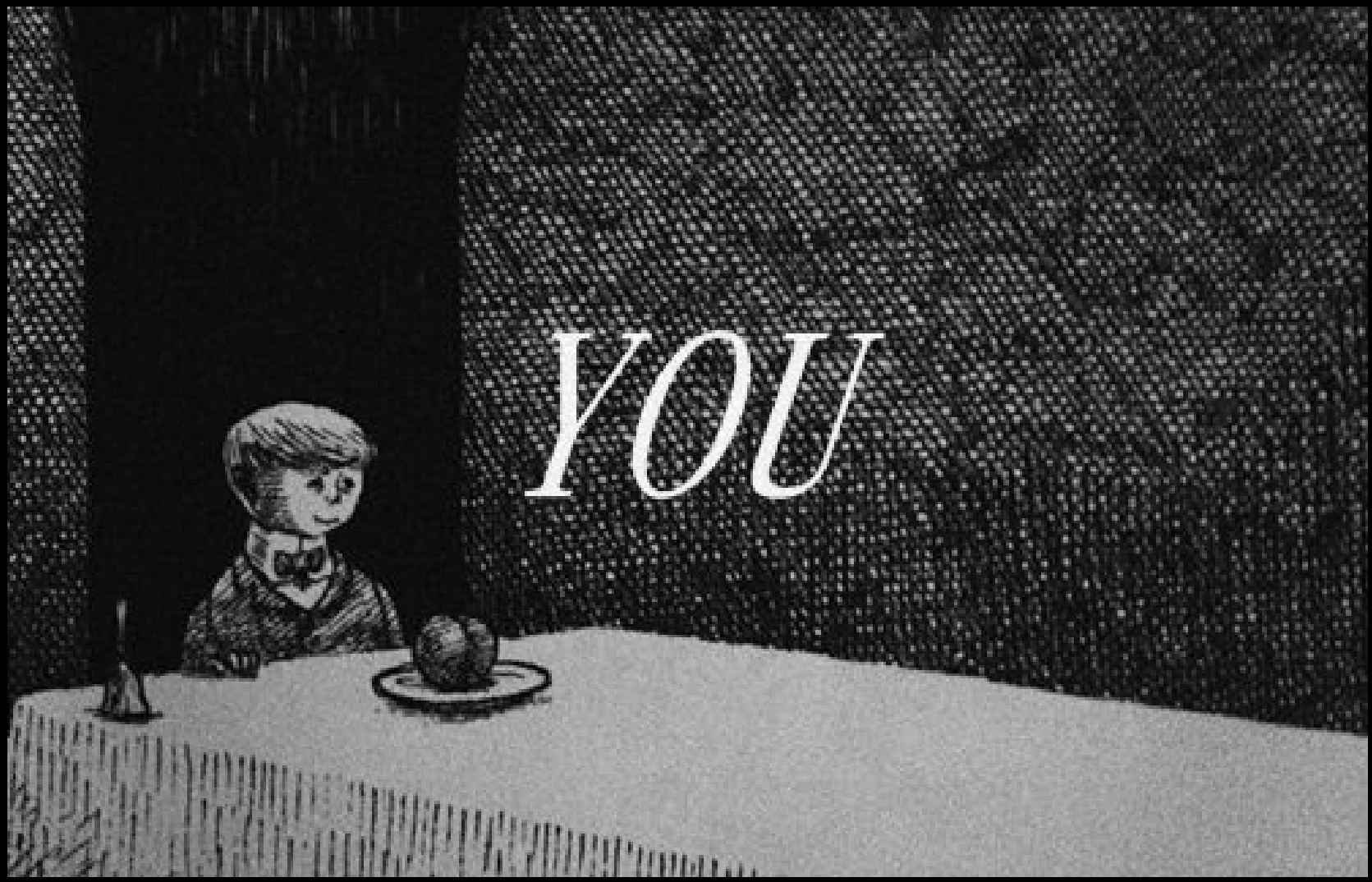
– <rdf:RDF>
  – <rdf:Description rdf:about="https://arc.lib.montana.edu/linked-bioscience/14">
      <rdf:type rdf:resource="http://schema.org/WebPage"/>
      <schema:mainContentOfPage rdf:resource="https://arc.lib.montana.edu/linked-bioscience/14#person"/>
    </rdf:Description>
  – <rdf:Description rdf:about="https://arc.lib.montana.edu/linked-bioscience/14#person">
      <rdf:type rdf:resource="https://schema.org/Person"/>
      <schema:address rdf:resource="https://arc.lib.montana.edu/linked-bioscience/14#address"/>
      <schema:organization rdf:resource="https://arc.lib.montana.edu/linked-bioscience/14#organization"/>
      <schema:name>Matthew W. Fields</schema:name>
    – <schema:jobTitle>
        Professor, Microbiology and Immunology; Director, Center for Biofilm Engineering; Biofilm Physiology & Ecology Team Leader
      </schema:jobTitle>
      <schema:telephone>406-994-7164</schema:telephone>
      <schema:email>matthew.fields@montana.edu</schema:email>
      <schema:image rdf:resource="https://arc.lib.montana.edu/linked-bioscience/meta/img/photos/fiem-F_08.jpg"/>
      <schema:url rdf:resource="http://www.biofilm.montana.edu/people/faculty/fields-matthew.html"/>
      <schema:primaryImageOfPage rdf:resource="https://arc.lib.montana.edu/linked-bioscience/meta/img/photos/fiem-F_08.jpg"/>
      <schema:colleague rdf:resource="https://arc.lib.montana.edu/linked-bioscience/14"/>
      <schema:colleague rdf:resource="https://arc.lib.montana.edu/linked-bioscience/17"/>
      <schema:makesOffer>http://dbpedia.org/resource/DNA_extraction</schema:makesOffer>
      <schema:makesOffer>http://dbpedia.org/resource/Genetics</schema:makesOffer>
      <schema:makesOffer>http://dbpedia.org/resource/Biofuel</schema:makesOffer>
      <schema:makesOffer>http://dbpedia.org/resource/Biotic_component</schema:makesOffer>
      <schema:makesOffer>http://dbpedia.org/resource/Abiotic_component</schema:makesOffer>
      <schema:makesOffer>http://dbpedia.org/resource/Microbial_fuel_cell</schema:makesOffer>
      <schema:affiliation xml:lang="en">Montana State University (MSU)</schema:affiliation>
      <schema:worksFor xml:lang="en">Montana State University (MSU)</schema:worksFor>
      <schema:memberOf xml:lang="en">Microbiology and Immunology</schema:memberOf>
      <owl:sameAs>http://orcid.org/0000-0001-9053-1849</owl:sameAs>
      <schema:sameAs rdf:resource="http://orcid.org/0000-0001-9053-1849"/>
```


Structured Data (RDF) - https://arc.lib.montana.edu/linked-bioscience/about.rdf?id=14

Working on these machine tasks, left me feeling...


YOU

I needed to find a social network for the idea.

