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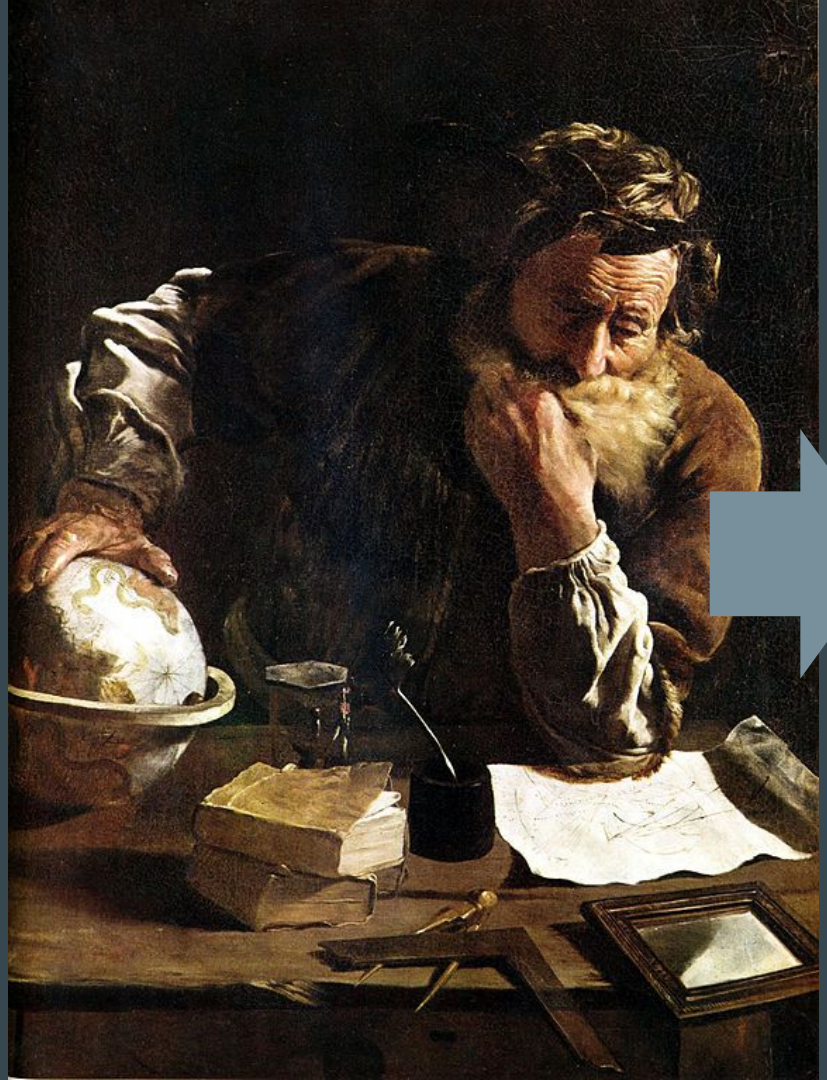

Archimedes Thoughtful, painted 1620 CE in Mantua by Domenico Fetti (1588–1623).

Selected for a Viewpoint in *Physics*

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Observation of Gravitational Waves from a Binary Black Hole Merger

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(LIGO Scientific Collaboration and Virgo Collaboration)

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[9]*Nikhef, Science Park, 1098 XG Amsterdam, Netherlands*
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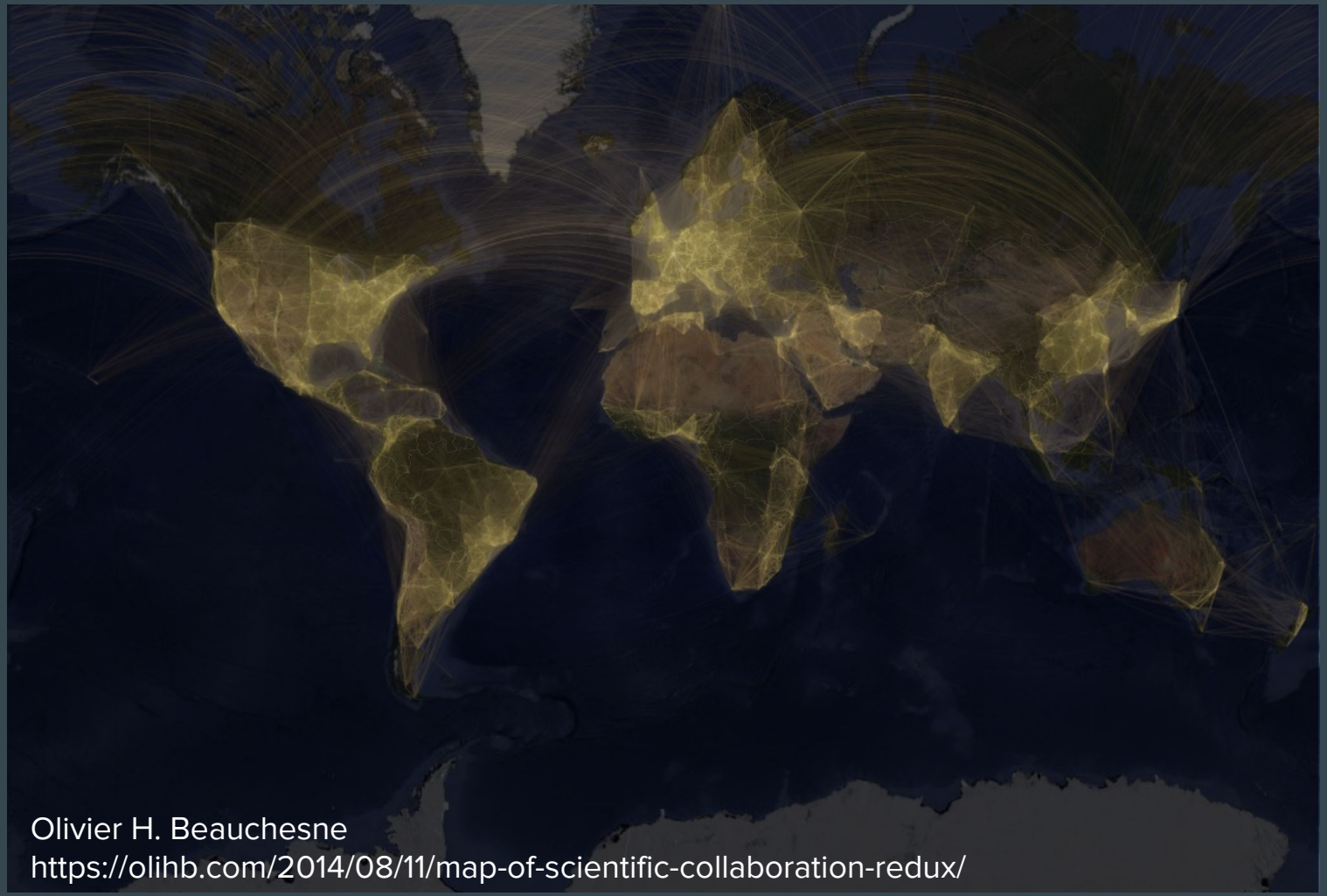

