



Challenges with creating PID ontologies

FAIR Facilities and Instrumentation

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High Field Magnetic Laboratory

Florida State University

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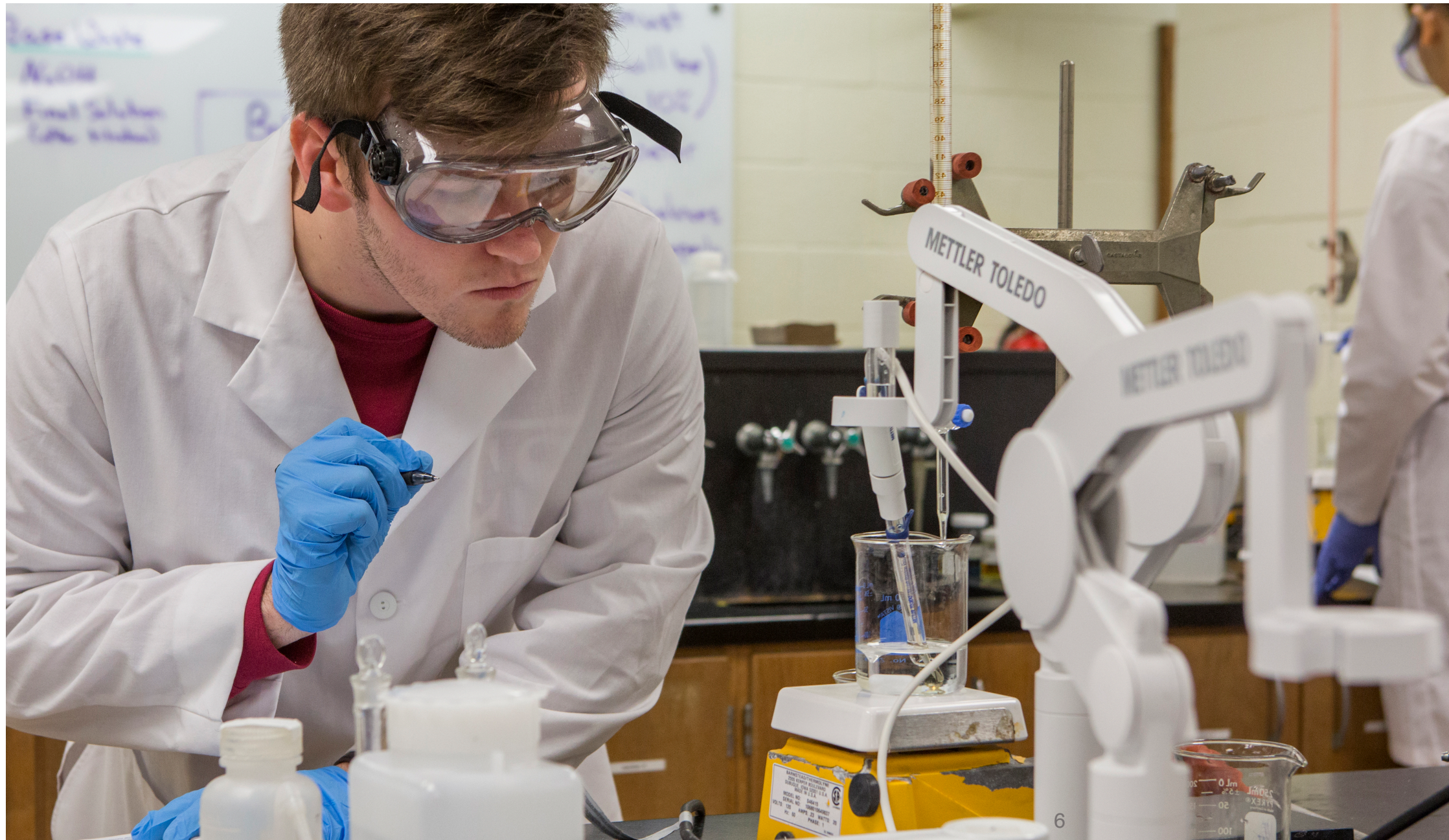
Where are they now?