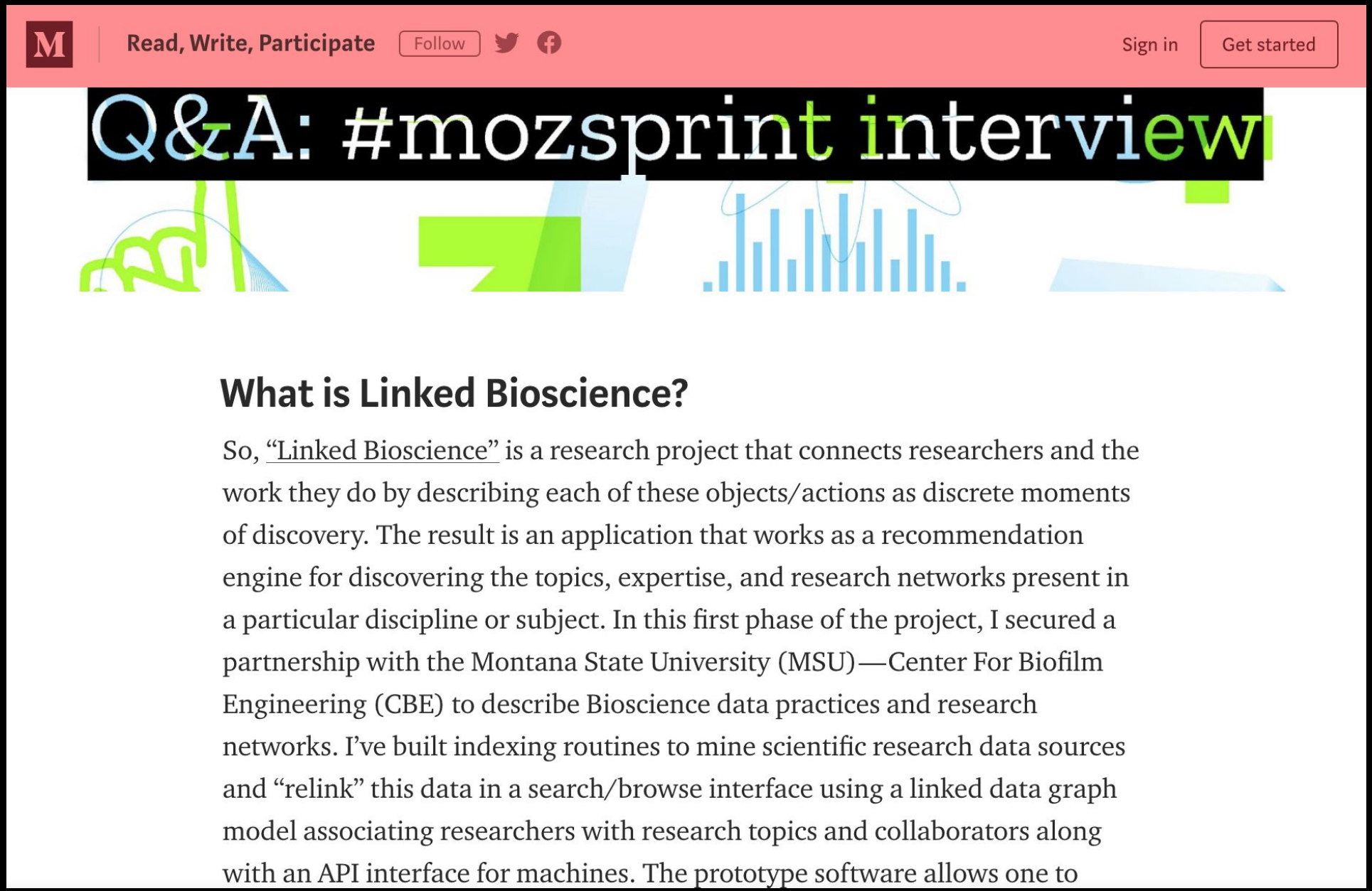
Working in the Open

A goal of building this as open source software for reuse

Mozilla Open Leaders

A cohort of Open Leaders fueling the #internethealth movement through mentorship & training on working open http://mozilla.github.io/leadership-training/

Mozilla Open Leaders Fellow



Network + Mentorship

Data hacking to create overall network visualization of researcher relationships OR citation network #8

Edit | New issue

Open **jasonclark** opened this issue on Jun 1 · 6 comments

jasonclark commented on Jun 1 • edited — Owner

There are about 35 researchers that form the network included in this release. Any ideas for these specific visualizations are welcome. **Brainstorming and sketching without code are welcome.**

Each researcher has a profile page which has some nice data (rdf, json-ld) behind the scenes in the markup.

This includes structured data for the page.
https://arc.lib.montana.edu/linked-bioscience/about.json?id=2

And structured data for the person.
https://arc.lib.montana.edu/linked-bioscience/person.json?id=2

And an indexable/spiderable list of all json-ld files is available in a sitemap.
https://arc.lib.montana.edu/linked-bioscience/sitemap-list-jsonld.xml

Those are open data endpoints that can be used to power a research network visualization.

I also have a list of publications produced by these researchers since 2008. It is in a .CSV format and can be a data source for a visualization related to the works created by the group.

Publication list as .csv

Assignees
No one—assign yourself

Labels
mozsprint

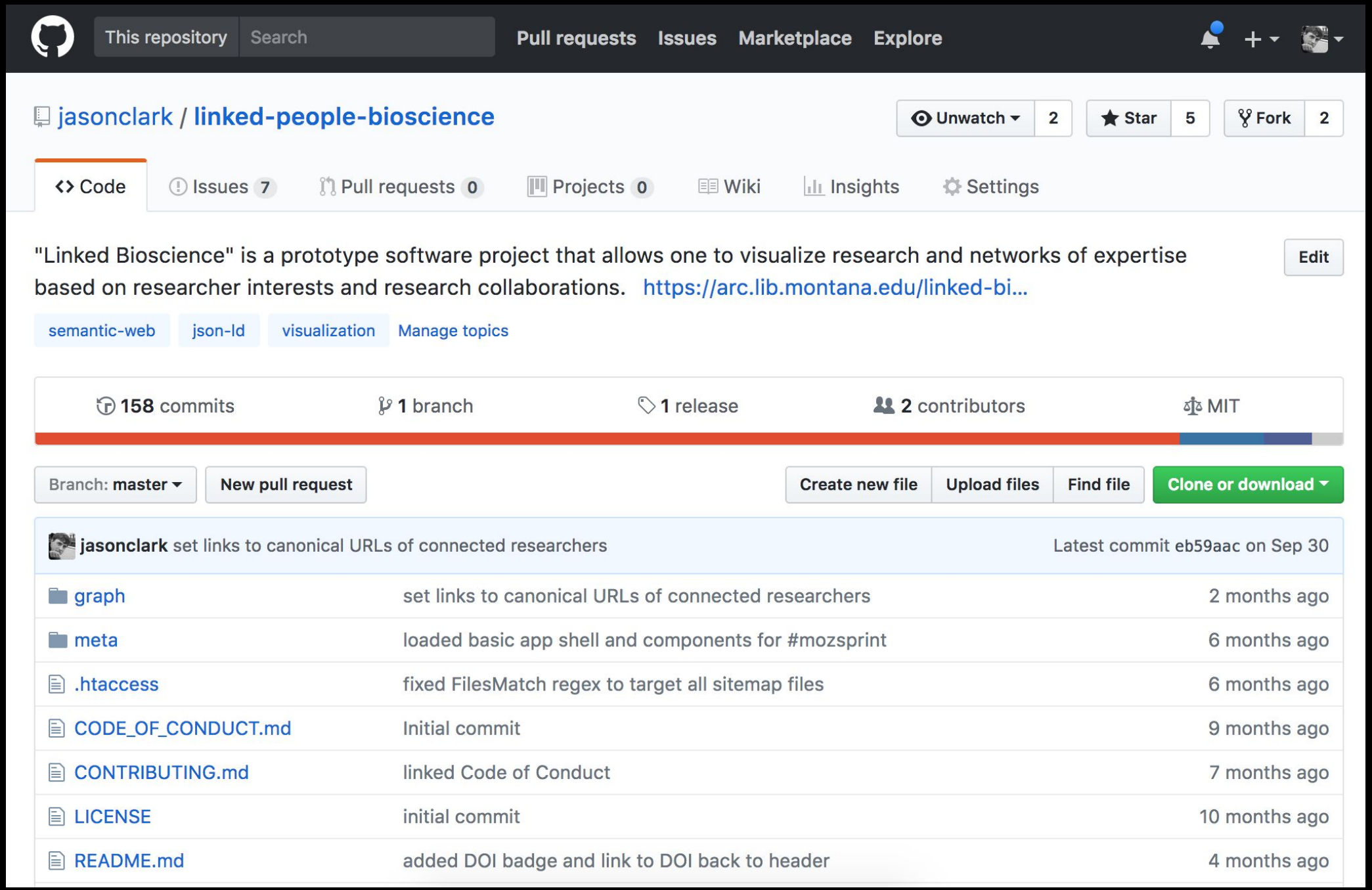
Projects
None yet

Milestone
No milestone

Notifications
Unsubscribe
You're receiving notifications because you were mentioned.