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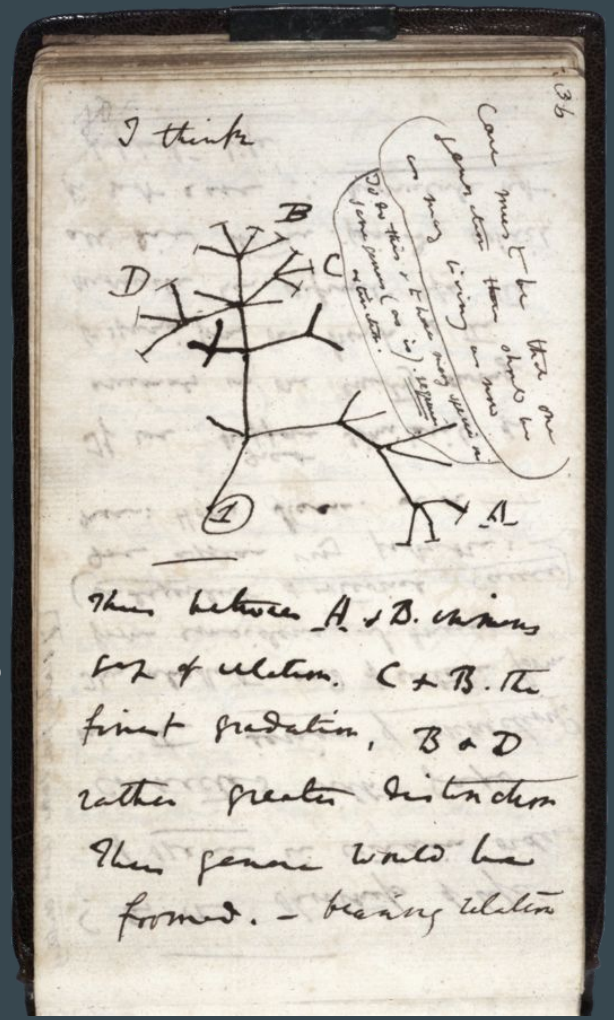