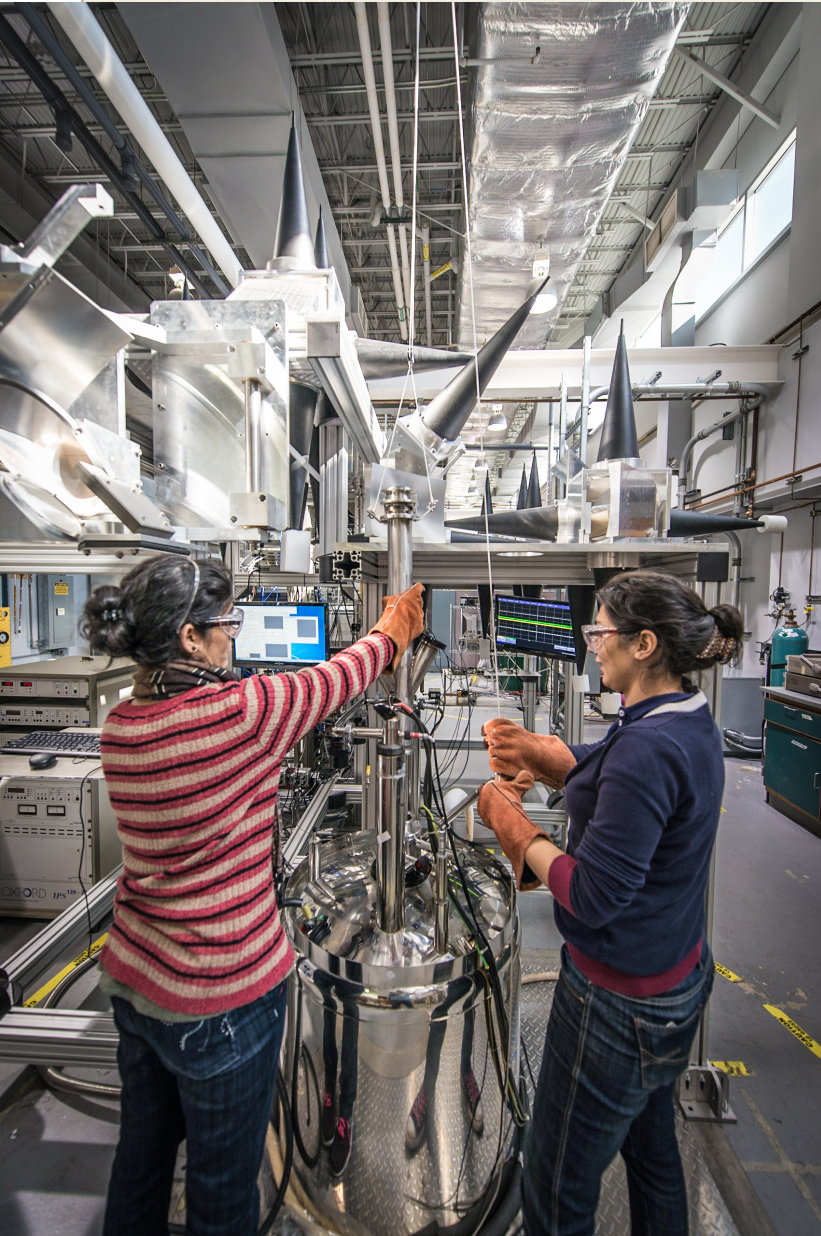
Introduction



An Accidental Ontologist

- Was Head of Discovery Data Services
 - Department for catalog data quality control and management
- Tech-savvy catalog and metadata librarian
- Familiar with:
 - Information Organization
 - XML Schema
 - Web technologies





USEDit Team

Universal Scientific Equipment Discovery Tool

Member of USEdit 2018-2022

- *Founding members:* Claudius Mundoma, Michael Meth, Renaine Julian*
- *Later joined by:* Nicholas Ruhs, Leah Booher (also worked for SciCrunch), Mark Lopez, David Rodriguez*
- Initially formed to replace **FSU Asset Management** website (<https://apps.its.fsu.edu/AssetManagement/app/>)

* See Slide 31 for where former USEdit members are now

Universal Scientific Equipment Discovery Tool

Metadata/Ontology Tasks

- Create metadata profile/schema
 - Physical and holdings descriptions
- Create scientific equipment ontology
 - Include institutional relationships
- Create a prototype discovery tool
 - USEdit Website (<https://dev-usedit-prototype.pantheonsite.io/>)

Information Organization



Information Organization

From simple to complex

- List
- Ordered list
- Dictionary
- Controlled vocabulary
- Taxonomy
- Ontology

Information Organization

List

oysters
snails
squids
clams
scallops
octopuses
ammonites

Ordered List

ammonites
clams
octopuses
oysters
scallops
snails
squids

Dictionary

SQUID. In physics, a superconducting quantum interference device.

Squid. In zoology, a marine cephalopod with eight arms and two tentacles.