3 participants

Sponsorship during Global Sprint



https://github.com/jasonclark/linked-people-bioscience

Results + Next Steps

API + Open Data for Analyzing Scholarly Networks

Matthew W. Fields - Linked Bioscience (Demo)

Matthew W. Fields

Title Professor, Microbiology and Immunology; Director, Center for Biofilm Engineering; Biofilm Physiology & Ecology Team Leader

Department Microbiology and Immunology, Montana State University (MSU)

Phone 406-994-7164

Email matthew.fields@montana.edu

Room 366 Barnard Hall

Guides Subject and Course Help

Network subject(s)

- Ecology
- Microbiology
- Immunology

Expertise and Skill(s)

- DNA Extraction
- Genetics
- Biofuel
- Biotic Component
- Abiotic Component
- Microbial Fuel Cell

Visualizations + Data

- Vita
- Homepage
- RDF
- Visualize network
- Visualize expertise

Example Profile - https://arc.lib.montana.edu/linked-bioscience/about.html?id=14

HTML

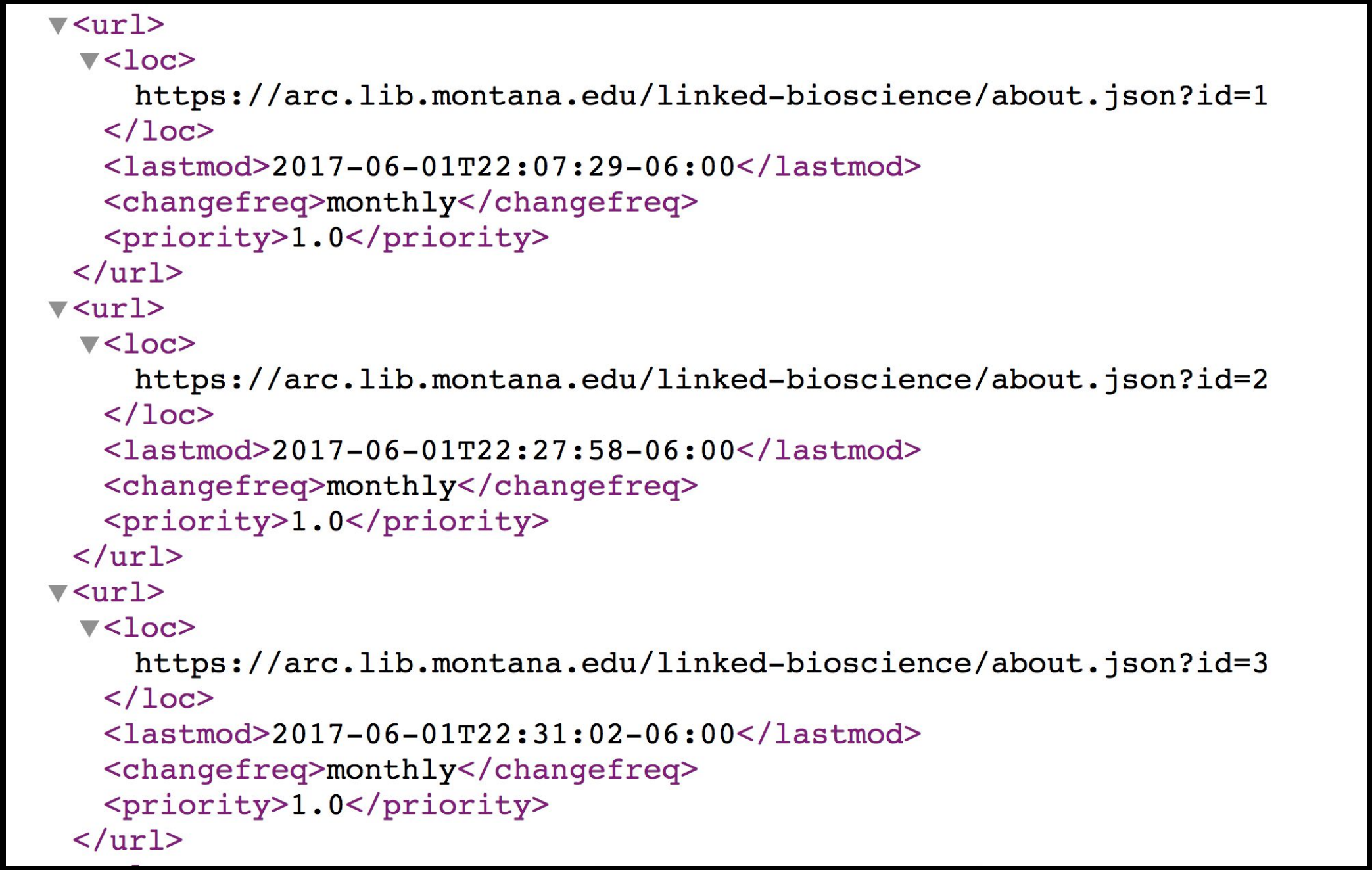
https://arc.lib.montana.edu/linked-bioscience/about.html?id=14

JSON-LD

https://arc.lib.montana.edu/linked-bioscience/about.json?id=14

RDF

https://arc.lib.montana.edu/linked-bioscience/about.rdf?id=14



Harvestable Research Graph

https://arc.lib.montana.edu/linked-bioscience/sitemap-list-jsonld.xml

Recommendation Engine

Linked Bioscience

Home | Search | Browse

Graphing Researcher Profiles for Discovery

Search

fluid dynamics

Topics

Search

Browse by Network Area

Show me the network topics

- Examples: Biochemistry, Microbiology, Physics, etc.

Search

Enter people or topics... People Search

Your search for **fluid dynamics** resulted in **12** items.

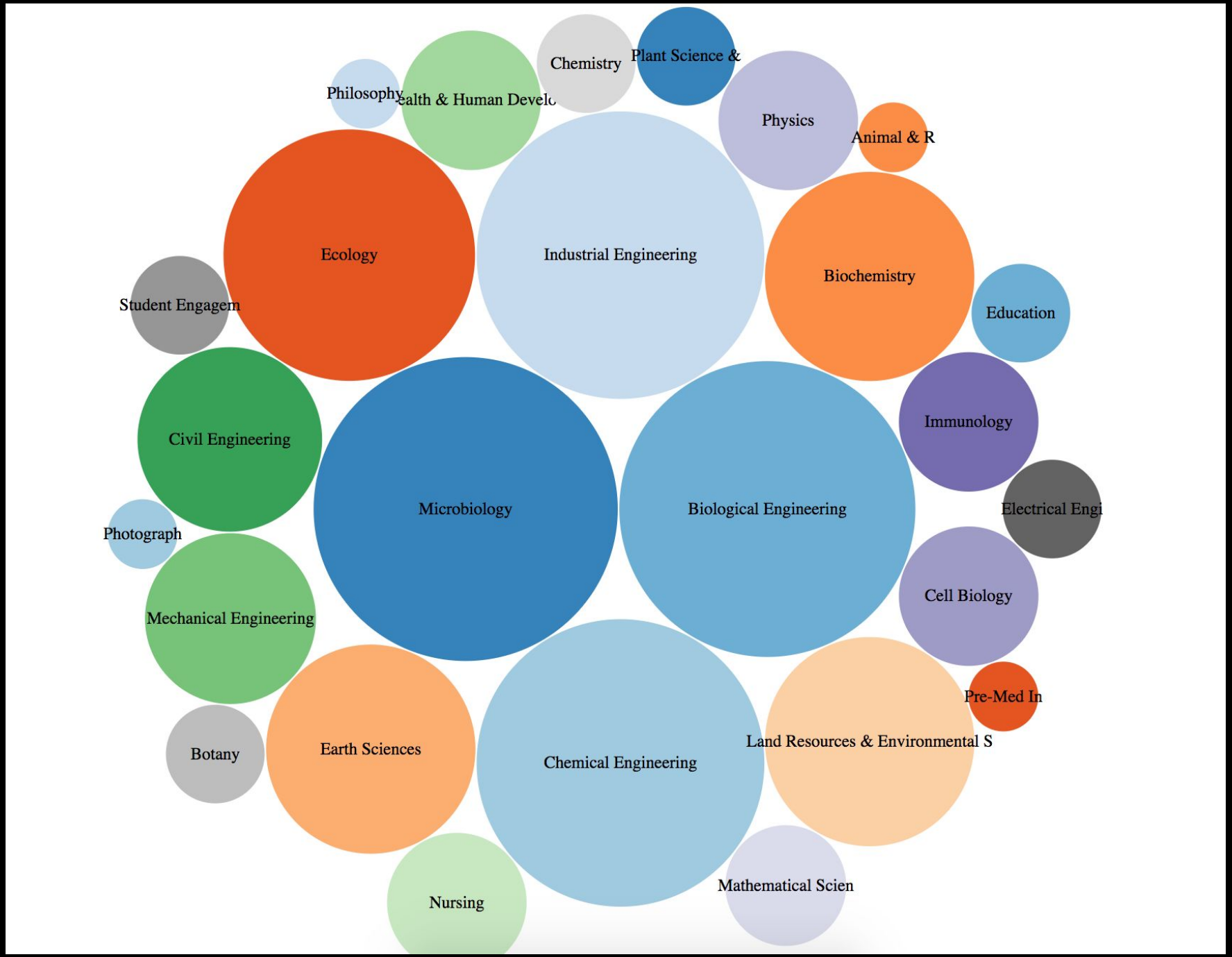
Run new search? Back to Homepage

- 
- **Jennifer R. Brown**

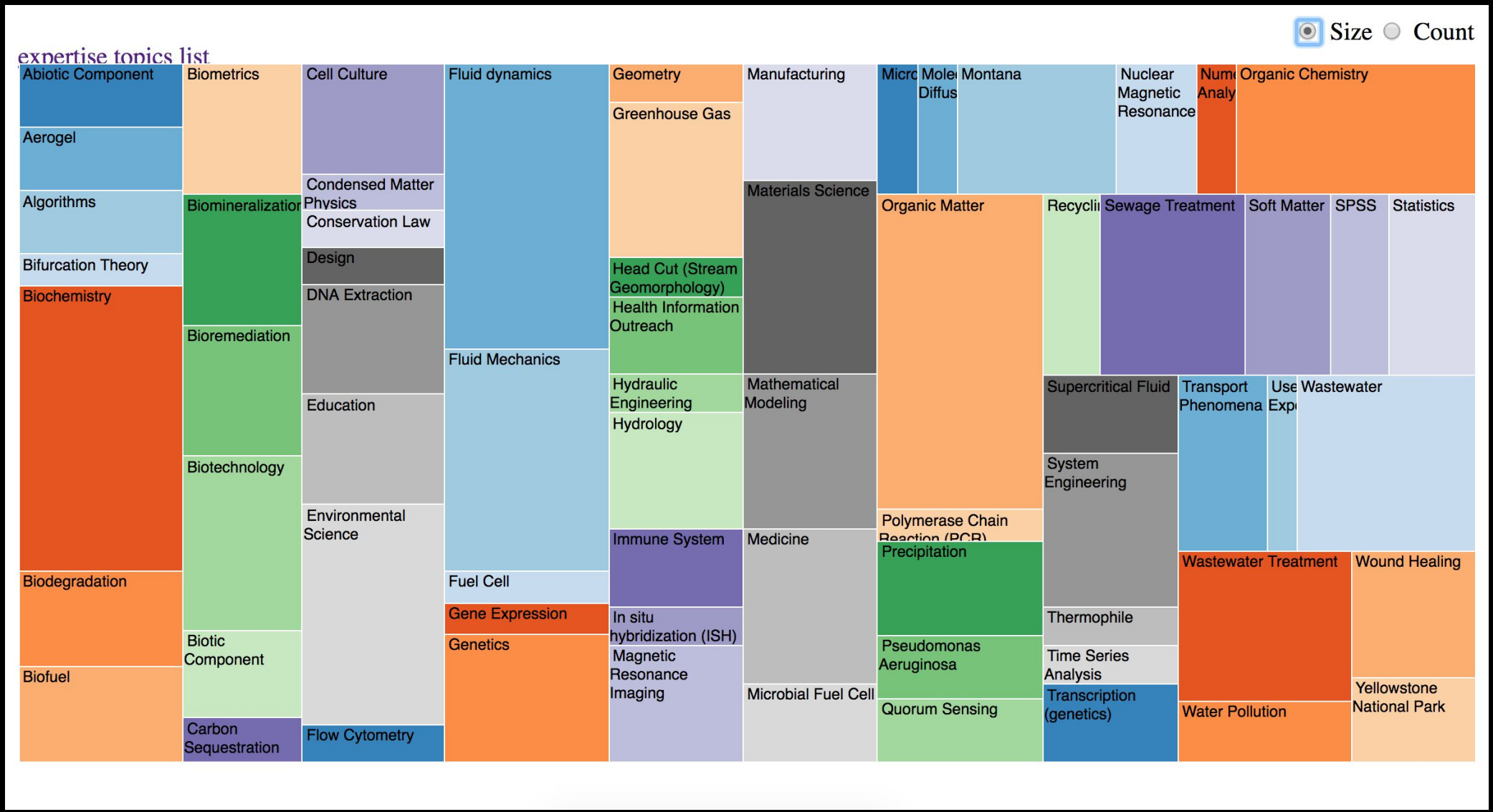
  Title: Assistant Professor, Chemical and Biological Engineering

  Department: Chemical and Biological Engineering