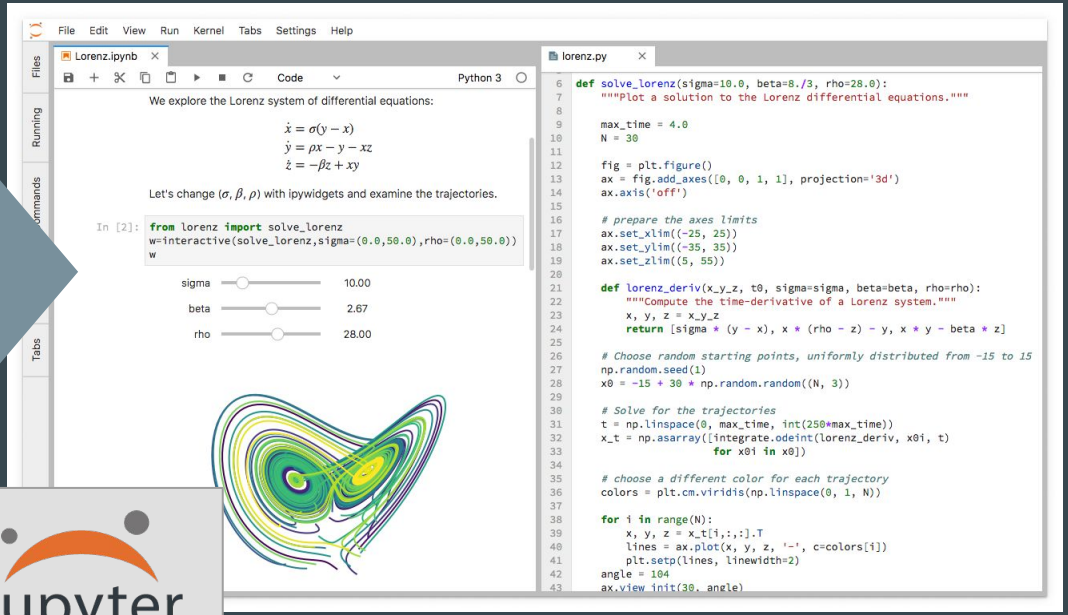

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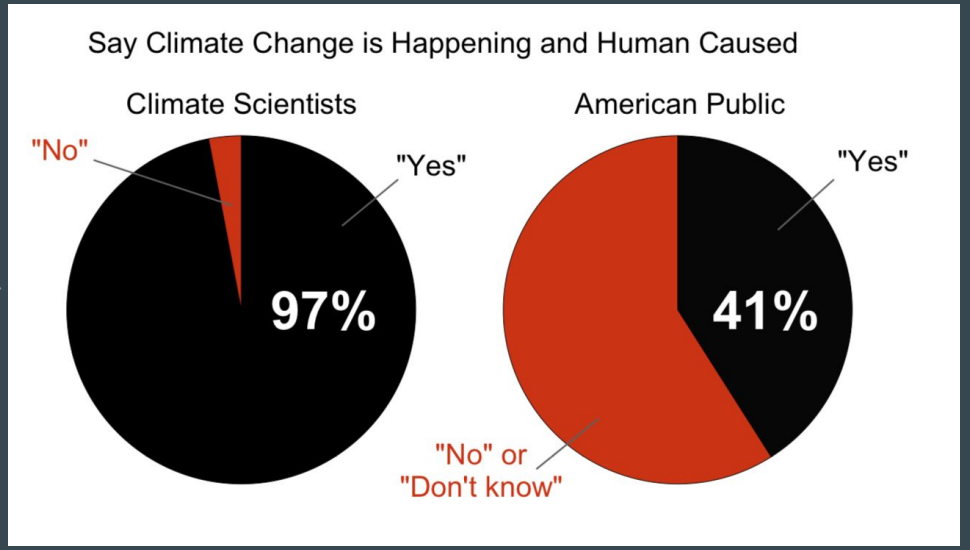

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Artificial intelligence faces reproducibility crisis

Matthew Hutson

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Science 16 Feb 2018:
Vol. 359, Issue 6377, pp. 725-726
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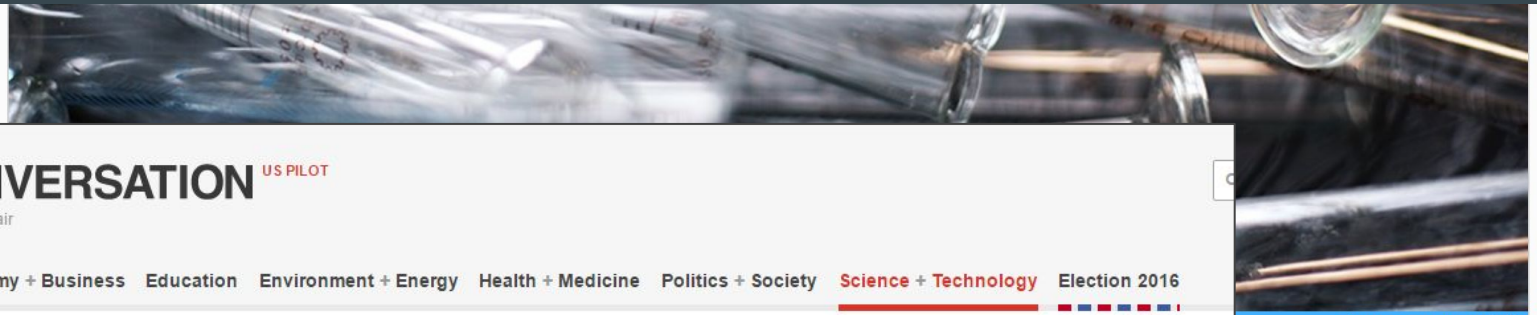
Summary

The booming field of artificial intelligence (AI) is grappling with a replication crisis, much like the ones



