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Data Management

Jack O'Gorman
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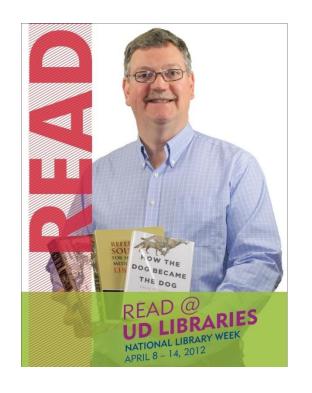
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Data Management SOCHE May 2017



Jack O'Gorman

Reference and Instruction Librarian/

Associate Professor

Roesch Library

University of Dayton

jogorman1@udayton.edu

937-220-2324

Research Data Defined

"Research data means the recorded factual material commonly accepted in the scientific community as necessary to validate research findings, but not any of the following:

- Preliminary analyses
- Drafts of scientific papers
- Plans for future research
- Peer reviews
- Communication with colleagues"

Big Data Defined

"Big Data should be understood as a putatively new mode of knowledge production, based on the global retention of all data, rather than the measure of a specific volume."

Data Management Defined

"Data Management is the compilation of many small practices that make your data easier to find, easier to understand, less likely to be lost, and more likely to be usable during a project, or ten years later. Data Management is fundamentally about taking care of one of the most important things you create during the research process: your data."

(Briney p.7)

Briney, K. (2015). Data management for researchers: Organize, maintain and share your data for research success. Exeter, UK: Pelagic Publishing.

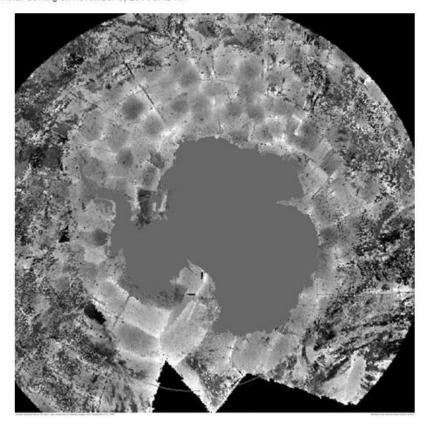
Data Management Plans

"Proposals submitted to NSF must include a supplementary document of no more than two pages labeled "Data Management Plan" (DMP). This supplementary document should describe how the proposal will conform to NSF policy on the dissemination and sharing of research results. Proposals that do not include a DMP will not be able to be submitted."

Problem: Unreadable Data

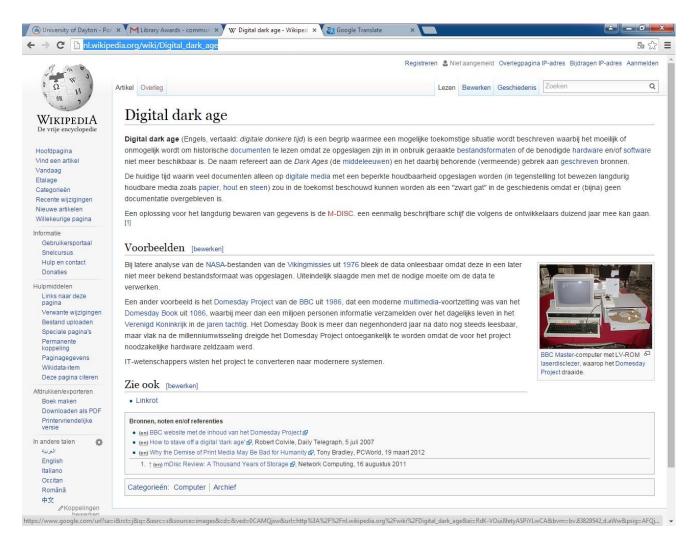
Earliest Satellite Images of Antarctica

By Keith Cowing on November 6, 2014 6:45 PM



http://www.moonviews.com/2014/11/earliest-satellite-images-of-antarctica.html#more

Problem: Digital Dark Ages





Contents lists available at ScienceDirect

Environmental Research





Submicrometer particles and their effects on the association between air temperature and mortality in Brisbane, Australia



