THE UNIVERSITY OF TEXAS AT EL PASO

F.A.I.R. PRINCIPLES OF DATA SCIENCE
Creating Open-Source Research for Collaboration and Publication

What is Open Science?

Open Science is the practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methods.

https://www.fosteropenscience.eu/foster-taxonomy/open-science-definition

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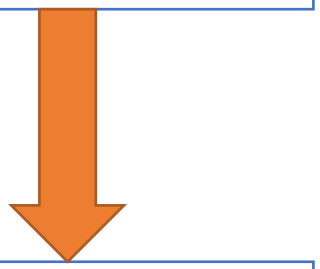
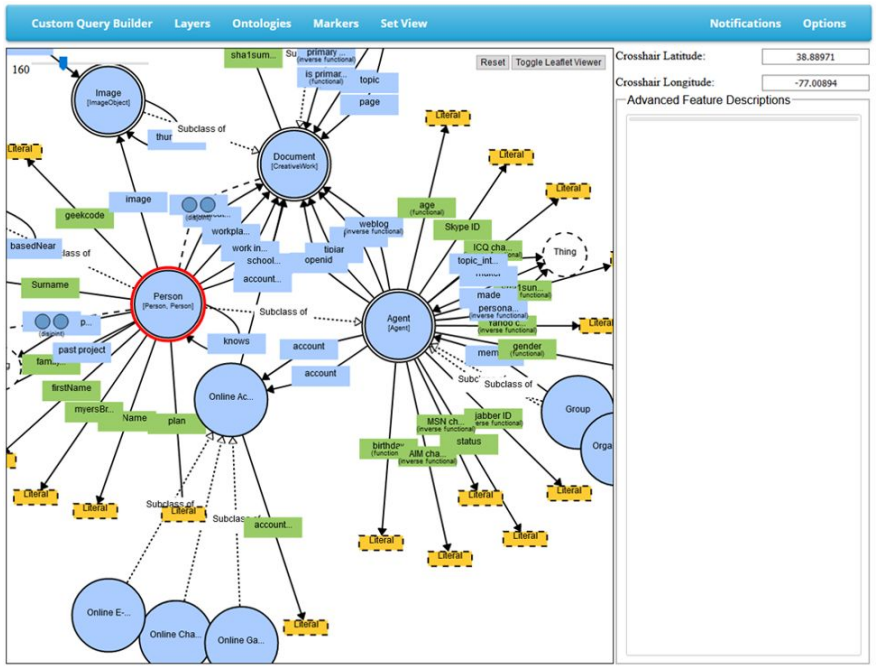


JOURNAL ARTICLE



(Credit: Tanner Fry. Public domain.)
https://www.usgs.gov/media/images/varankaontologyviewsmall

F.A.I.R. PRINCIPLES

Findable
Accessible
Interoperable
Reuseable

https://www.go-fair.org/fair-principles/

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https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1002/2017GL073524

PROJECT WORKFLOW

1. OBTAIN ORCID iD
   - https://orcid.org/

2. OBTAIN A DATA MANAGEMENT CHECKLIST
   - https://www.usgs.gov/products/data-and-tools/data-management/data-management-plans

3. HAVE A MEETING

4. DISCUSS LICENCE ISSUES

5. EXECUTE

F.A.I.R. DATA MANAGEMENT FOR OPEN SOURCE

What, where, and how are you going to put stuff?

DATA FORMAT

Geospacial

GML, GeoTIFF, DBF

Text

geojson, csv

Sustainable Digital File Formats from the Library of Congress
https://www.loc.gov/preservation/digital/formats/fdd/descriptions.shtml

USGS

Data dictionary
https://pubs.usgs.gov/of/2003/of03-001/htmldocs/datadict.htm
Metadata Wizard
https://www.usgs.gov/software/metadata-wizard-20

DATA REPOSITORIES

Zenodo
Figshare
Mendelay
OSF

https://zenodo.org/record/3946720#.YFsu-q9KhjV
https://fairsharing.org/collection/GeneralRepositoryComparison

F.A.I.R. DATA MANAGEMENT FOR OPEN SOURCE

What, where, and how are you going to put stuff?