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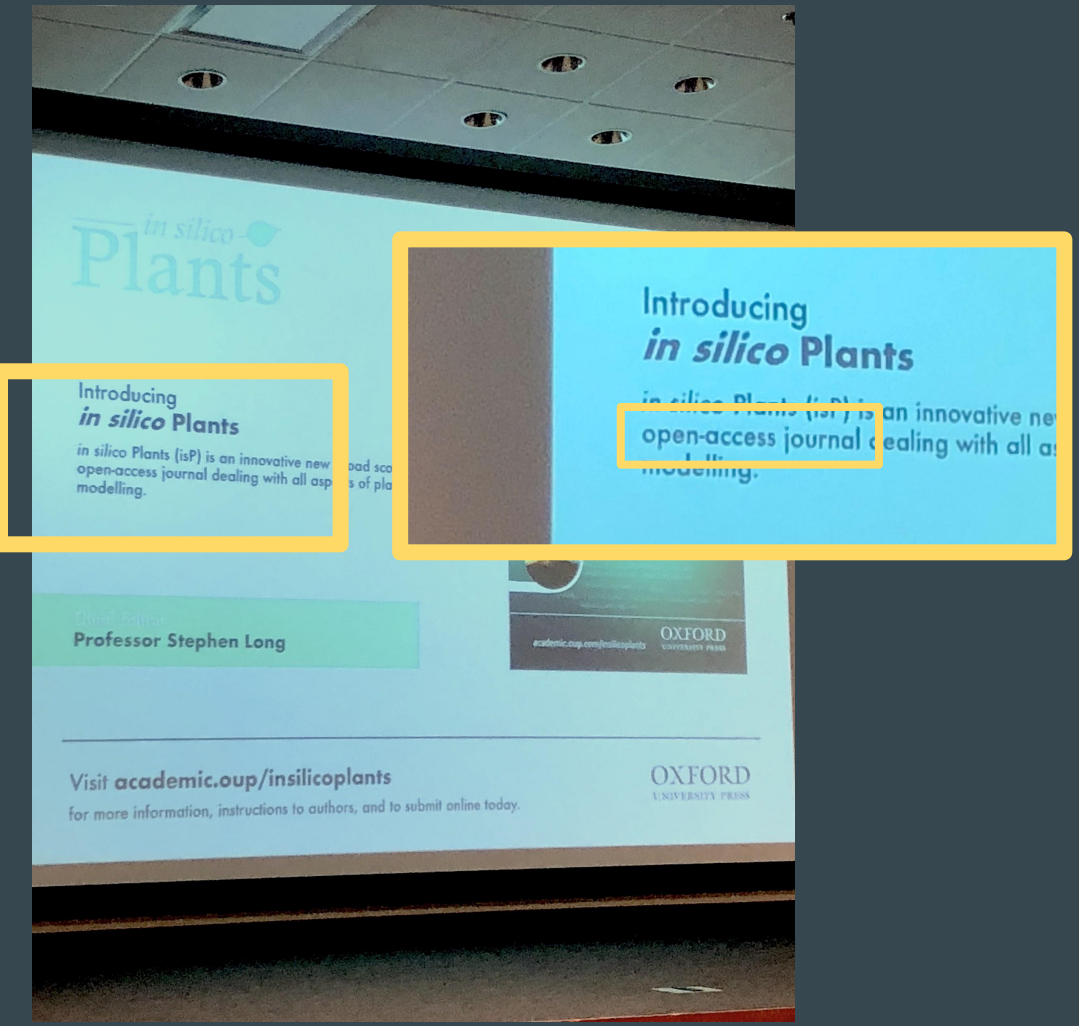
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...is only useful with high-quality metadata!

Data management 101

- Data collection & organization
- Short term storage and backing up
- Quality control & assurance
- Metadata generation
- Workflow documentation
- Long term storage and preservation plans

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Open Source Software

- sou
- lic ange and distribute the sof ose
- De manner

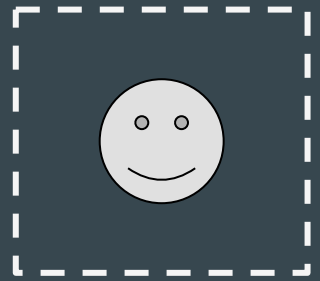
Benefits

- Reproduce research
- Find & fix bugs
- Extend utility: new software
- Community effort

Open Source Software

- source code available
- licensed so that others can study, change and distribute the software to anyone and for any purpose
- Developed in a public, collaborative manner





Benefits

- Reproduce research
- Find & fix bugs
- Extend utility: new software
- Community effort

17 December 2014

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Researcher Data Publication Perceptions

John Ernest Kratz ; Carly Strasser

(show affiliations)

Data "publication" seeks to appropriate the prestige of authorship in the peer-reviewed literature to reward researchers who create useful and well-documented datasets. The scholarly communication community has embraced data publication as an incentive to document and share data. But, numerous new and ongoing experiments in implementation have not yet resolved what a data publication should be, when data should be peer-reviewed, or how data peer review should work. While researchers have been surveyed extensively regarding data management and sharing, their perceptions and expectations of data publication are largely unknown. To bring this important yet neglected perspective into the conversation, we surveyed 249 researchers across the sciences and social sciences-- asking what expectations "data publication" raises and what features would be useful to evaluate the trustworthiness, evaluate the impact, and enhance the prestige of a data publication. We found that researcher expectations of data publication center on availability, generally through an open database or repository. Few respondents expected published data to be peer-reviewed, but peer-reviewed data enjoyed much greater trust and prestige. The importance of adequate metadata was acknowledged, in that almost all respondents expected data peer review to include evaluation of the data's documentation. Formal citation in the reference list was affirmed by most respondents as the proper way to credit dataset creators. Citation count was viewed as the

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DOI 10.5281/zenodo.13293
Keyword(s):
Data publication Data
Related publications and datasets:
Supplement to:
https://github.com/JEK-III/ResearcherDataPubPerceptions/tree/v1.0
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Sharing and Publishing Jupyter Notebooks

Documentation

Overview

Teaching: 10 min
Exercises: 15 min

Questions

- Why should I invest time in good documentation?
- How does my target audience influence my documentation strategy?
- What are some published examples of good documentation?

Objectives

- Describe how documentation is useful to yourself and to others
- Evaluate and rank the quality of comments in published notebooks
- Evaluate and rank the quality of existing metadata records.
- Describe types of metadata directly relevant for research reproducibility.

Overview

Documenting your process, especially as it concerns your data, is a key element of making your research more reproducible. If you do not thoroughly record all the data manipulation steps you used to process data, it will likely be impossible for you, or anyone else, to repeat the analysis in the future (Wilson et al. 2016). Using the Jupyter Notebook for scripting your data processing is powerful because it saves the code – the **what** – and interspersed it the motivations behind each step, i.e., the **why**.

There is also project-level documentation that isn't needed to understand a particular series of data processing steps, but to understand the organization of the project as a whole. Finally, documentation can be used to aid discoverability.

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What's the holdup?

