

# The Heliocentric Model of Open Science

## Understanding Scientific Information Stewardship

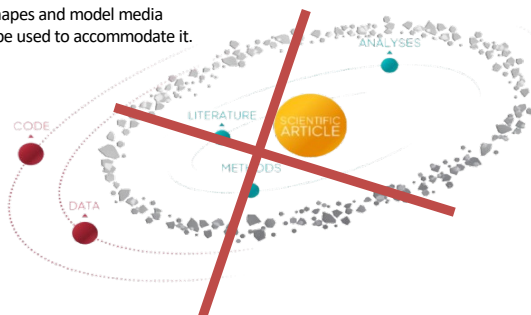
### Top-Down and Bottom-Up v2 29OCT2024

Monica Gonzalez-Marquez, et al\*, Open Science Advocate  
[mg246@cornell.edu](mailto:mg246@cornell.edu) – DOI: 10.5281/zenodo.13968889

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#### 1. Do away with a paper-centric model of documentation

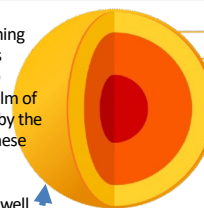
Scientific documentation should not be constrained by the limits of the out-of-date research article. Scientific information takes make shapes and model media should be used to accommodate it.



Helio uses labor as the basic unit to breakdown scientific processes for documentation. These satellites are not mapped to sections in a paper but to components of scientific processes, as instantiations of the scientific method, and as the labor needed to complete them. This presupposes that scientific processes and their components will vary according to discipline.

This model is an analogy of the original planetary model transition process. Just as it was an error to position the Earth at the center, it has been an error to place the paper at the helm of scientific documentation.

#### 2. Return to first principles and allow Scientific Questions and their constraints to guide documentation structure.



The purpose of documentation is to Communicate our science to current and Future generations. Science is a verb, it is labor. RDM should be grounded in preserving Information about the labor that produced the data, as well as the data itself.

QUESTION BACKGROUND

ANALYSES

DISCUSSION

NARRATIVE

SCIENTIFIC PROCESS

RESULTS

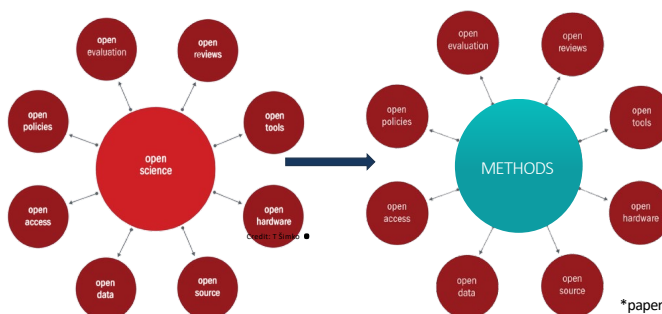
The methods satellite below shows some of the Labor involved in completing the methods component of a human science study. These details are indispensable to understanding how to interpret and Potentially reproduce a study. They are also indispensable to accurate peer review. Current documentation practices either grossly under-describe or completely omit these needed details.

#### 3. For optimal communication, allow the labor of the scientific process to determine: a. What needs to be documented b. How it should be documented

It doesn't matter how sophisticated a machine learning algorithm might be or what A.I. can do, the ultimate interpreters of scientific information will always be people. Hence, we must document so that information is usable and understandable by people.

**Golden Rule:**  
Documentation  
is for  
communication  
with humans

The Open Science movement has erred by not connecting its efforts directly to scientific processes as a whole, instead focusing on disjointed bits and pieces. Open Science is NOT Open Access, Open Source or Open Data. Open Science is about creating complete and usable records of entire scientific processes. The infrastructure and tools created must be reframed as at the service of documenting complete scientific processes for posterity.



The documentation tools we build are meant to serve the components of the scientific process, not exist independently: Data without its context is meaningless.

\*paper with collaborators forthcoming