AVAILABLE METADATA

USGS

Data dictionary
https://pubs.usgs.gov/of/2003/of03-001/htmldocs/datadict.htm
Metadata Wizard
https://www.usgs.gov/software/metadata-wizard-20

GeoJSON vs CSV

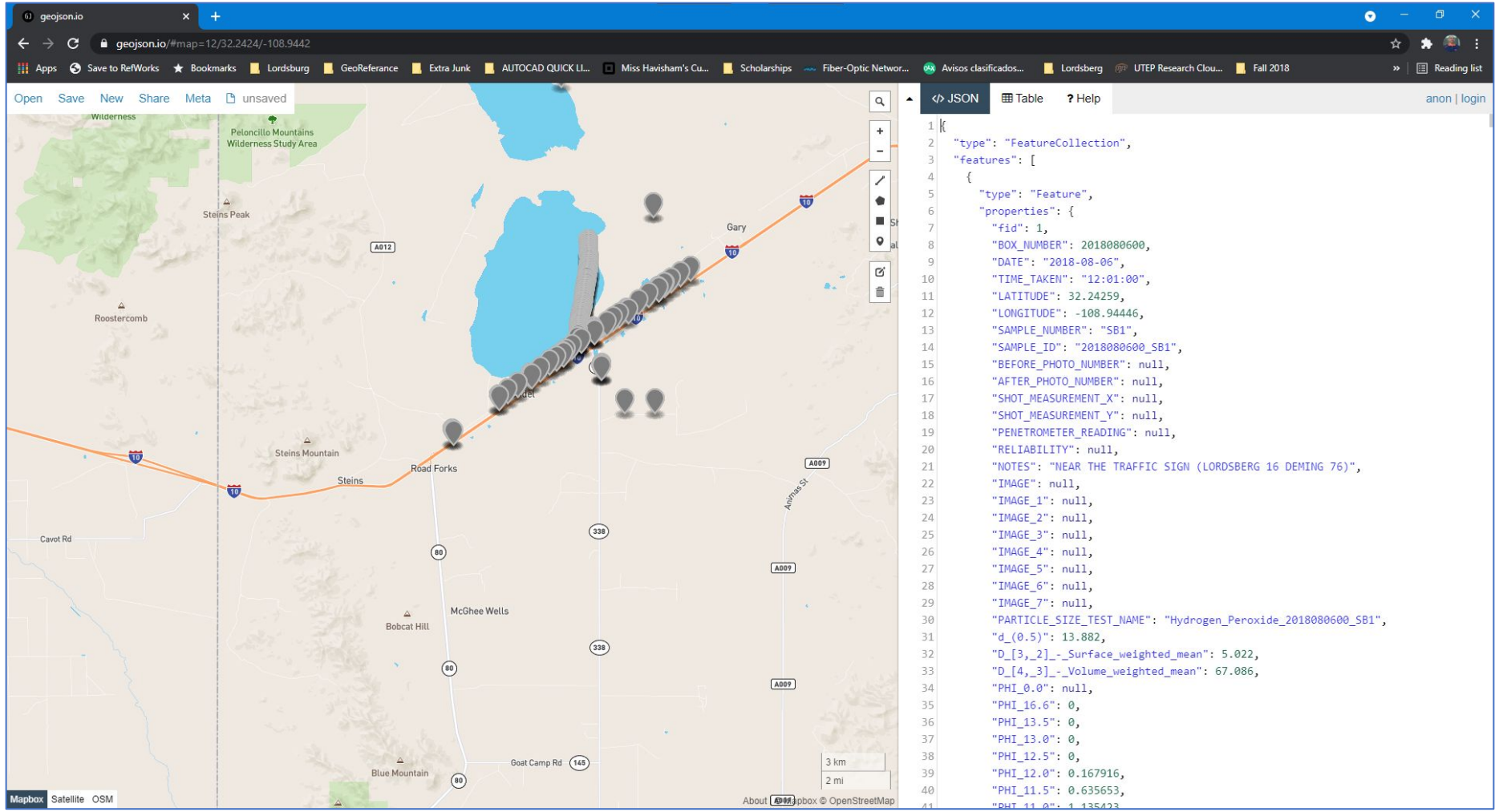
Dataset

386 lines of sample data containing: Locations (Logitude, Latitude in WGS84 datum), Images, Penetrometer readings, Shot measurements, Notes, and Particle size measurements (Weighted averages)

	GeoJSON	CSV
Form	Java Script Object Notation	Comma Separated Values
Data Size	525KB	114 KB
Hierarchial	Data has a hierarchy that can use dictionaries and lists while using python or QGIS	Not able to show Hierarchy
Extensions	.geojson or .geojson-ld	.csv or .geocsv
Scalability	Very Scalable	No support for Scalability