Controlled Vocabulary

Cephalopoda

Use For: Cephalopods

Use For: Coleoidea

Use For: Dibranchiata

Broader Term: Mollusks

Narrower Term: Architeuthidae

Narrower Term: Nautilida

Narrower Term: Octopoda

Narrower Term: Ommastrephidae

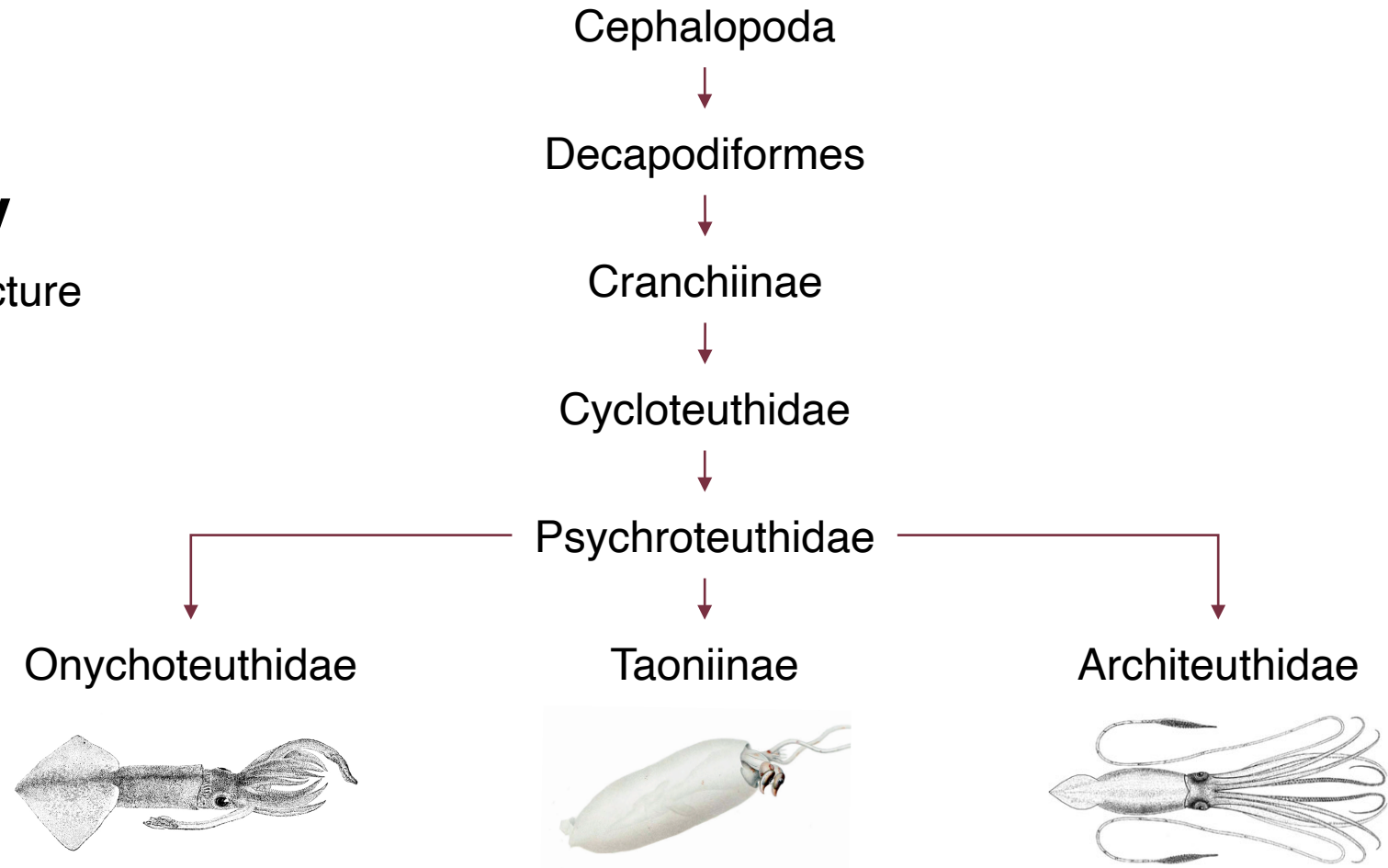
Narrower Term: Sepiida

Narrower Term: Squids

Information Organization

Taxonomy

Hierarchal structure



Information Organization

Ontology

Controlled vocabulary

**Hierarchal-like
structures**