Lina Wang a, Shilu Tong b, Ghasem (Sam) Toloo b, Weiwei Yu b,*

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^a State Environmental Protection Key Laboratory of Environmental Risk Assessment and Control on Chemical Process, East China University of Science and Technology, Shanghai, China

Problem: Retracted Articles



Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres



Retraction notice to "Submicrometer particles and their effects on the association between air temperature and mortality in Brisbane, Australia" [Environ. Res. 128 (2014) 853–860]



Lina Wang a, Shilu Tong b, Ghasem (Sam) Toloo b, Weiwei Yu b

This article has been retracted: please see Elsevier Policy on Article Withdrawal (http://www.elsevier.com/locate/withdrawalpolicy).

This article has been retracted at the request of the Authors following an inquiry from the Queensland University of Technology (QUT). The inquiry found and it was confirmed by the authors that:

The article contained misleading and inaccurate information. Specifically, there was:

- incorrect analysis of the data, partly as a consequence of a failure of communication regarding the nature of the data set and how it was collected.
- incorrect and misleading description of how and when the data set was collected
- · failure to correctly attribute the source of the data.
- an incorrect description of the statistical methods and data selection.
- incorrect citation of papers in the description of the data collection.

2. Accuracy of publication:

- The authors of the paper make misleading statements at Sections 2.1 (Data Collection) and 2.2 (Data Analysis). Specifically the authors:
 - imply that one or more of them participated in the collection of the dataset:
 - gave a false impression that the analysis was based on a far greater body than actually existed; and
 - conducted an analysis that was based on incorrect assumptions about the data.
- · Conclusions of the paper are flawed.

3. Incorrect citation and author acknowledgement:

 The final sentence in Section 4 (Discussion) of the Paper makes two incorrect citations to Crouse et al. (2009, 2010).

^a State Environmental Protection Key Laboratory of Environmental Risk Assessment and Control on Chemical Process, East China University of Science and Technology, Shanghai, China

School of Public Health and Social Work, Institute of Health and Biomedical Innovation, Queensland University of Technology, Brisbane, QLD, Australia

Retractionwatch.com

Retraction Watch

without comments

Tracking retractions as a window into the scientific process

Top 10 most highly cited retracted papers

Harvey P, Valentine A, Davies SE, Walker-Smith JA.

Ever curious which retracted papers have been most cited by other scientists? Below, we present the list of the 10 most highly cited retractions. Readers will see some familiar entries, such as the infamous Lancet paper by Andrew Wakefield that originally suggested a link between autism and childhood vaccines. You'll note that many papers - including the #1 most cited paper - received more citations after they were retracted, which research has shown is an ongoing problem. As always, we will update the list as more information comes to light.

Article	Year of retraction	Cites before retraction	Cites after retraction	Total cites from journal indexed by Web of Science
1. <u>Visfatin: A protein secreted by visceral fat that mimics the effects of insulin</u> . SCIENCE, JAN 21				
2005				
Fukuhara A, Matsuda M, Nishizawa M, Segawa K, Tanaka M, Kishimoto K, Matsuki Y, Murakami M, Ichisaka T, Murakami H, Watanabe E, Takagi T, Akiyoshi M, Ohtsubo T, Kihara S, Yamashita S, Makishima M, Funahashi T, Yamanaka S, Hiramatsu R, Matsuzawa Y, Shimomura I.	2007	247	776	1023
2. <u>Ileal-lymphoid-nodular hyperplasia</u> , non- specific colitis, and pervasive developmental disorder in children. LANCET, FEB 28 1998				
THE SECOND COST TWO SET RESIDENCE AND SECOND COST OF THE SECOND COST				
Wakefield AJ, Murch SH, Anthony A, Linnell J, Casson DM, Malik M, Berelowitz M, Dhillon AP, Thomson MA		675	308	983

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The Center For Scientific Integrity

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The Retraction Watch FAQ. including comments policy

The Retraction Watch Transparency Index

The Retraction Watch Leaderboard

Top 10 most highly cited retracted papers

The Retraction Watch Store Upcoming Retraction Watch

appearances

What people are saying about Retraction Watch

Problem: Personal Data Shared



"In early August we discovered that sensitive personally identifiable information appeared in some full text documents contained in the ERIC collection. Specifically, social security numbers and other highly sensitive information were found in multiple documents and in a way that could not easily be isolated. For that reason, we had to temporarily disable access to many full text documents."