- Cost
- Lack of training
- Fear of lost rights or benefits
- No incentives

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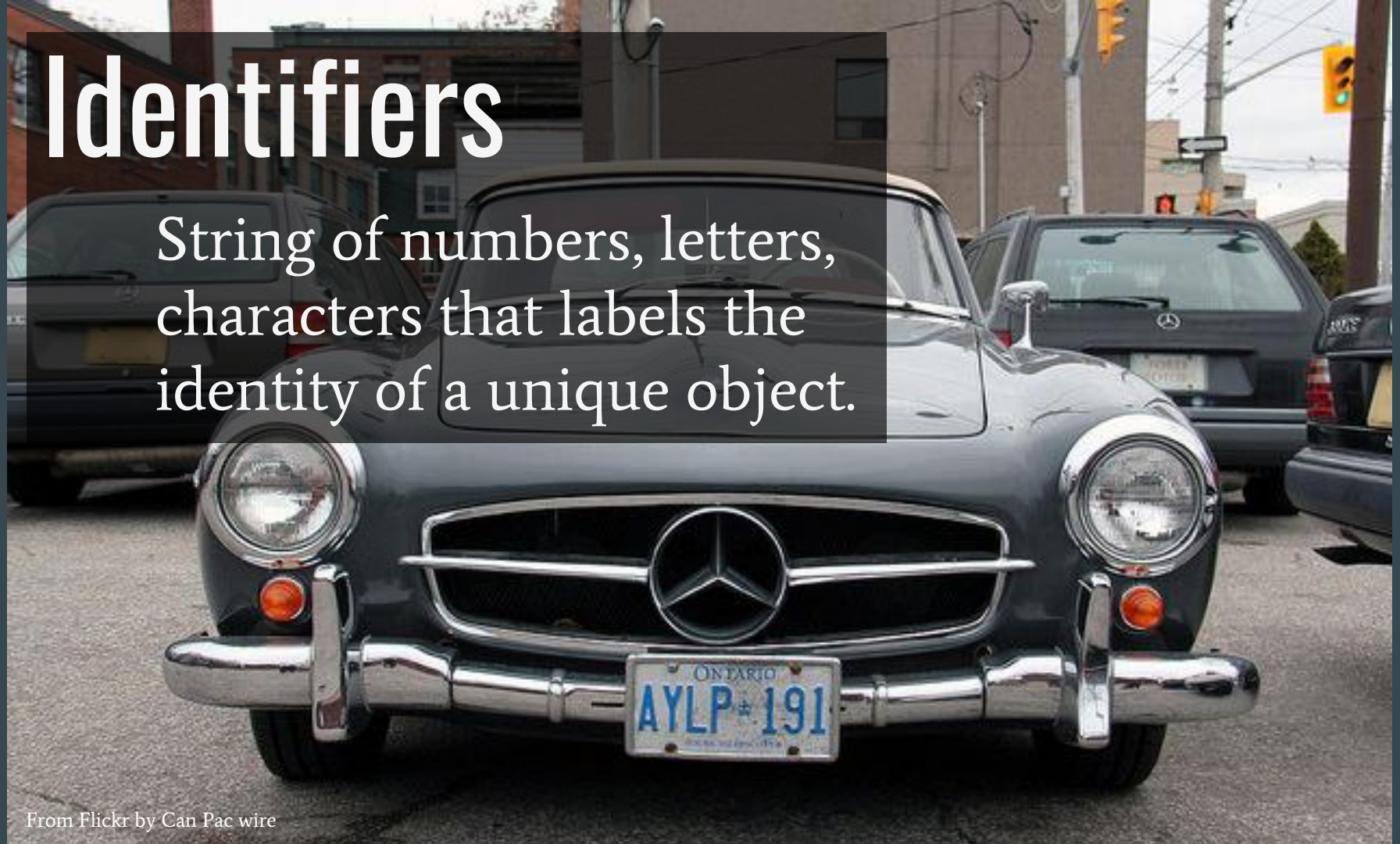
How to make process outputs count?

1. Share them
2. Connect them
3. Claim them
4. Advertise them

} get persistent identifiers & cite them

Identifiers

String of numbers, letters, characters that labels the identity of a unique object.



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Identifiers in various disciplines [edit]

A small sample of various identifiers

Identifier	Scope
atomic number, corresponding one-to-one with element name	international (via ISV)
Australian Business Number	Australian
CAGE code	U.S. and NATO
CAS registry number	originated in U.S.; today international (via ISV)
CO	
Dig	pe
DIN	
E number	originated in E.U.; may be seen internationally
EC number	
Employer Identification Number (EIN)	U.S.
Global Trade Item Number	international
Group identifier	many scopes, e.g., specific computer systems
International Chemical Identifier	international
International Standard Book Number (ISBN)	ISBN is part of the EAN Namespace; international scope
International Standard Serial Number (ISSN)	international
ISO standard number, e.g., ISO 8601	international
Library of Congress Control Number	U.S., with some international bibliographic usefulness
Personal identification number	many scopes, e.g., banks, governments
Personal identification number (Denmark)	Denmark

Digital Object Identifier, or DOI

Identifiers are important for citation!

data
software
genetic code
reagents
protocols
...