Other formats can be found from the Open Geospatial Consortium (OGC)
https://www.ogc.org/docs/is

GeoJSON vs CSV



https://geojson.io

LINKED DATA

The term “Linked Data” refers to a set of best practices for publishing and connecting structured data on the Web. These best practices have been adopted by an increasing number of data providers over the last three years, leading to the creation of a global data space containing billions of assertions— the Web of Data.

Bizer, C., Heath, T., & Berners-Lee, T. (2009). Linked Data - The Story So Far. *Int. J. Semantic Web Inf. Syst., 5*, 1-22.

DATA.XLSX

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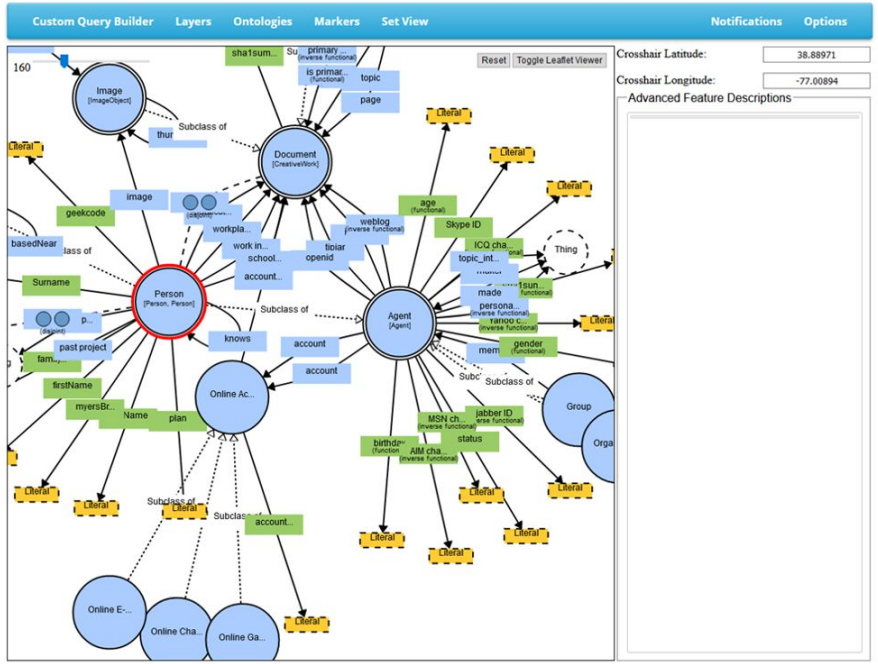