"We are seeking to restore access to documents as soon as possible. In order to restore access to ERIC, we have to check every document to see if it contains personally identifiable information."

"Documents will be returned on a rolling basis and may take several weeks, but we are working as fast as possible." —email from "ERIC Team" August 2012

Opportunity: Shared Data

Global scientific community commits to sharing data on Zika

10 February 2016



Leading global health bodies including academic journals, NGOs, research funders and institutes, have committed to sharing data and results relevant to the current Zika crisis and future public health emergencies as rapidly and openly as possible.

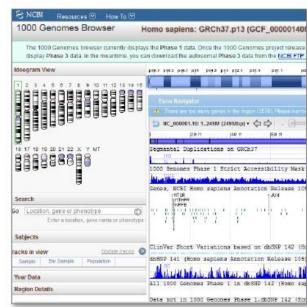
Organisations including the Bill and Melinda Gates Foundation, Médecins Sans Frontières, the US National Institute of Health and the Wellcome Trust, along with leading academic journals including Nature, Science and the New England Journal of Medicine, have signed a joint declaration and hope that other bodies will come on board in the coming weeks.

Scholarly examples of "big data"

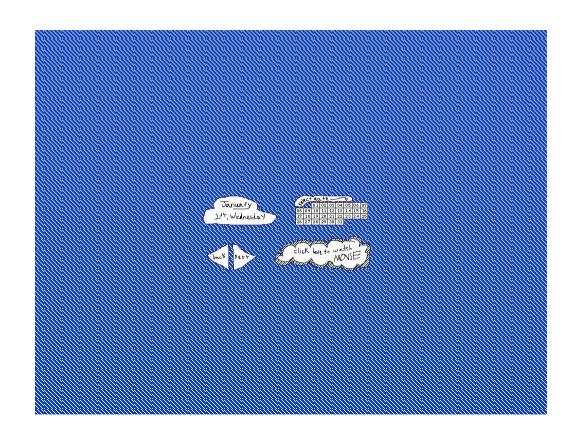
 First human genome sequence took resources from 20 institutions, 13 years, and \$3 billion to determine the order of 3 Billion nucleotides. Today some labs are sequencing the equivalent of 320 genomes per week.

Fukornys_clamarensis 12/11/2014 10:45:00 PM Fulmerus_glecielis 1/9/2015 2:24:00 PM 6/12/2014 12:00:00 AM GENOME REPORTS 5/15/2014 12:00:00 AM Galeopterus_variegatus 1/8/2015 8:56:00 AM Gellus_gellus 6/28/2013 12:00:00 AM 11:12:00 AM Geospiga_fortis 1/23/2014 12:00:00 AM Glycine max 11/14/2014 3/31/00 PM Gorilla_gorilla 10/29/2013 12:00:00 AM HUMAN MICROBIOM 4/19/2012 12:00:00 AM 12:00:00 AM H sapiens Halianetus_albicilla 1/9/2015 2/24/00 PM Haliaeetus_leucocephalus 12/9/2014 3:12:00 AM 10/30/2014 5:18:00 PM Haplochromis burtoni Harpegnathos_saltator 1/23/2015 9:38:00 PM Heterocephalus glaber 10/29/2013 12:00:00 AM Homo sapiens 12/14/2012 12:00:00 AM Hydra_magnipapillata 3/8/2013 12:00:00 AM Hydro_vulgaris 11/27/2013 12:00:00 AM 2/6/2015 3:43:00 PM INFLUENZA 2/9/2015 11:29:00 AM 1/23/2014 12:00:00 AM lctidomys_tridecemlineatus 10/29/2013 12:00:00 AM laculus jaculus 12/23/2014 3:52:00 PM Larimichthys_crocea