Data citation

Sidlauskas, B. 2007. Data from: Testing for unequal rates of morphological diversification in the absence of a detailed phylogeny: a case study from characiform fishes. Dryad Digital Repository. doi:10.5061/dryad.20

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John Ernest Kratz ; Carly Strasser

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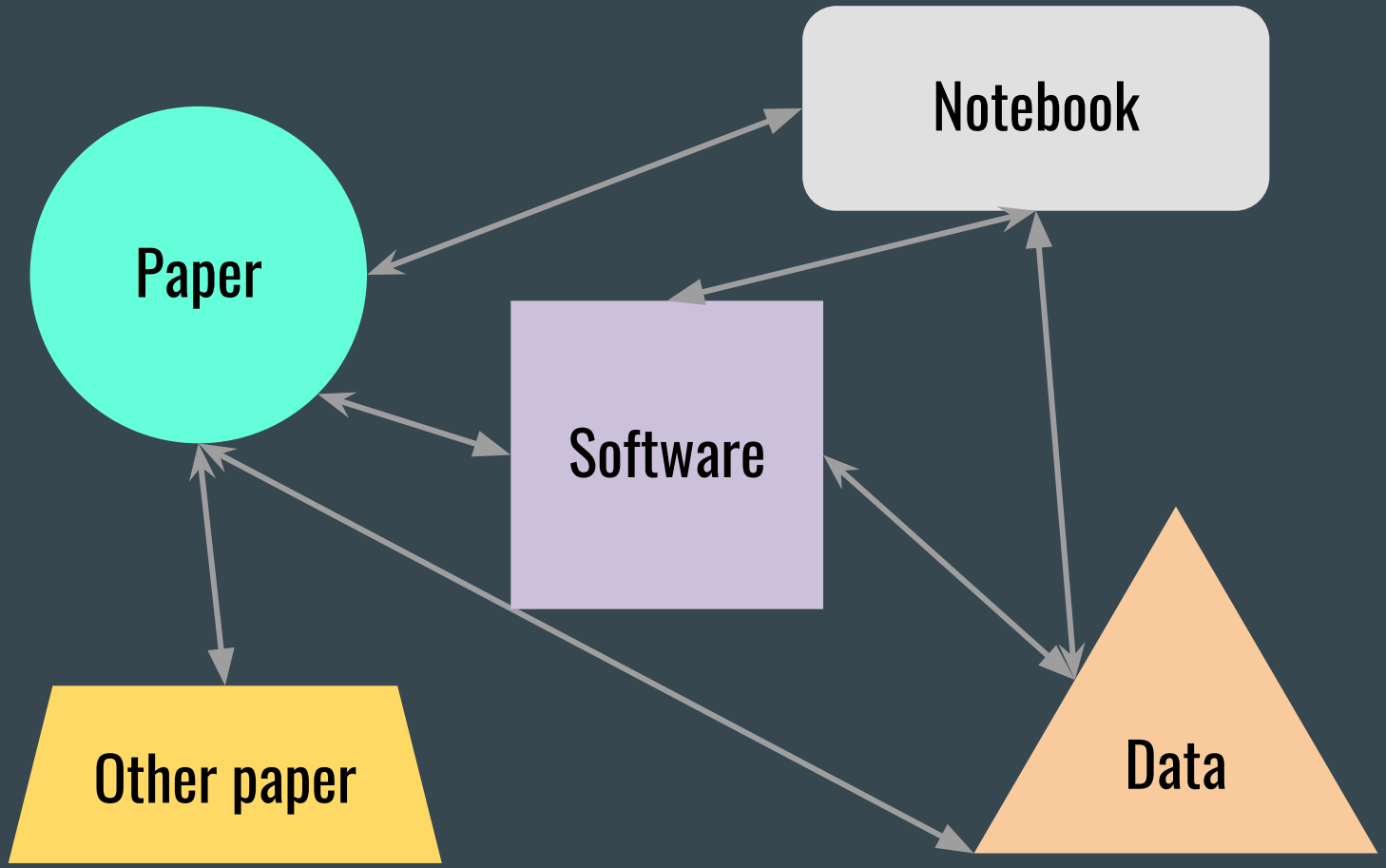
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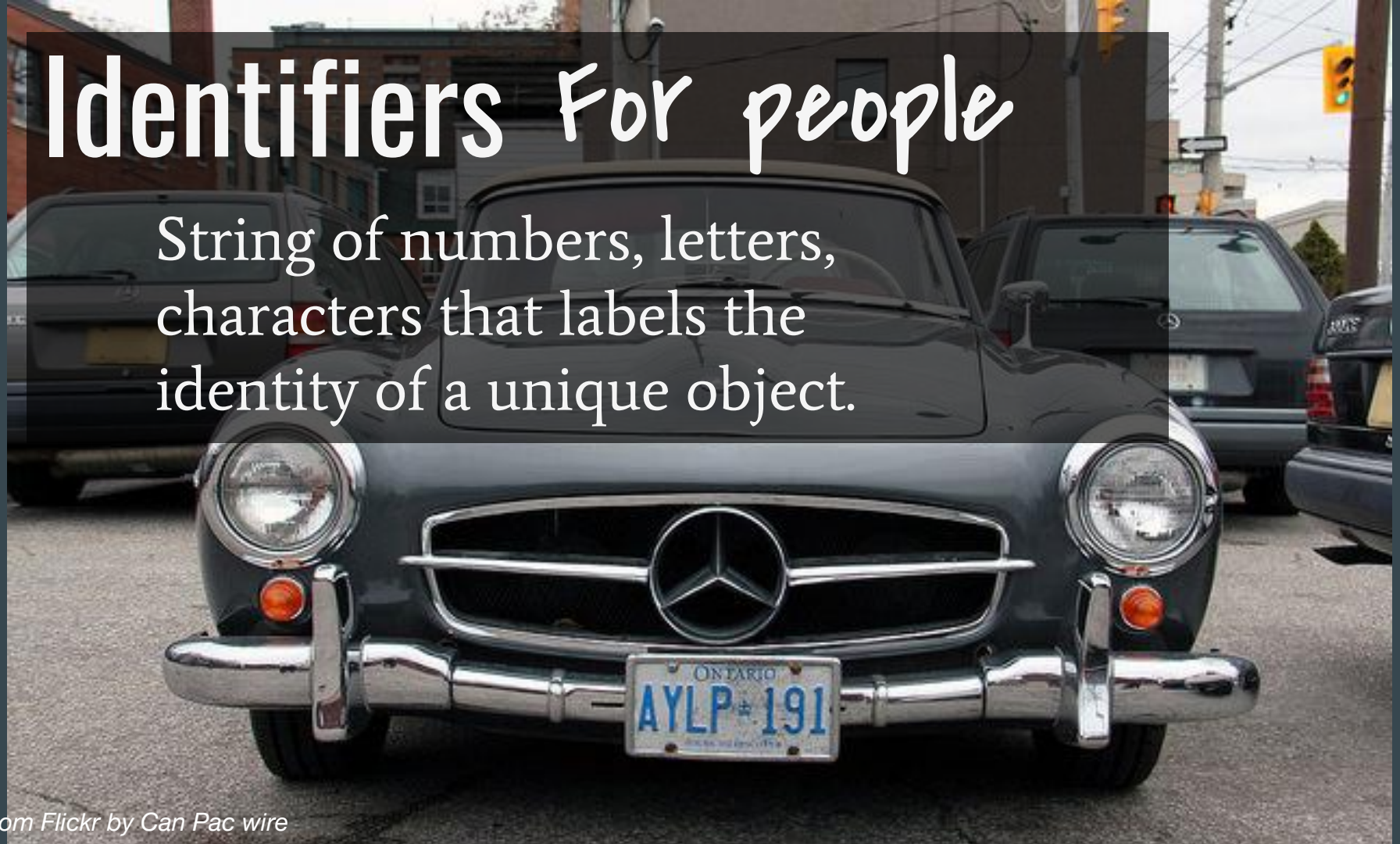