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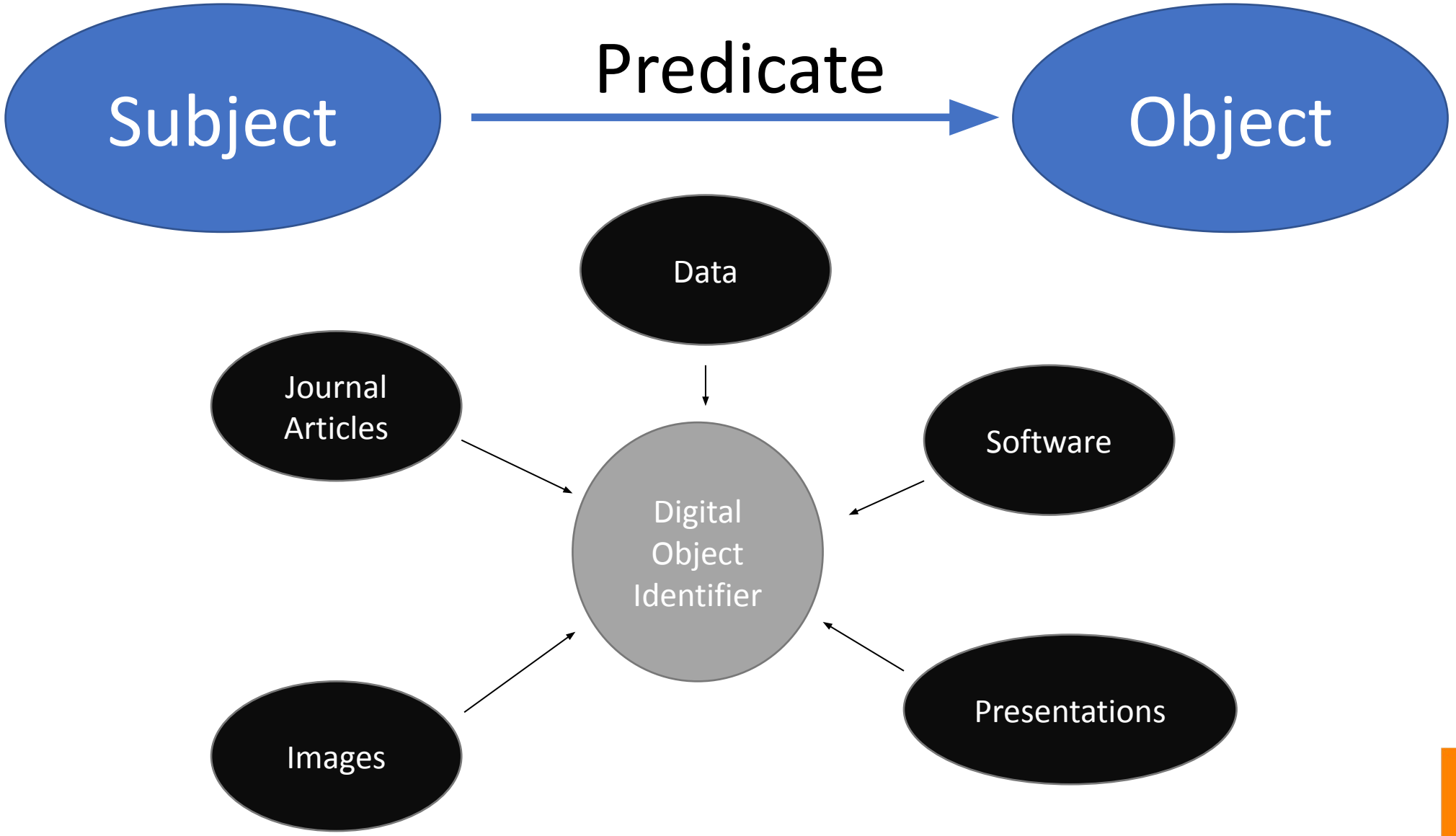
LINKED DATA



https://www.w3.org/wiki/GeoRDF

Works Cited

Wilkinson, M. D. *et al.* The FAIR Guiding Principles for scientific data management and stewardship. *Sci. Data* 3:160018 doi: 10.1038/sdata.2016.18 (2016).