AAGATTCCGAATGCA GCGTATAGCTAGCTA TCTACGATAGTACTG TGCGACGTACCTAAA



New Form of Scholarly Communication Data Descriptor





Home ▶ Data Descriptors ▶ Data Descriptor

SCIENTIFIC DATA | DATA DESCRIPTOR OPEN



Pantheon 1.0, a manually verified dataset of globally famous biographies

Amy Zhao Yu, Shahar Ronen, Kevin Hu, Tiffany Lu & César A. Hidalgo

Affiliations | Contributions | Corresponding authors

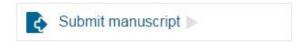
Scientific Data 3, Article number: 150075 (2016) | doi:10.1038/sdata.2015.75

Received 12 February 2015 | Accepted 13 November 2015 | Published online 05 January 2016

About Scientific Data

Scientific Data is an open-access, peer-reviewed journal for descriptions of scientifically valuable datasets. Our primary article-type, the Data Descriptor, is designed to make your data more discoverable, interpretable and reusable.





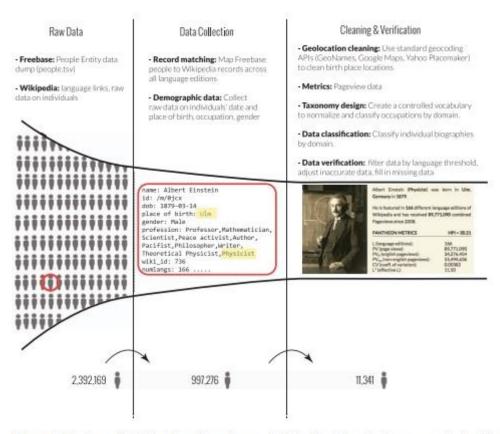


Figure 1. Pantheon Data Workflow. Flow diagram detailing the data collection process for the Pantheon 1.0 (n = 11,341). Inset image from pantheon.media.mit.edu.

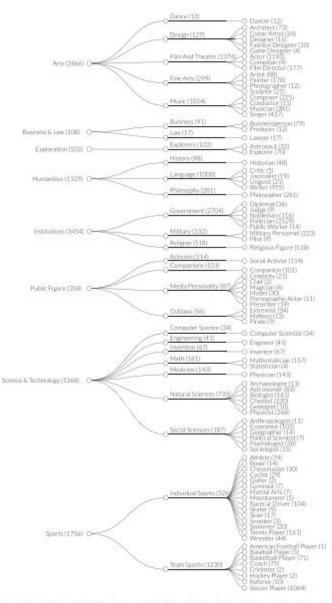


Figure 3. Domain Taxonomy. From left to right: domain (i.e., Sports), industry (i.e., Team Sports) and occupation (i.e., Soccer Player).

Famous People:

- Pirate (9)
- Mathematician (157)
- Soccer Player (1064)

Data Records

The Pantheon dataset is publicly available on the Harvard Dataverse Network and can be accessed directly at: https://dataverse.harvard.edu/dataverse/pantheon. The dataset is visualized at http://pantheon. media.mit.edu, a data visualization engine that allows users to dynamically explore the dataset through interactive visualizations.

The data consists of three files—pantheon.tsv, wikilangs.tsv, and pageviews_2008-2013.tsv (Data Citation 1).

The first file, pantheon.tsv, is a flattened tab-limited table, where each row of the table represents a unique biography. Each row contains the following variable fields:

- name—name of the historical character (in English)
- en_curid—unique identifier for each individual biography, maps to the pageid from Wikipedia. To
 map to an individual's biography in Wikipedia, use the en_curid field as an input parameter to the
 following URL: http://en.wikipedia.org/?curid=[en_curid]. We use the English curid as the unique
 identifier in the Pantheon dataset; we confirmed that all biographies with L>25 as of May 2013 had an
 entry in the English Wikipedia.
- countryCode- ISO 3166-1 alpha2 (based on present-day political boundaries)
- countryCode3- ISO 3166-1 alpha3 country code (based on present-day political boundaries)
- · countryName—commonly accepted name of country
- continentName—name of continent
- birthyear—birthyear of individual
- · birthcity-given birthcity of individual
- · occupation-occupation of the individual
- · industry-category based on an aggregation of related occupations
- · domain-category based on an aggregation of related industries
- gender-male or female
- TotalPageViews—total pageviews across all Wikipedia language editions (January 2008 through December 2013)
- L_star—adjusted L (see Appendix for calculation)
- numlangs—number of Wikipedia language editions that each biography has a presence in (as of May 2013)
- StdPageViews—s.d. of pageviews across time (January 2008 through December 2013)
- PageViewsEnglish—total pageviews in the English Wikipedia (January 2008 through December 2013)
- PageViewsNonEnglish—total pageviews in all Wikipedias except English (January 2008 through December 2013)
- AverageViews—Average pageviews per language (January 2008 through December 2013)
- HPI—Historical Popularity Index (see equation (4))