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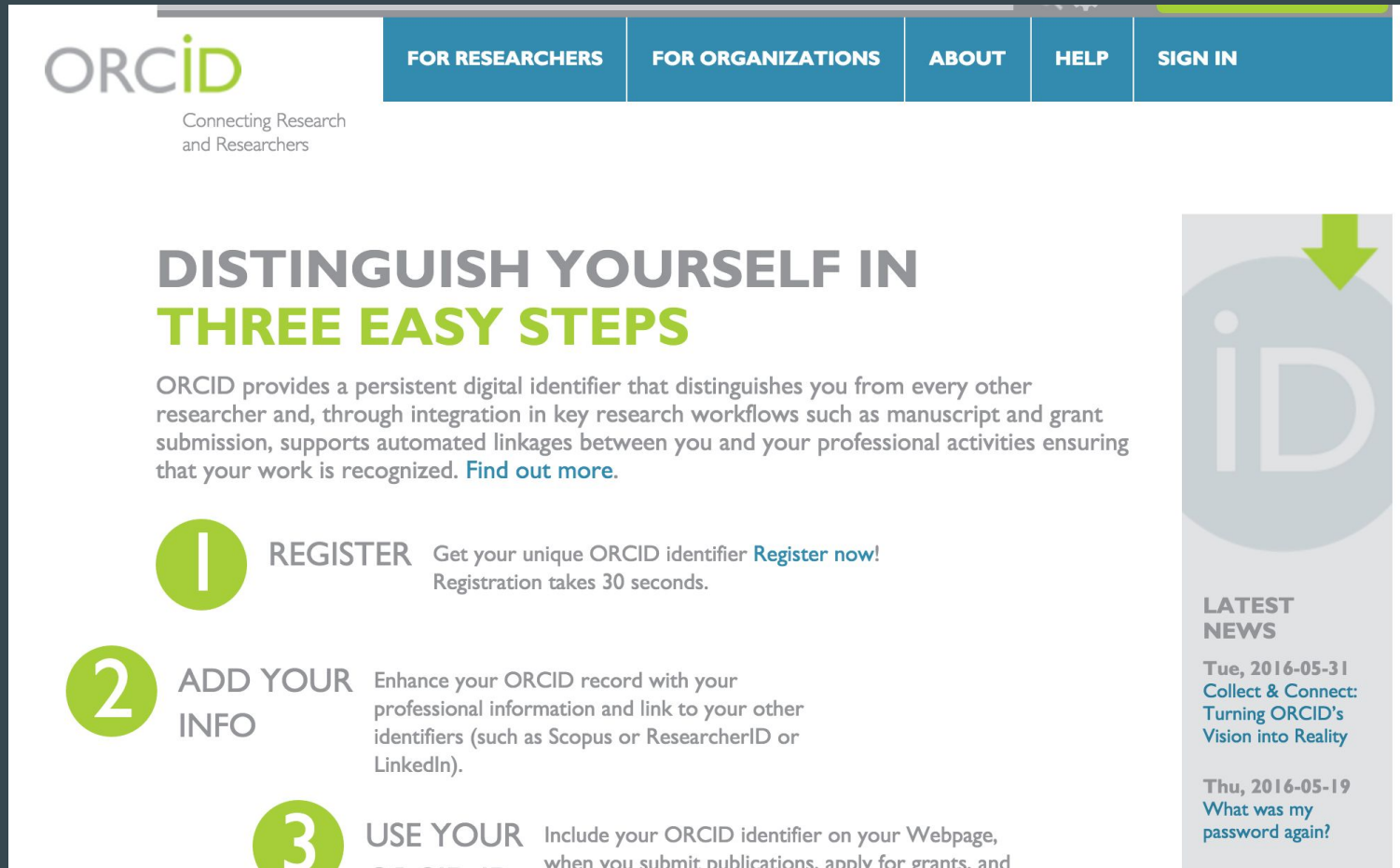
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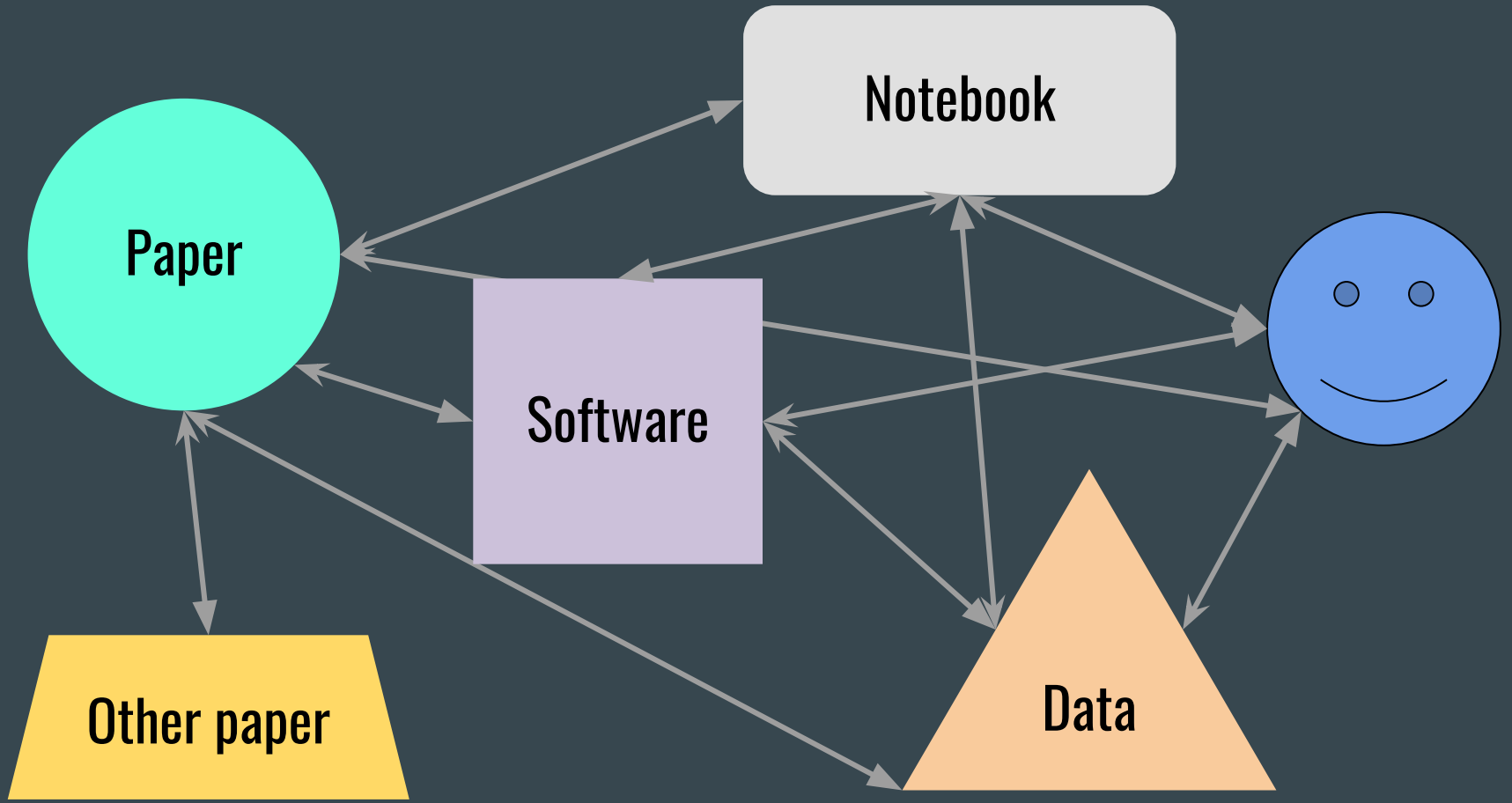
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Other Research Outputs