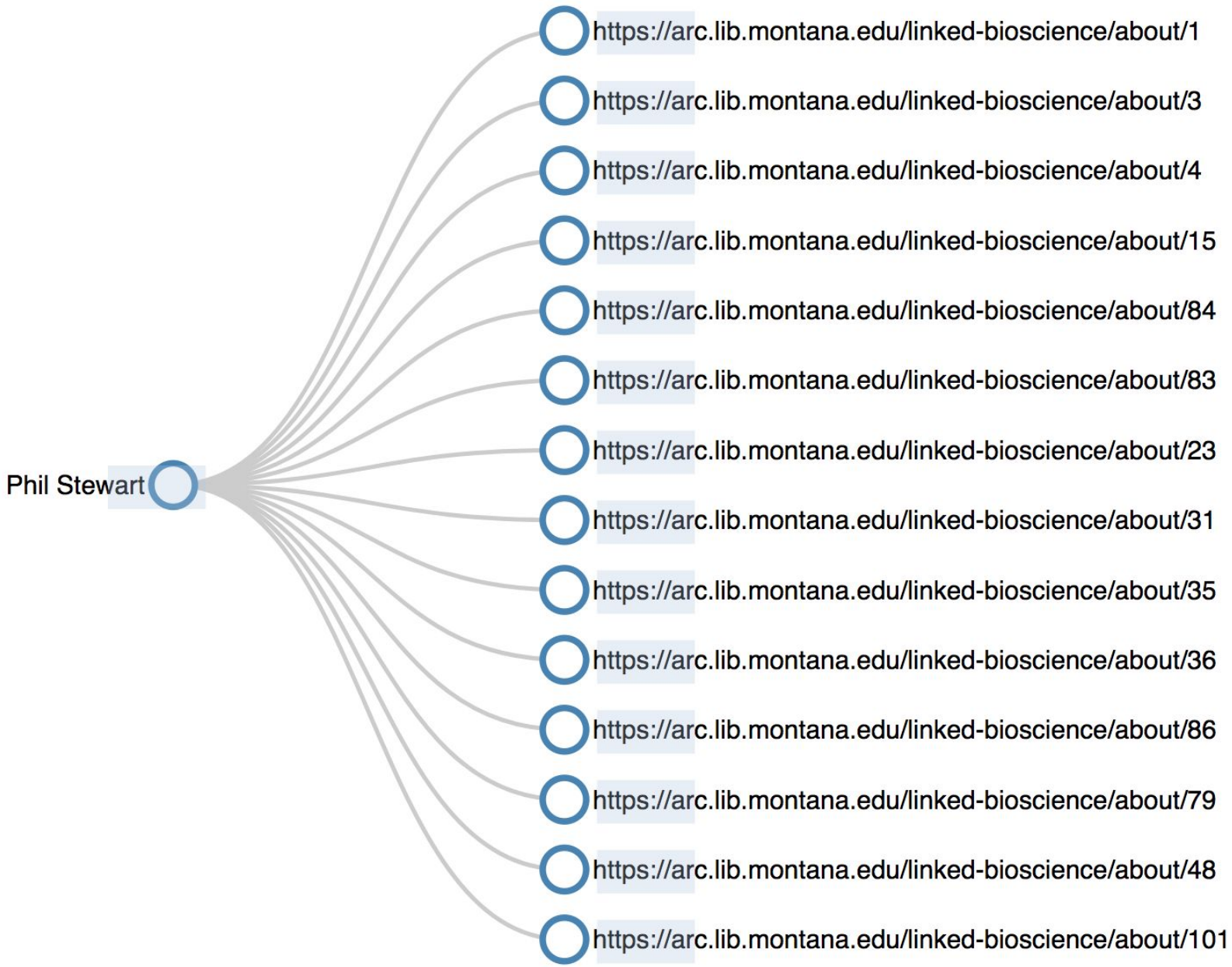
Data Visualization



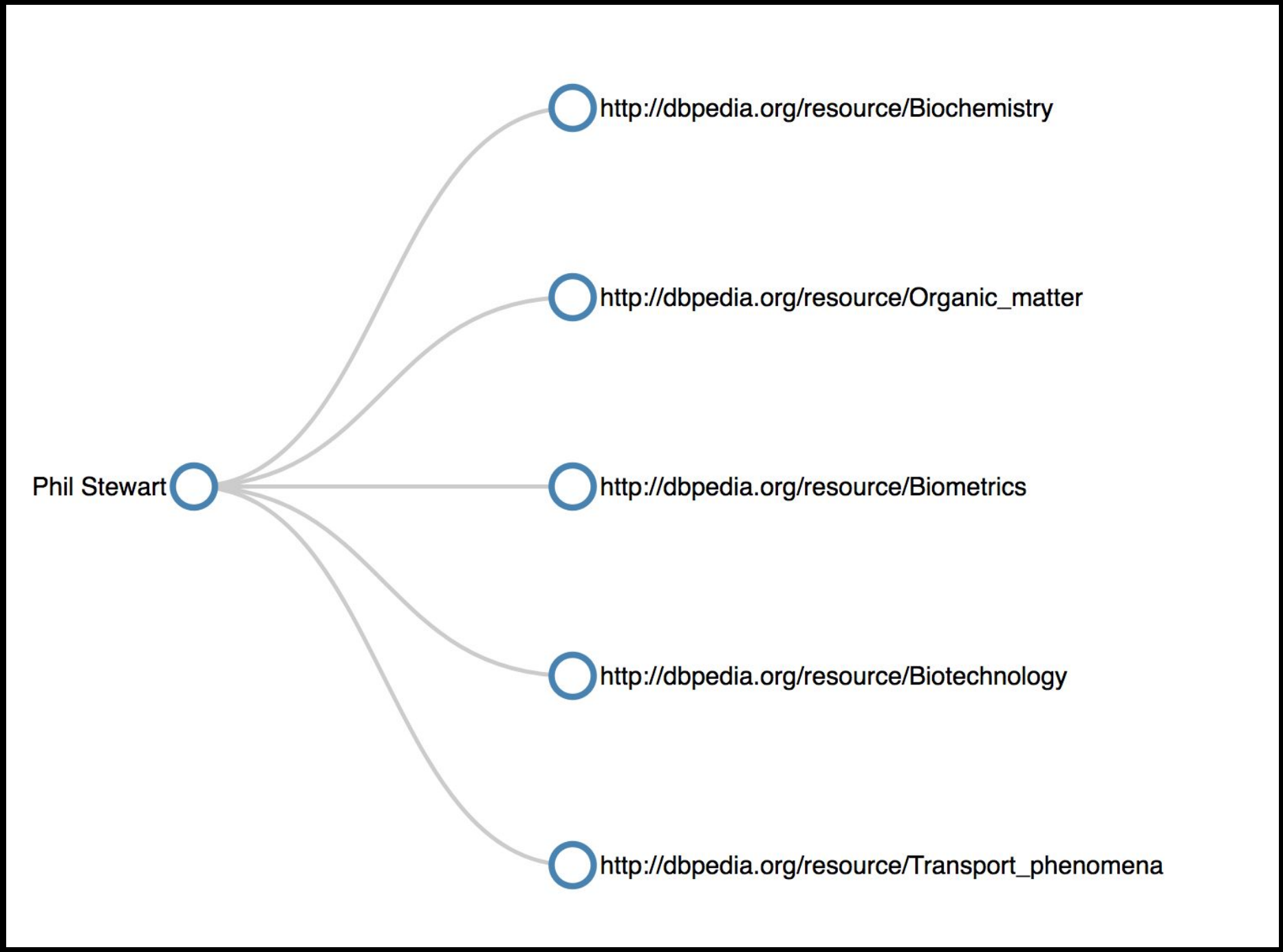
Example Topic Visualization -
https://arc.lib.montana.edu/linked-bioscience/graph/network-bubble.html



Example Treemap of Expertise Visualization - https://arc.lib.montana.edu/linked-bioscience/graph/expertise-treemap.html

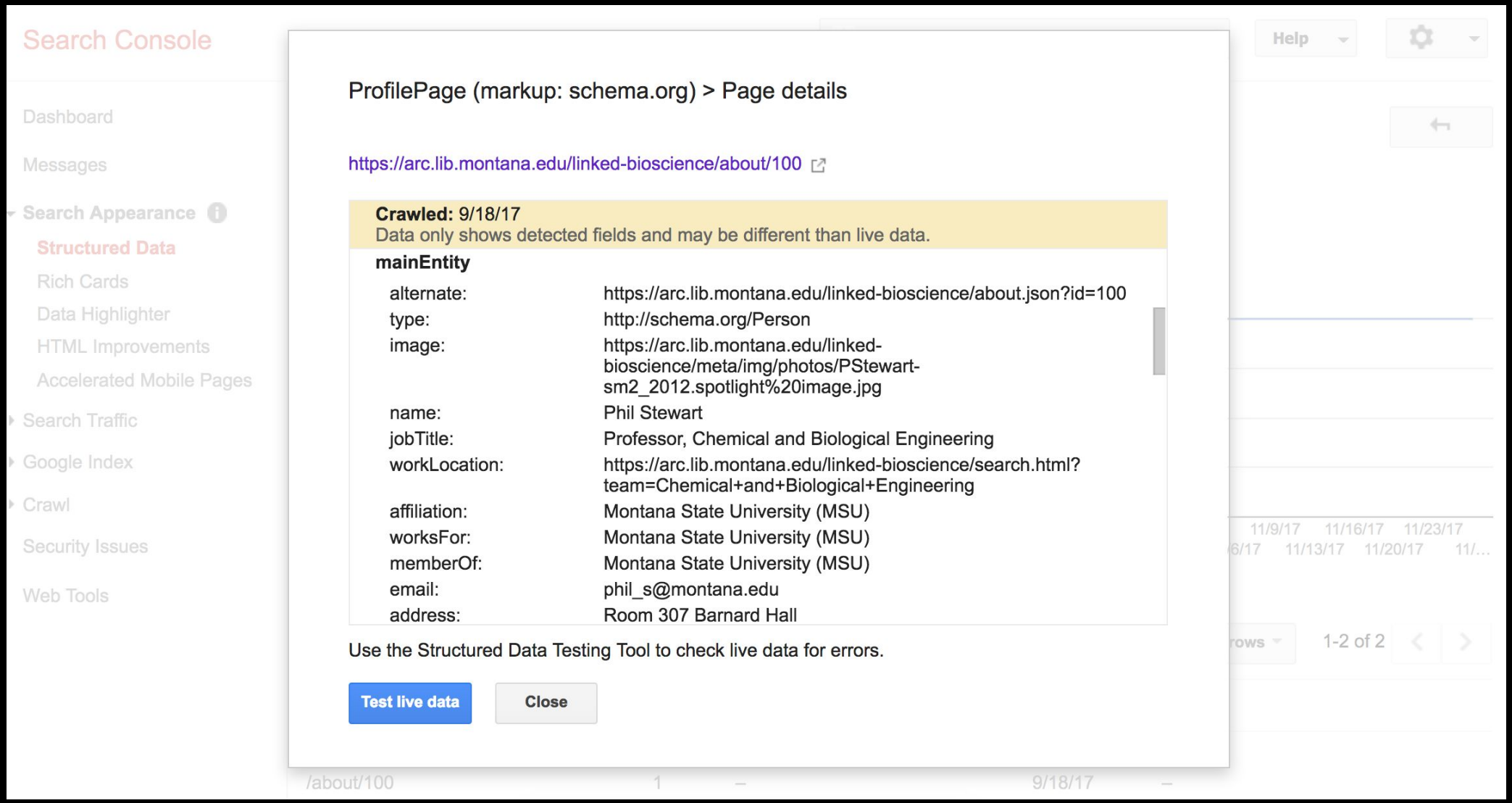


Example Individual Network Visualization -
https://arc.lib.montana.edu/linked-bioscience/graph/network-bubble.html

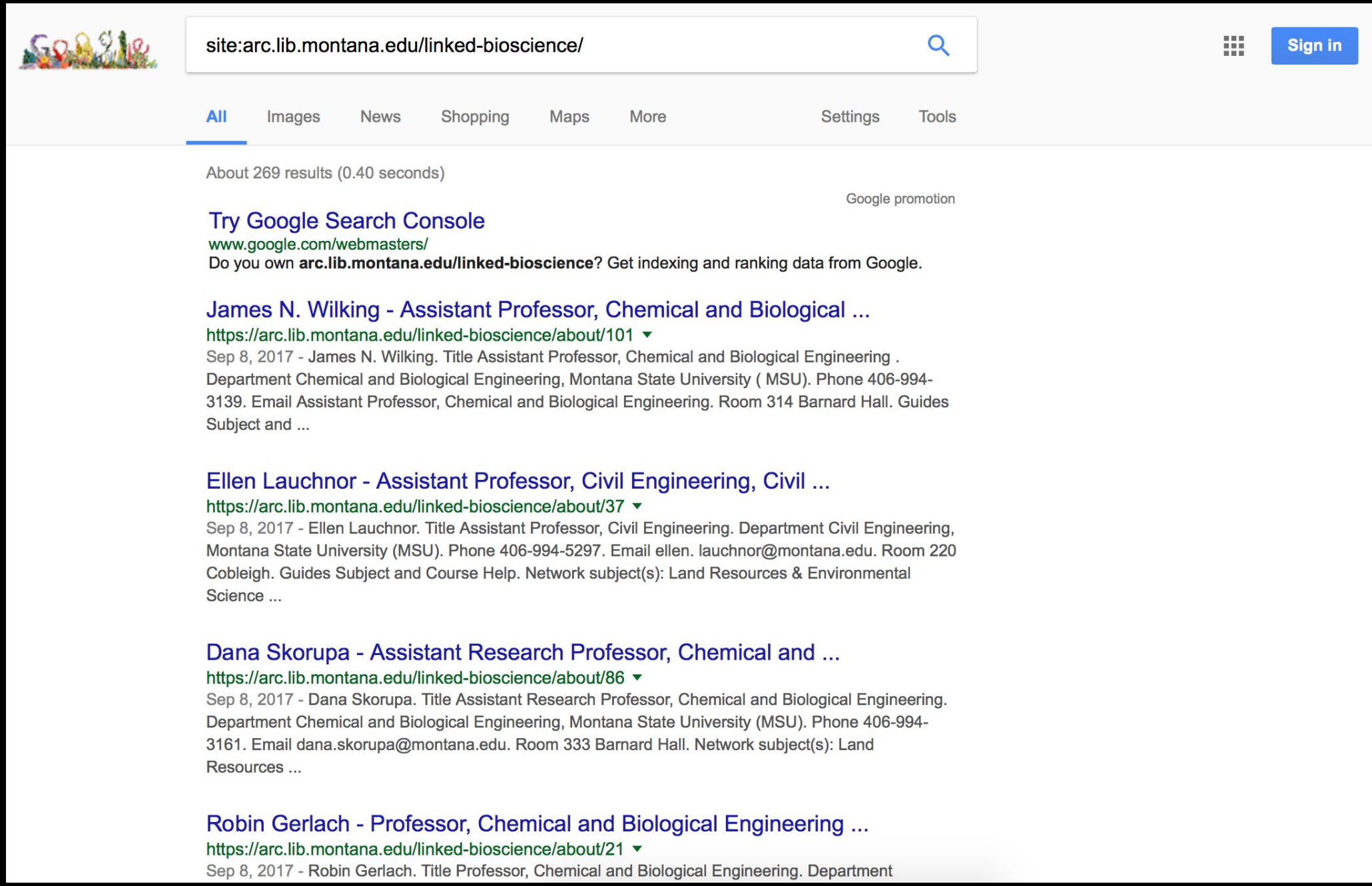


Example Individual Expertise Visualization -
https://arc.lib.montana.edu/linked-bioscience/graph/network-bubble.html

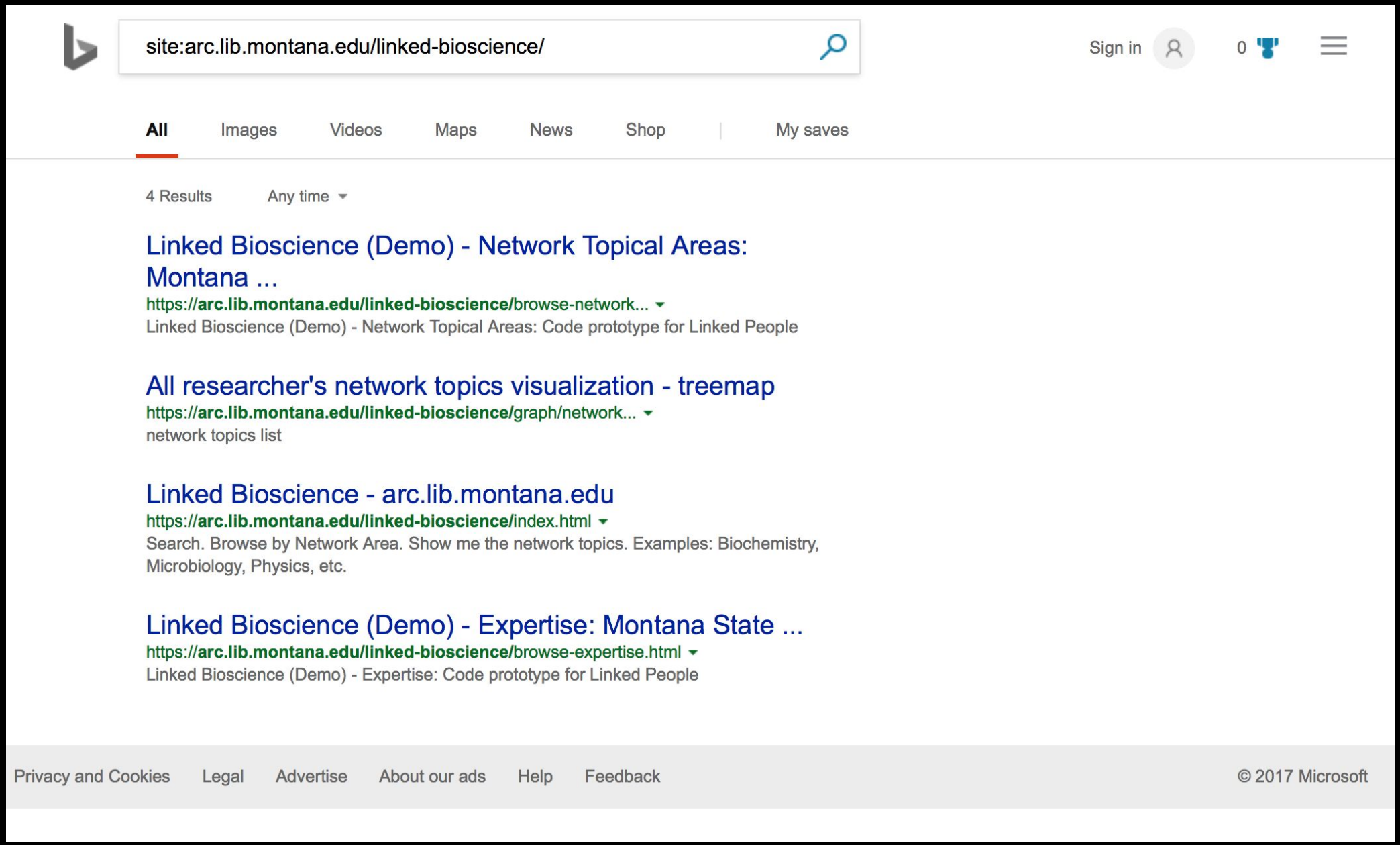
Machine Interpretation



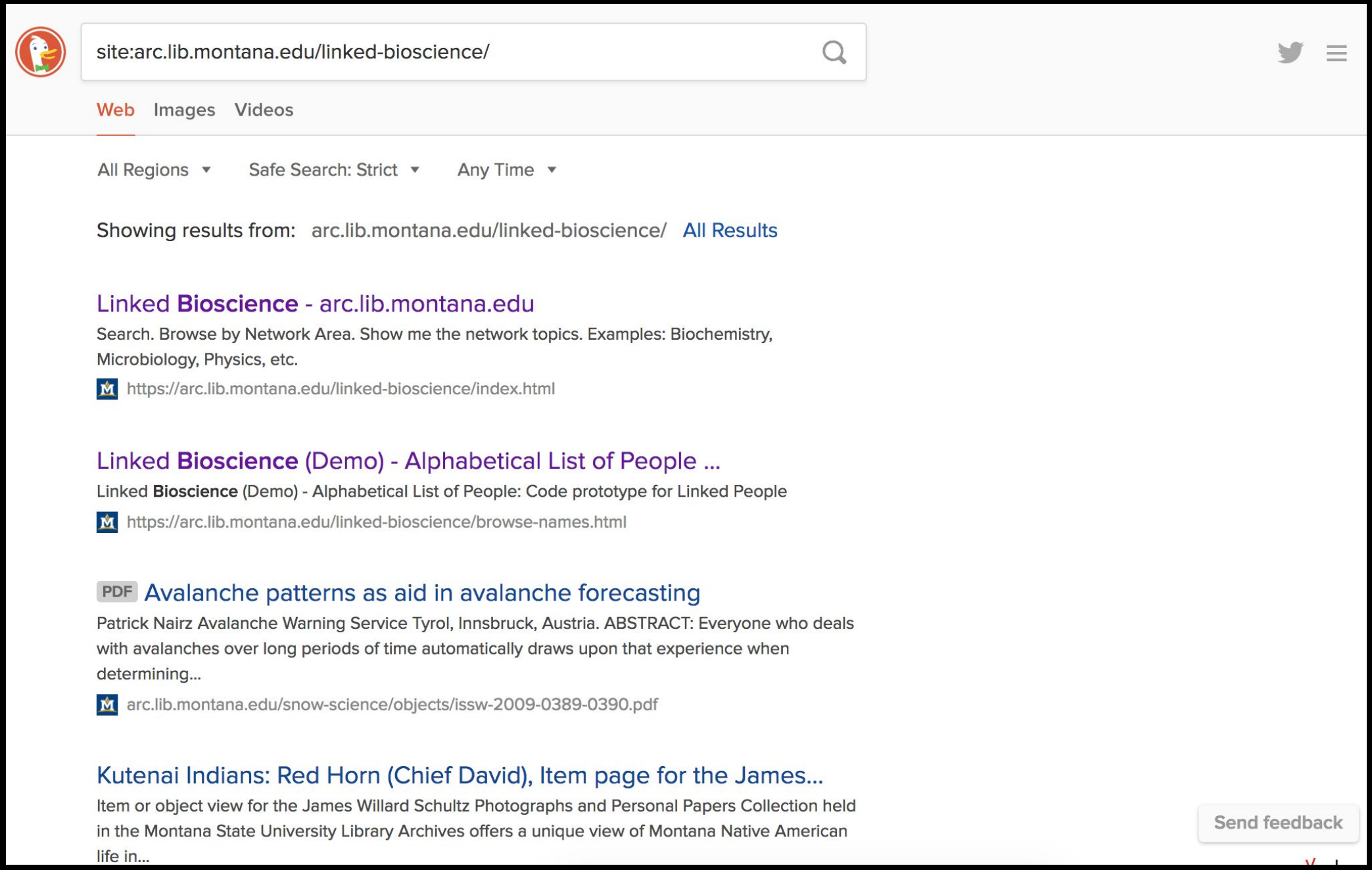
Interpretation of Researcher Profiles for Discovery in Search Engines



Linked Bioscience in a Google Search Engine Result Page (SERP)