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Data Citations

Yu, A. Z., Ronen, S., Hu, K., Lu, T. & Hidalgo, C. Harvard Dataverse http://dx.doi.org/10.7910/DVN/28201 (2014).

Data Set Citations

ELSEVIER



View in a browser



Scopus Newsletter: April 2017

Linking to research datasets

Research dataset links can now be found on the Scopus Document details page. Through collaboration with the Data Literature Interlinking (DLI) service and Scholix, Scopus is able to link articles with datasets when available on the external data repository. Now, when research datasets are available on the external data repository for an article, the Scopus Document details page will include a "Related Research Data" sidebar, located to the right of the article details.

Another Example

A Pox on History

mail, in a little piece of 350-year-old human skin. And the surprise discovery is dramatically rewriting the history of one of the most notorious diseases to plague humankind.

Ana Duggan, an evolutionary geneticist at McMaster University, was collaborating with scientists in Lithdesiccated corpses found in the crypt of a church in Vilnius. Out of the more than 500 corpses interred there. most had decomposed but about 200 were preserved by the cool dry conditions in the crypt. The sample that startled Duggan came from the leg of a toddler entombed between 1643 and 1665.

Duggan and colleagues were analyzing DNA in the skin sample to learn something about the child's life and death. While probing for evidence of the JC polynomavirus a common bug, they tested the sample for virus DNA-and instead found the variola virus, which causes smallpox.

Known for its signature blisters and gruesome deaths, smallpox killed 300 million people in the 20th century and has long been a scourge of humanity. But how long? Scientists have argued that it has been with us for at least 10,000 years, Researchers have found pockmarks on the face of a 3,000-yearhistorical texts describe epi- its DNA, errors sneak into arose in the late 1500s or

demics of a smallpox-like disease in fourth-century China and second-century Rome. Still the 17th-century

variola virus DNA detected by Duggan and colleagues is the oldest definitive trace of smallpox that researchers have found. Which is why Duggan and her adviser. Hendrik Poinar, took the next sten: After nieging together the genome of the virus in their sample, they compared it with the published genomes of 42 other variola strains collected in the 20th century before 1980, when smallpox was eradicated. As old Egyptian mummy. And a virus replicates and copies

The last natural case of in Somalia in 1977.

the genome at a fairly regular rate; the newer the virus strain the more mutations it will harbor. Looking at the DNA mutations in all those variola virus strains, and assuming a steady mutation rate, the researchers worked backward to create a variola the life of that Lithuanian family tree and calculate the age of the strain that gave rise SCIENCE to all the others, including the one in 17th-century Vilnius.

Duggan and Poinar's analysis, published in Current Biology, concludes that variola as we know it likely A child from 17thcentury Europe might have just rewritten the book on a deadly scourge

early 1600s-thousands of years later than researchers currently believe "We have to go back and rethink it all," says Ann Carmichael a historian at Indiana University, Bloomington, who studies smallpox epidemics.

If variola virus didn't cause deadly outbreaks until about 500 years ago, what was behind the earlier plagues attributed to smallpox? "That's the million-dollar question," Poinar says. One possibility researchers say, is another virus with similar symptoms like chickenpox or measles.

Another puzzle: If small pox virus wasn't around until the late 1500s or so, how did epidemics of smallpox or a similar disease strike indisenous people in the Americas before then? Researchers think those outbreaks might have been tristered by a lase viru-Europeans had become immune to before they carried it to the New World where people were susceptible to it. Meanwhile, in Europe, the virus mutated into something more lethal, causing terrible outbreaks, one of which took

were analyzing DNA in the skin sample to learn something about the child's life and death. While probing for evidence of the JC polyomavirus, a common bug, they tested the sample for virus DNA—and instead found the variola virus, which causes smallpox.