Relationships

Gene Ontology

Biological process



Metabolic process



Primary metabolic process



Carbohydrate metabolic process



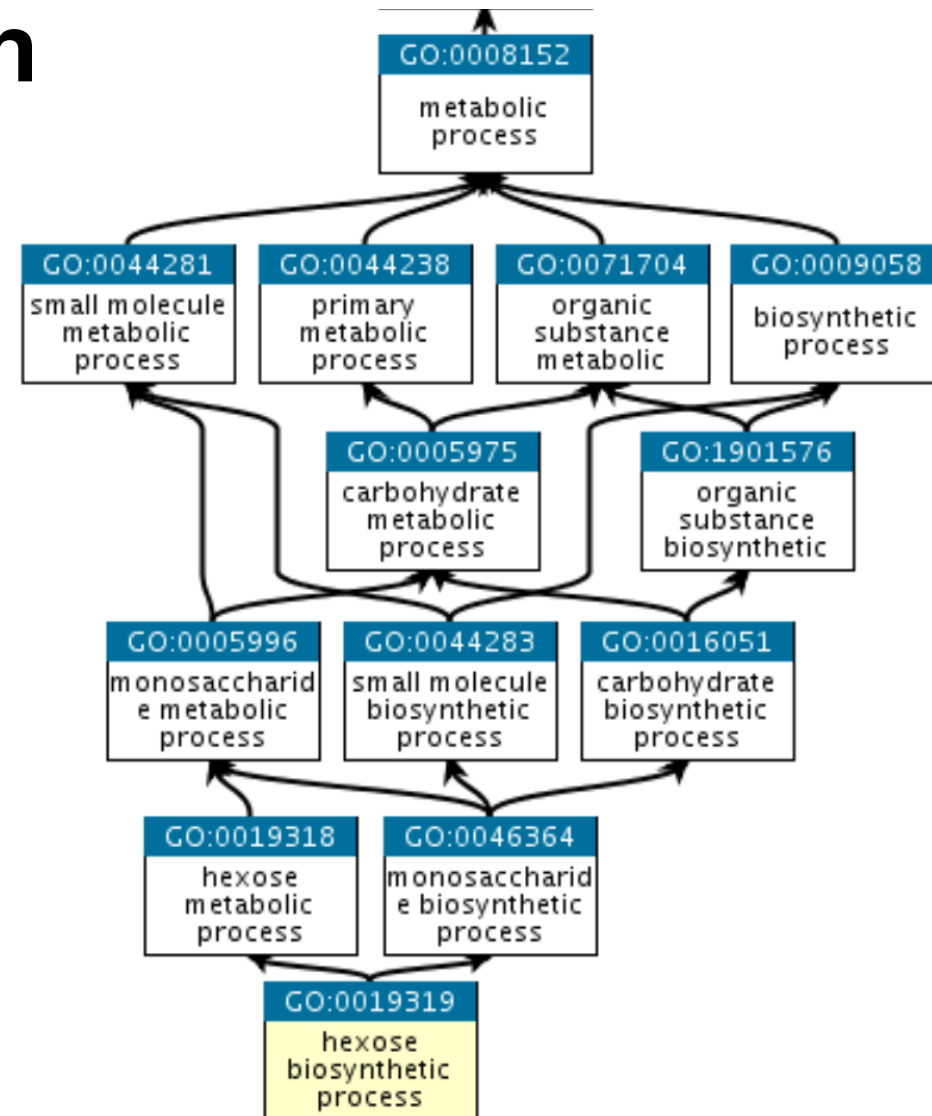
Glucose metabolic process

Information Organization

Ontology