Linked Bioscience in a Bing Search Engine Result Page (SERP)



Linked Bioscience in a DuckDuckGo Search Engine Result Page (SERP)

Where do we go from here?

- Continue to benchmark machine interpretation by search engines
- Adding to ontology based on researcher feedback
- Develop version 2 of interface with user experience testing
- Pilot new researcher profiles with additional departments and centers

- Publish research article on prototype
- Seek grant funding for continued development
- Incorporate activity into local initiatives such as Data Infrastructure & Scholarly Communication (DISC)

Reweaving the Web = Magic

'Tis true. There’s magic in the web of it.
A sibyl, that had numbered in the world
the sun to course two hundred
compasses, in her prophetic fury sewed
the work.

The Scholarly Tissues of Our Research...

The Woven Record of How We Do Research...

Building analyzable and “hackable” datapoints for researchers and programmers.

Building transparency around our research for our collaborators, our administrators, and our citizens .

Questions?

twitter.com/jaclark
www.jasonclark.info

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

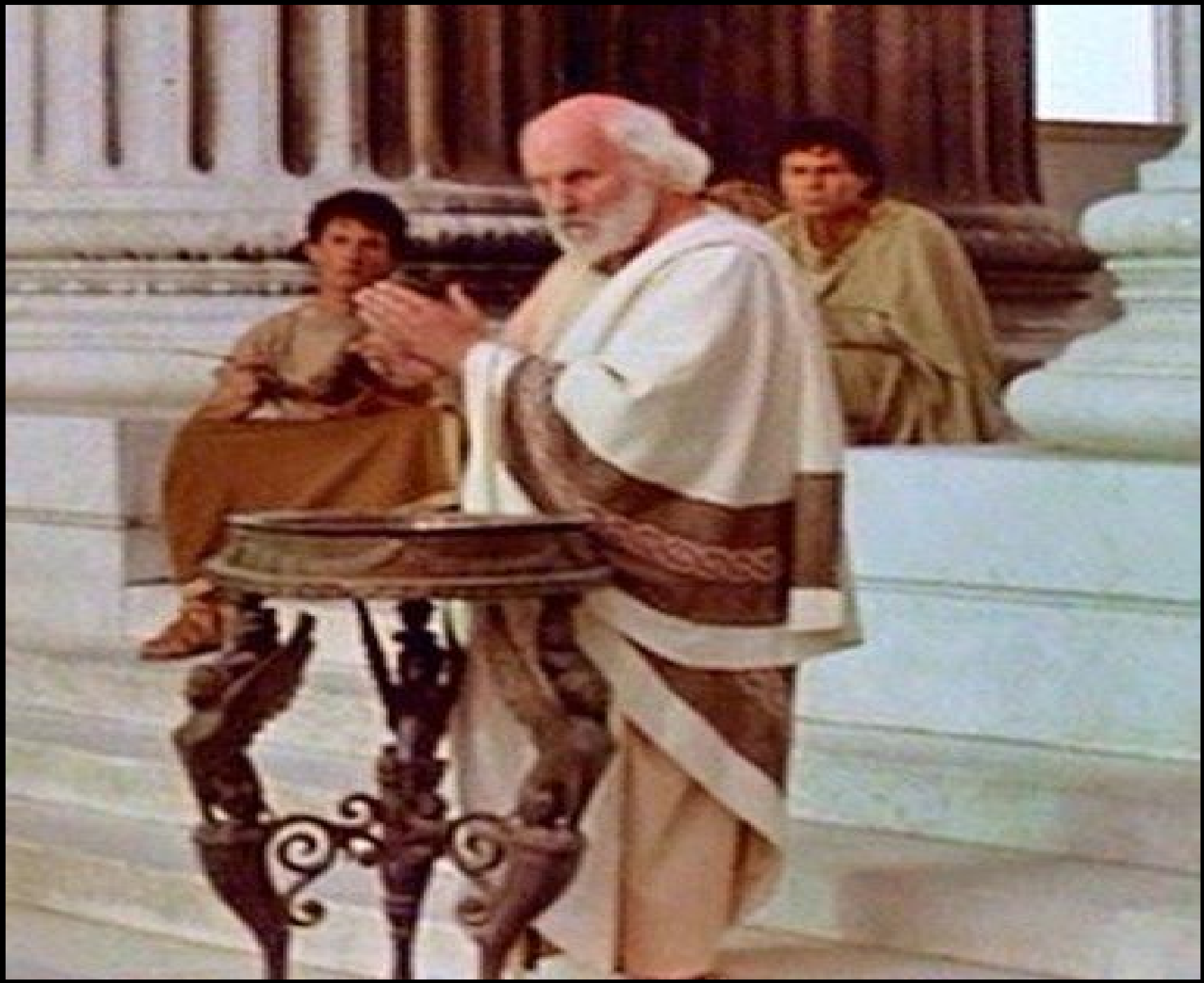
Koster, Lukas (2011) Brief Introduction to Linked Data (open access) https://docs.google.com/document/d/1W6UOCLgxTyM0BlPfd5hs58dh4k6CUdLW354AjjtnJfk/edit

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

"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



Defining Terms and Truths

“a method of publishing structured data so that it can be interlinked and become more useful. It builds upon standard Web technologies such as HTTP, RDF and URIs, but rather than using them to serve web pages for human readers, it extends them to share information in a way that can be read automatically by computers. This enables data from different sources to be connected and queried.”