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Still, the 17th-century variola virus DNA detected by Duggan and colleagues is the oldest definitive trace of smallpox that researchers have found. Which is why Duggan and her adviser, Hendrik Poinar, took the next step: After piecing together the genome of the virus in their sample, they compared it with the published genomes of 42 other variola strains collected in the 20th century before 1980, when smallpox was eradicated. As a virus replicates and copies its DNA, errors sneak into

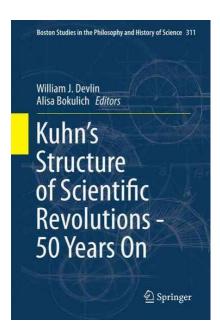
The last natural case of smallpox was recorded in Somalia in 1977.

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Duggan and Poinar's analysis, published in *Current Biology*, concludes that variola as we know it likely arose in the late 1500s or

Paradigm Shift

- Scholars as users and producers of scholarly resources - including data
- Scholars need to know of the existence and availability of data repositories

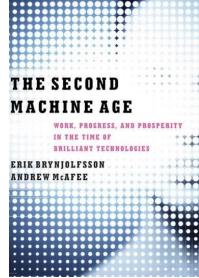


Discoverability of Data

- How does one find data sources?
 - Discipline specific
 - Repositories are generally tied to functional domains
 - Usual literature sources pay attention to data citations.
 - Data management resource guides

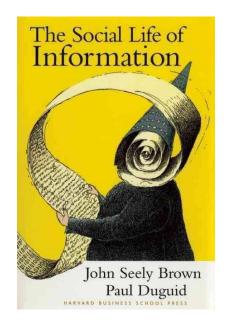
Keeping Up

- But there is the challenge of keeping up...
- Changes described above are coming faster than the pace of producing new scholars.
- Scholars must stay agile and aware of developments.
- Second half of the chessboard.

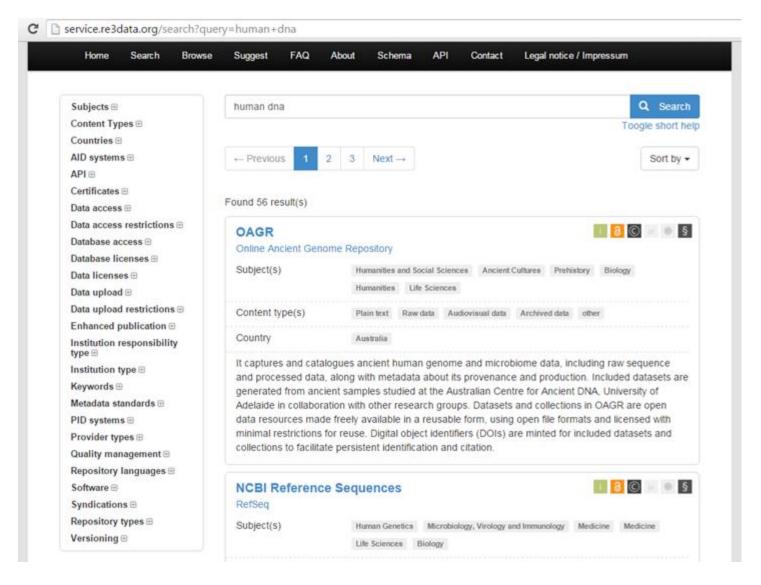


Networks of Scholars

- Increasing importance of social networks to find these partners and sources
- Knowledge is found in a distributed network of people



Data Clearinghouses: re3data.org



Citing Data Resources

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DOI

- dx.doi.org/10.7910/DVN/28201
- Digital Object Identifier
- Assumes that items are "born digital"







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China National Knowledge Infrastructure (CNKI) ISTIC (The Institute of Scientific and Technical Information of China)



