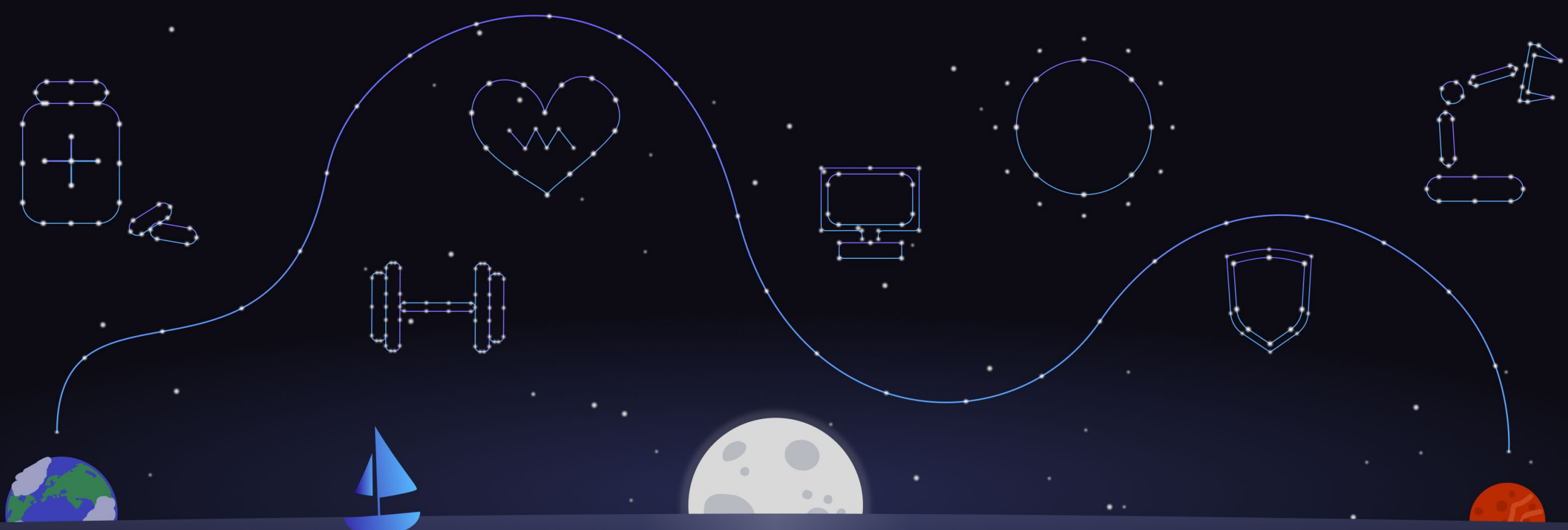

Increasing the Transparency And Reproducibility Of Space Radiation Science: The Radiation Biology Ontology (RBO)

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What is the RBO? Why develop the RBO?

- The RBO is an ontology about radiation biology, with emphasis on space applications
- Designed to support organizing, describing and archiving data from experiments and observations examining the effects of radiation on biological systems
- Developed by an Open Consortium using GitHub
- > 300 declared classes
- >3500 imported classes

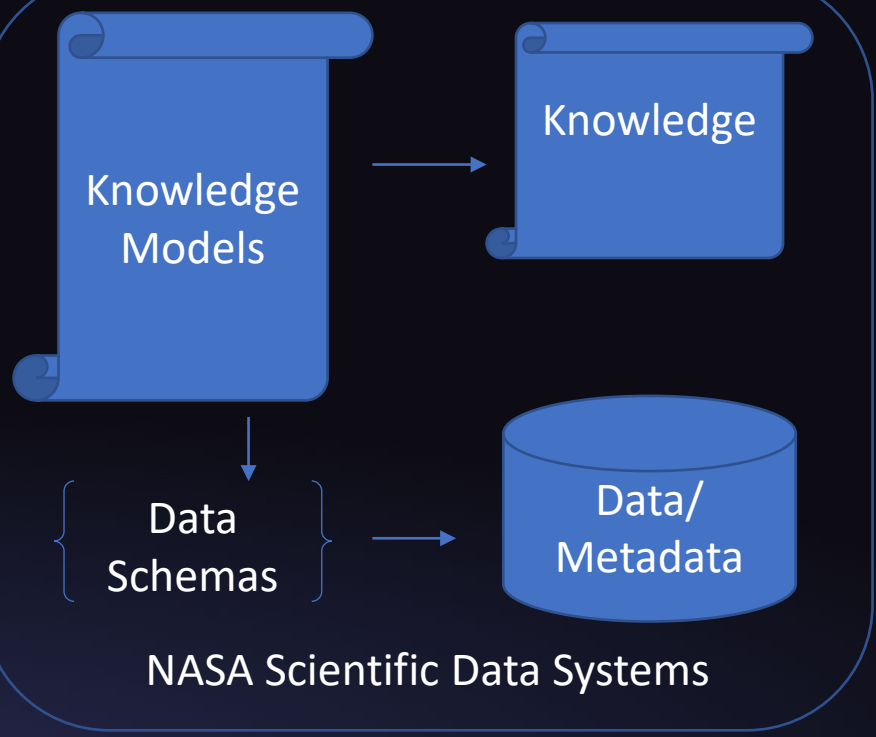
- A Common Conceptual Framework underlies scientific knowledge, including the understanding of biomedical processes
- Capturing and formalizing this framework will
  - accelerate scientific data discovery
  - increase the accuracy of communication of findings
  - support
    - automated systems and data integration
    - transformation of data into knowledge
    - automated reasoning