C Strasser and E Khare. 2017. **Data**. Moore grantee list of articles. Zenodo. doi:10.5281/zenodo.841794. & Moore grantee publication data. Zenodo. doi:10.5281/zenodo.555947.

C Strasser, P Cruse, J Kunze, and S Abrams. 2013. **Data** from "DataUp: A tool to help researchers describe and share tabular data". figshare. doi: 10.6084/m9.figshare.884625

CA Strasser and SE Hampton. 2012. **Data** from "The Fractured Lab Notebook: Undergraduates and Ecological Data Management Training in the United States." Data in KNB Repository.

C Strasser, P Cruse, and S Abrams. 2014. **Grant** from the Alfred P. Sloan Foundation."Dash: Improving Community Repositories for Better Data Sharing." Available at escholarship.org/uc/item/2mw6v93b.

J Lin, P Cruse, M Fenner, and C Strasser. 2014. **Grant** from the National Science Foundation, EAGER ACI Award No. 1448821. "Making Data Count: Developing a Data Metrics Pilot." Available at escholarship.org/uc/item/9kf081vf.

P Cruse and C Strasser. 2012. **Grant** from Institute of Museum and Library Services, No. LG-07-12-0505-12. "Improving Data Stewardship with the DMPTool: Empowering Libraries to Seize Data Management Education."

P Cruse, S Abrams, C Strasser, A Sallans, S Shreeves, and A Budden. 2012. **Grant** from the Alfred P. Sloan Foundation. "Data Management Planning Tool 2: Responding to the Community."

P Cruse, C Strasser, W Michener, J Kunze, and D Vieglais. 2012. **Grant** from the National Science Foundation, supplemental to OCI Award No. 0830944. "DataUp: Further Development and Community Building." Available at escholarship.org/uc/item/1dt1v1pc.

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