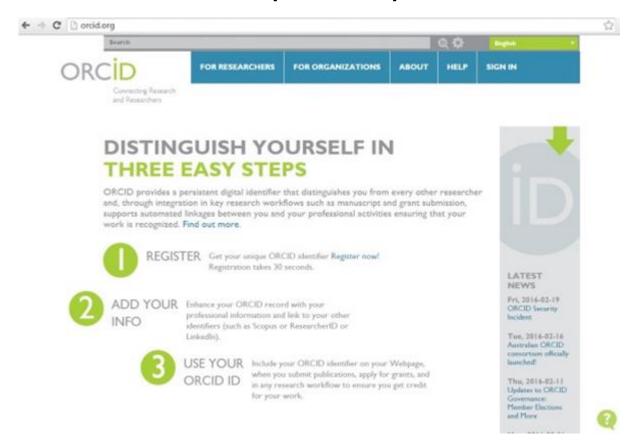


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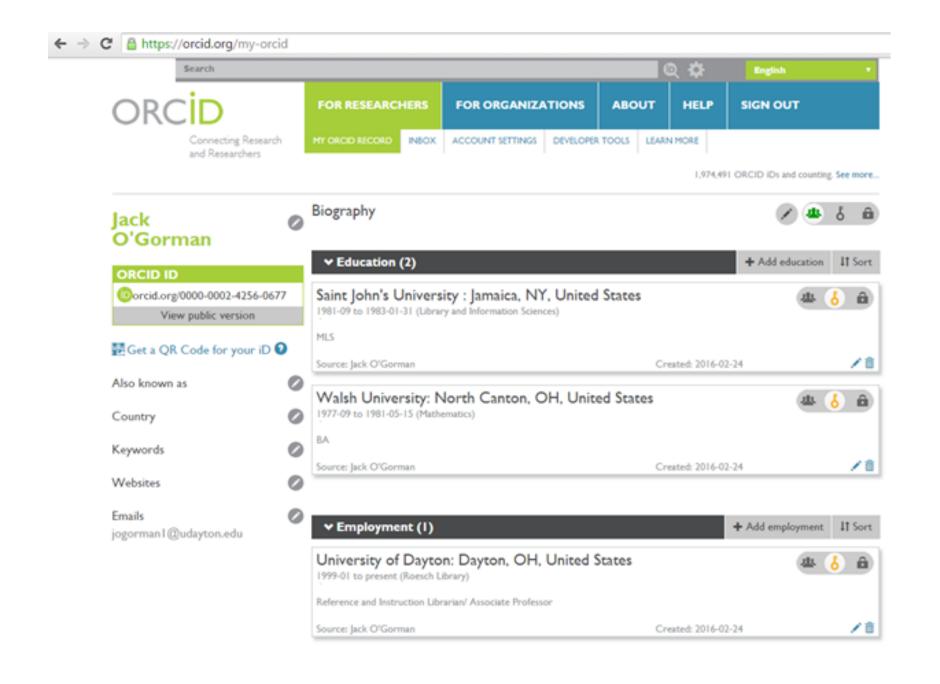
Finding Researchers

 Role of disambiguation in researcher networks (ORCID)



ORCID

- ORCID is stands for Open Researcher and Contributor ID https://orcid.org/content/o-orcid
- When UD graduate students complete their thesis, the library encourages them to get an ORCID as part of Electronic Theses & Dissertation registration
- You should consider one too





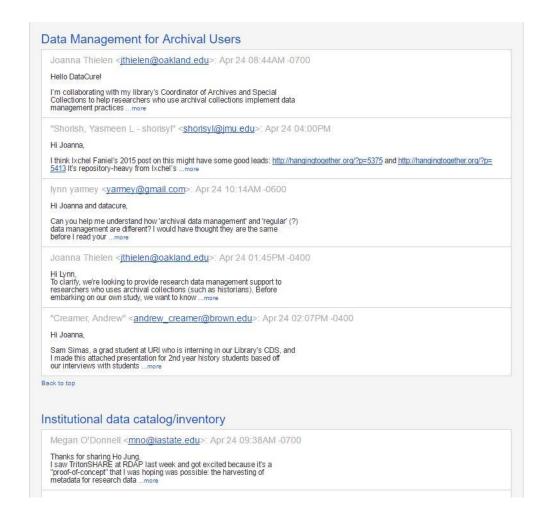
"Many funding agencies require data management plans (DMP) as part of grant proposals. The DMPTool helps institutions & researchers to create high-quality DMPs that meet funder requirements, including those from:"







datacure@googlegroups.com



Library's Role



- Continuation of our traditional role.
 - Acquire information
 - Store information
 - Organize information
 - Make information available