Controlled vocabulary
Hierarchical-like
structures

Relationships



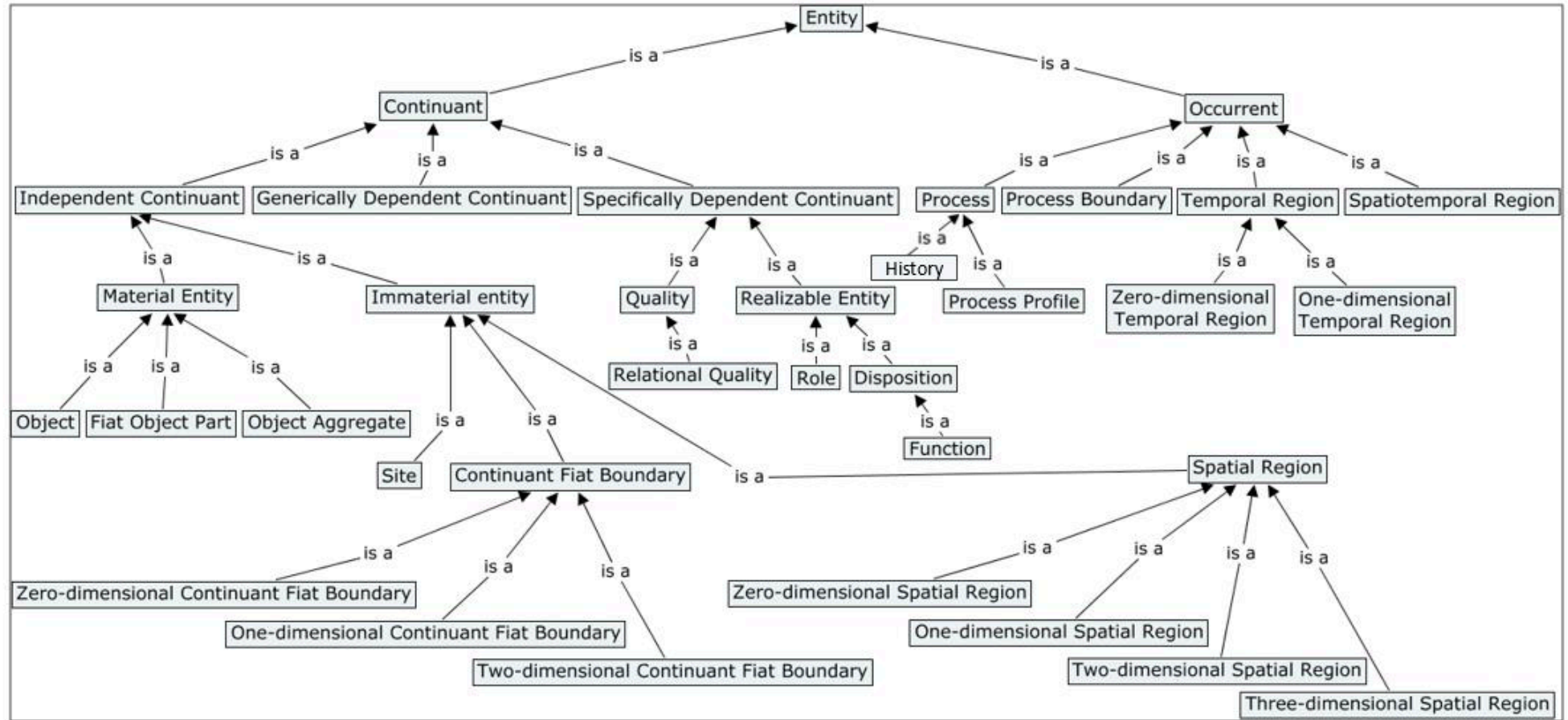




Equipment Ontology

Equipment Ontologies

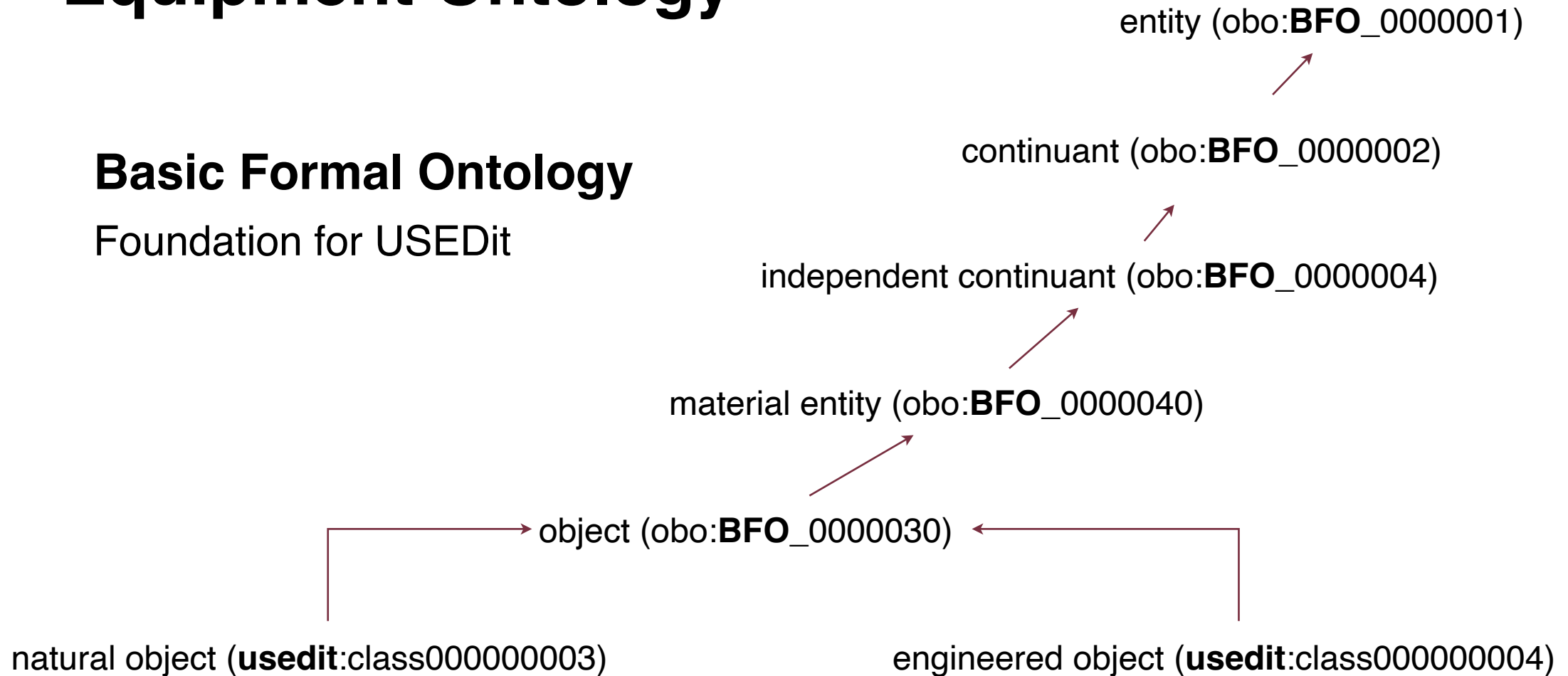
Basic Formal Ontology



Equipment Ontology