http://en.wikipedia.org/wiki/Linked_data

What is Linked Open Data?

- Practice of publishing structured, machine actionable data with an open license for sharing and reuse.

Principles of Publishing LOD

- Use URIs for description
- Make structured data available on WWW
- Allow for machine-actionability and sharing through common ontologies

* machine-actionable is a term used by Karen Coyle to mean readable and interpretable by computers or software agents. See her Library Technology Report on *Understanding the Semantic Web* at http://www.metapress.com/content/g212v1783607/

Resource Description Framework (RDF)

A structured data format for expressing relationships (descriptions) between things (resources).

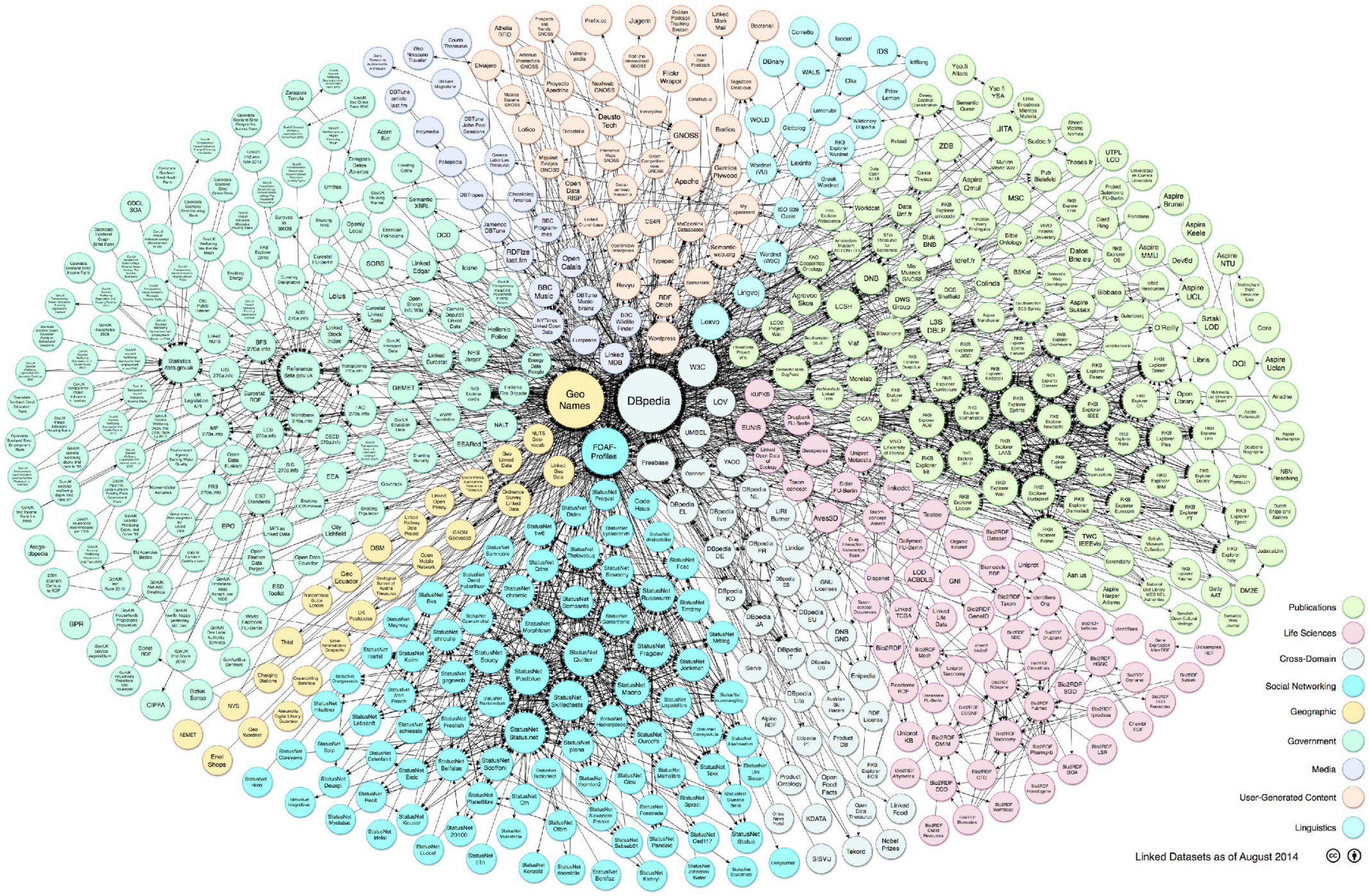
http://www.xml.com/pub/a/2001/01/24/rdf.html

The data model of RDF is based on the idea of a triple.

A triple is a simple statement with three distinct parts:

1. a subject
2. a predicate
3. an object

	A	B	C	D	E	F
1	Title	Author	Publisher	OCLC #	ISBN	Notes
2	This house of sky : landscapes of a Western mind	Ivan Doig	New York: Harcourt Brace Jovanovich, 1992.	25629631	0151900558	
3	To skin a cat : stories	Thomas McGuane	New York: Dutton/S. Lawrence, 1987.	15549047	0394755219	
4	Young men & fire	Norman Maclean	Chicago : University of Chicago Press, 1992.	283736539	0226500624	
5	A river runs through it, and other stories	Norman Maclean	Chicago: University of Chicago Press, 1976.	442266245	0671776975	Also a film version from Robert Redford http://en.wikipedia.org
6	The horse whisperer	Nicholas Evans	New York: Delacorte Press, 1995.	35722048	0440222656	
7	Hiking Yellowstone National Park	Bill Schneider	Helena, Mont: Falcon Press, 2003.	52500539	0762725397	2nd edition (Hiking Guide Series)



Linking Open Data cloud diagram 2014, by Max Schmachtenberg, Christian Bizer, Anja Jentzsch and Richard Cyganiak. http://lod-cloud.net/

Acknowledgements

I would like to thank Alison Hitchens for her excellent work in explaining and teaching these 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.