Automated Systems and Data Integration

The OBO Foundry

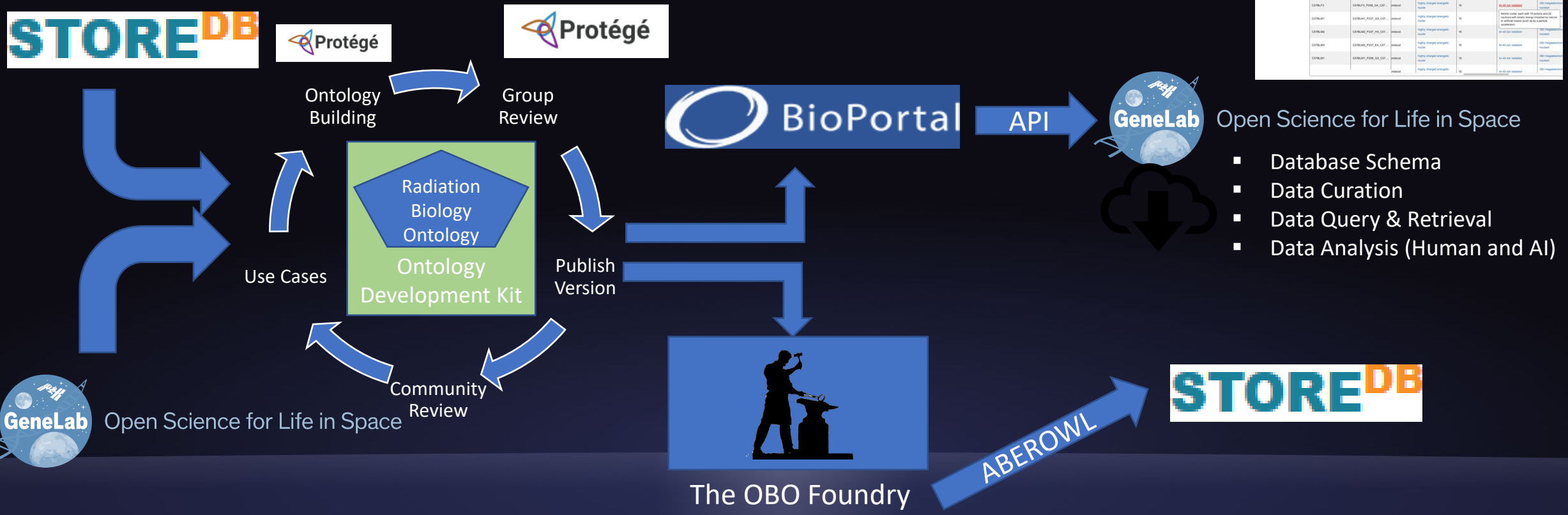
W3C Standards

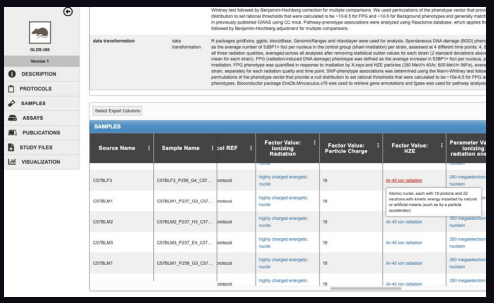
NASA Standards



OBI: Ontology for Biomedical Investigations
CHEBI: Chemical Entities of Biological Interest ontology
PATO: Phenotype And Trait Ontology
SOSA: Sensor, Observation, Sample, and Actuator Ontology
SSN: Semantic Sensor Network ontology