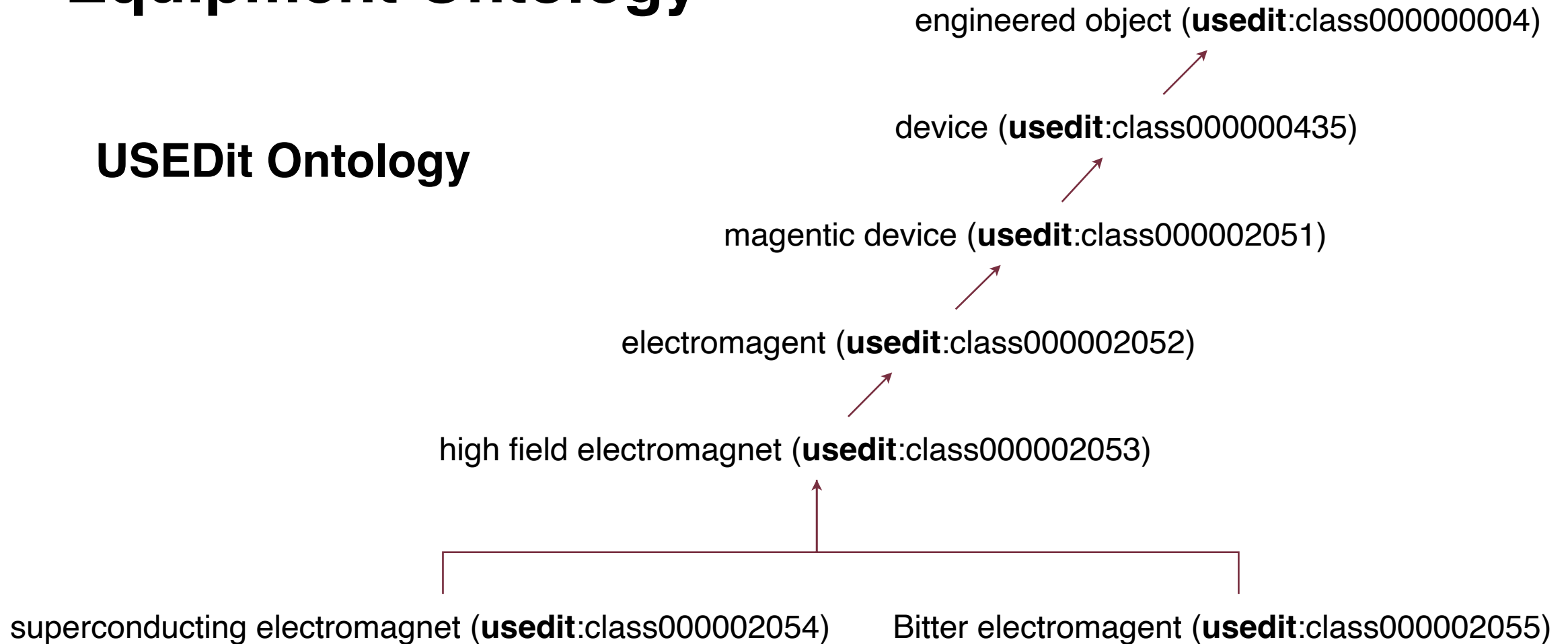
Basic Formal Ontology

Foundation for USEdit

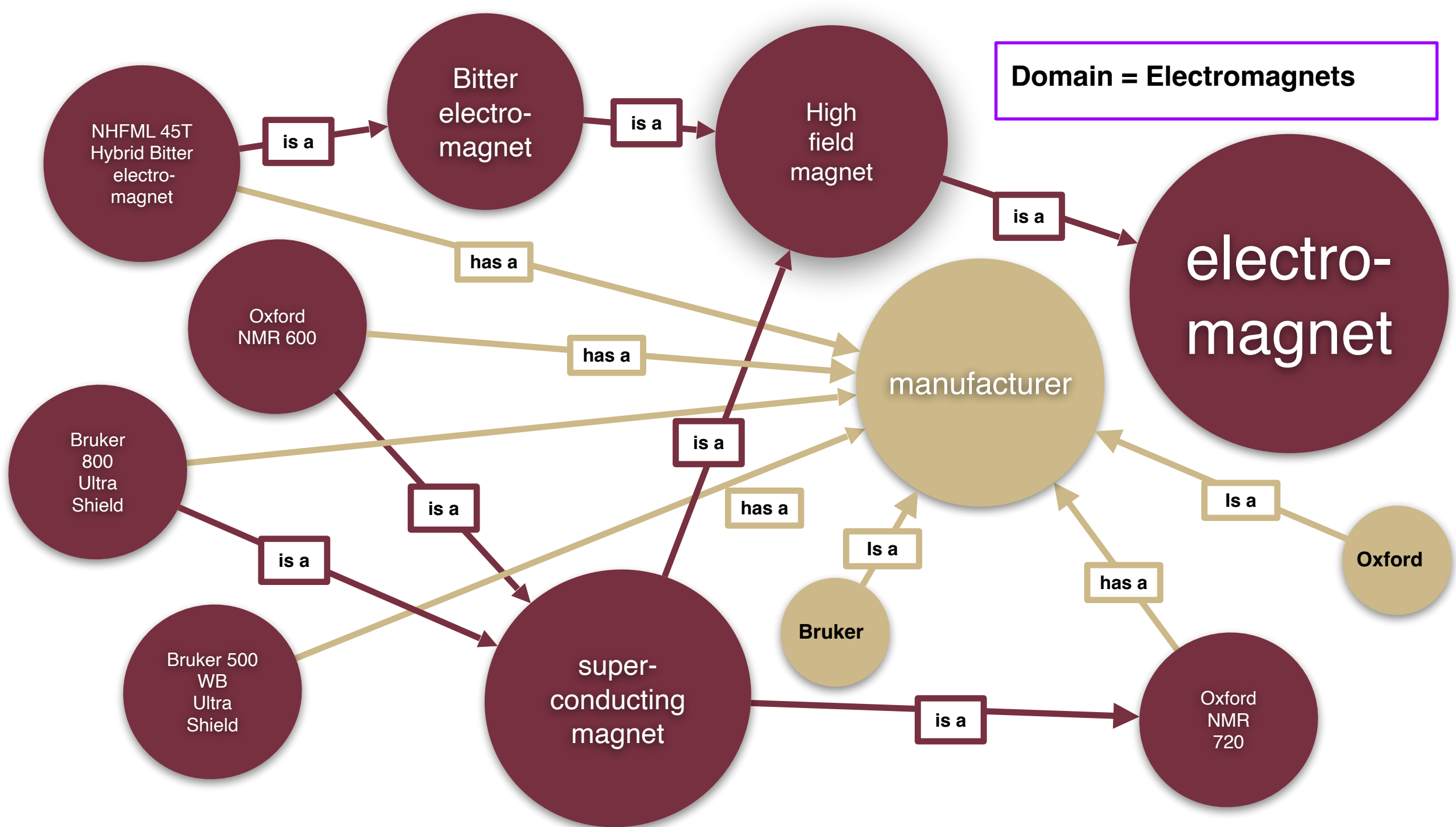


Equipment Ontology

USEDit Ontology



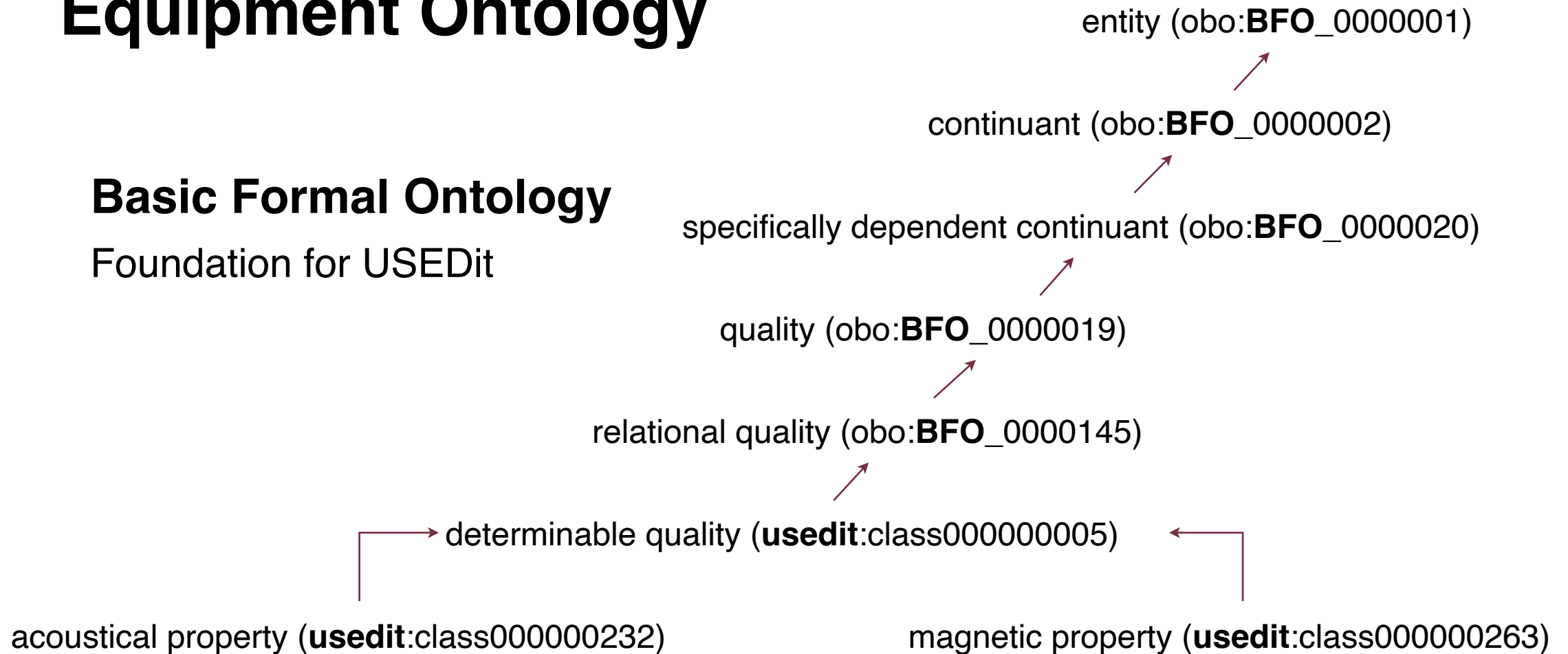
Domain = Electromagnets



Equipment Ontology