With this new information format, our role has expanded

The Next Big Thing

"Research Data Management is the next big development. As libraries have taken the lead in storing and preserving traditional research outputs via archiving in institutional repositories, so they will also play a part in the development of research data repositories. "Natalia Madjarevic LSE Research Online

http://blogs.lse.ac.uk/impactofsocialsciences/2012/10/10/madjarevic-open-access-libraries-respond/

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AT A GLANCE

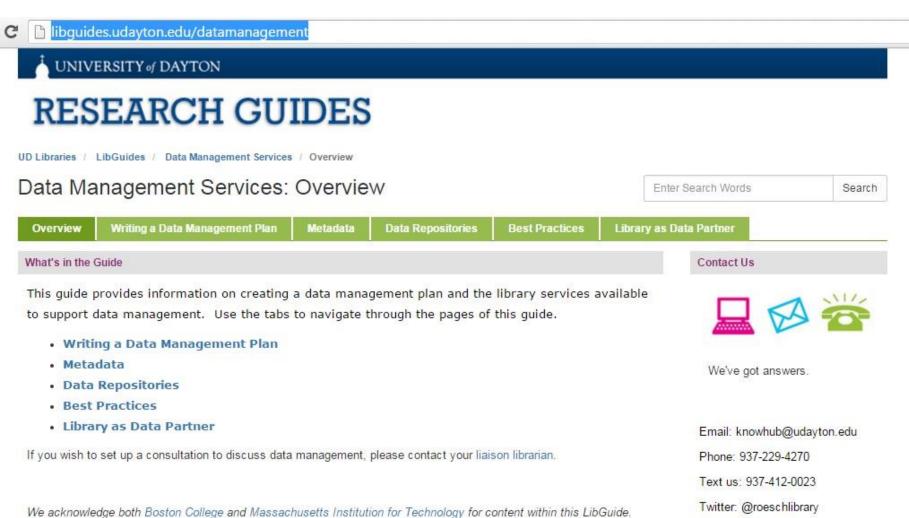
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Data Management



Data Management Plan 22 questions

- What type of data will be produced?
- Will it be reproducible?
- What would happen if it became unusable?
- How much data will there be?
- How often will it change?
- How rapidly will it grow?
- Who will use it now?
- Who will use it later?
- Who controls it (the institution, the PI, students?)
- How long should it be retained?
- Is there software required to use the data?
- Privacy requirements?
- Security requirements?
- Sharing requirements? Funding agency sharing policy?
- Other funding agency requirements for data management plans?
- Project and data documentation?
- File naming conventions?
- What file formats, and are those formats long lived?
- Will project and data identifiers be assigned?
- When and where will the data be published?
- Who is an appropriate community of scholars to share the data with?
- Who in the group will be responsible for data management?

What format should you use

Data Type	Preferred	Acceptable	Not Recommended
Text and textual data	.txt, .csv, .xml (with appropriate DTD)	.rtf	.docx, .doc
Images	.jp2, .tif, .png	.jpg, .gif, .dng	.psd, .jpx or .jpf,
Documents	.pdf/a, .epub		
Audio	.wav, .aif	.flac, .ogg,	.aifc, .ram, .wma
Moving Image & Video	.mj2, .mov		



http://crosstech.crossref.org/2014/02/many-metrics-such-data-wow.html

Further Reading

- Briney, K. (2015). Data management for researchers:
 Organize, maintain and share your data for research success.
 Exeter, UK: Pelagic Publishing.
- Carlson, J. (2011). Demystifying the data interview Developing a foundation for reference librarians to talk with researchers about their data. *Reference Services Review*, 40(1), 7-23.
- Krier, L., & Strasser, C. A. (2014). *Data management for libraries: A LITA guide*. Chicago: ALA TechSource, 2014
- MacMillan, D. (2014). Data Sharing and Discovery: What Librarians Need to Know. *Journal Of Academic Librarianship*, 40(5), 541-549. doi:10.1016/j.acalib.2014.06.011