Building RBO: Methods & Process

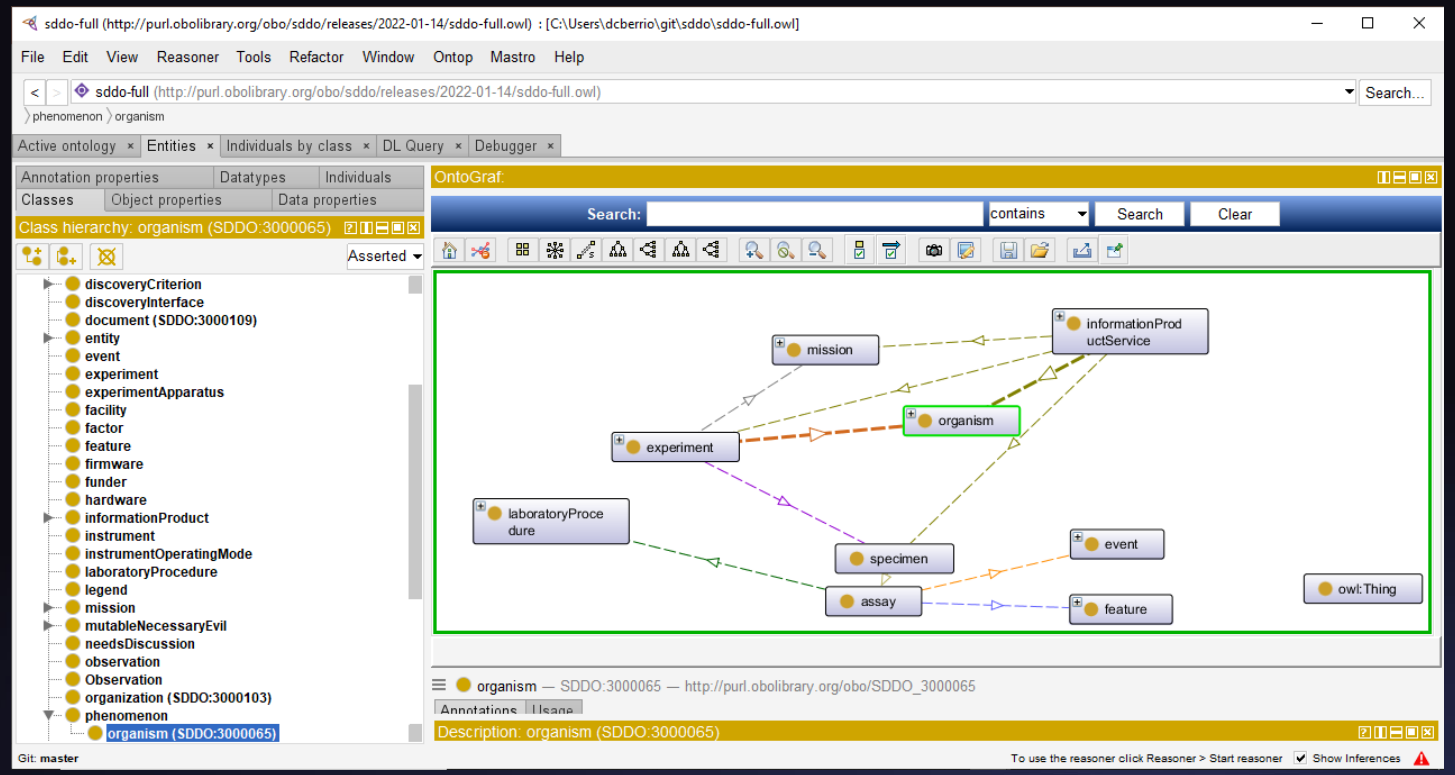




- Database Schema
- Data Curation
- Data Query & Retrieval
- Data Analysis (Human and AI)

RBO use cases, issues, requests, and other critical comments are welcomed from all:
https://github.com/Radiobiology-Informatics-Consortium/RBO

Applications



- Automated knowledge extraction
  - From scientific publications
  - From textbooks, reports
- Automated data curation
  - Metadata harmonization
  - Increase automation
- Interlingua for data integration for meta-analyses
- Scientific data discovery
- Automated inference using e.g., graph convolutional networks

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- NASA GeneLab
- NASA Life Sciences Data Archive