Basic Formal Ontology

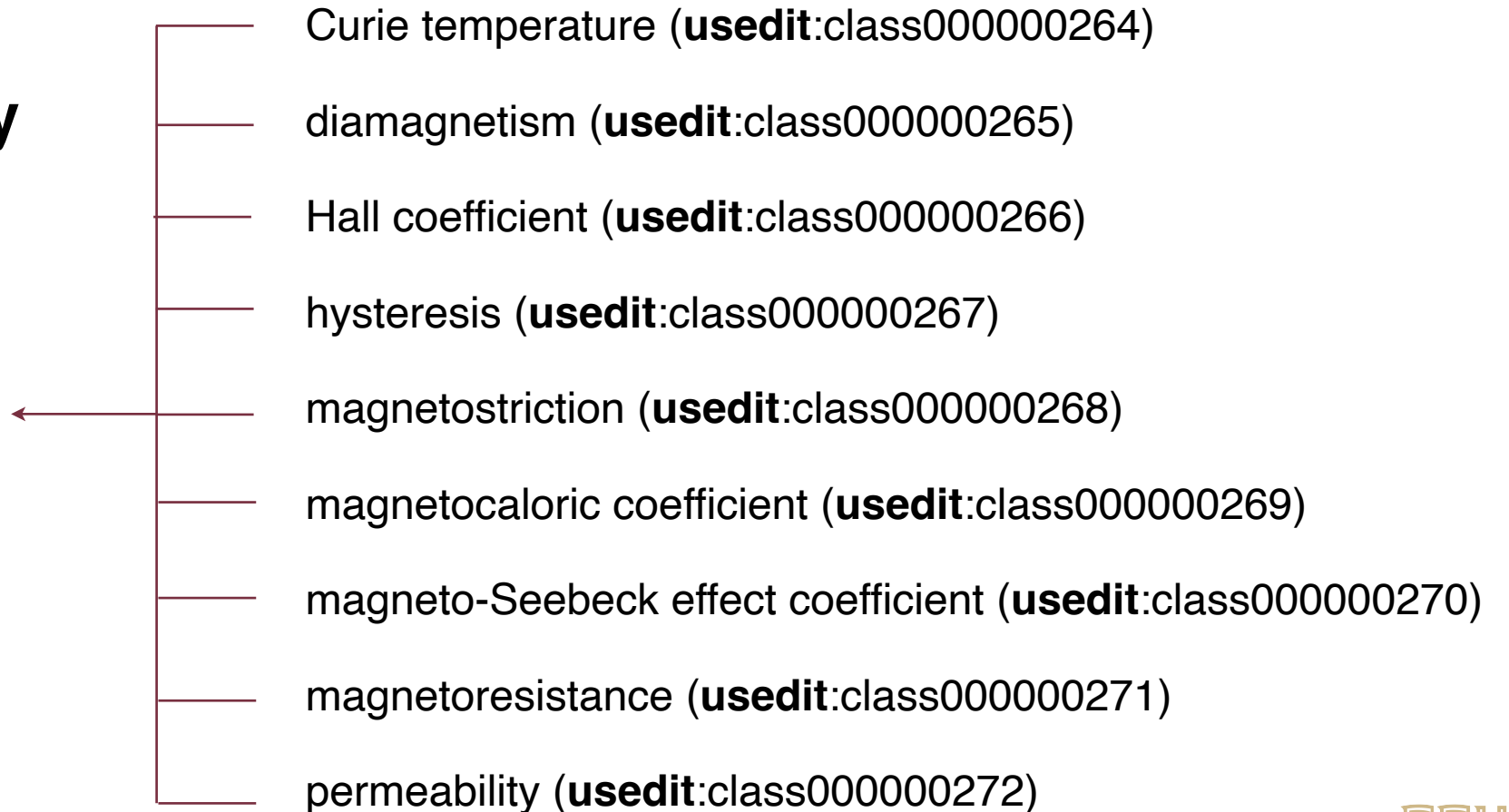
Foundation for USEdit



Equipment Ontology

USEDit Ontology

magnetic property
(**usedit:class000000263**)



Challenges



**USEDit ontology was
never completed**

Why?

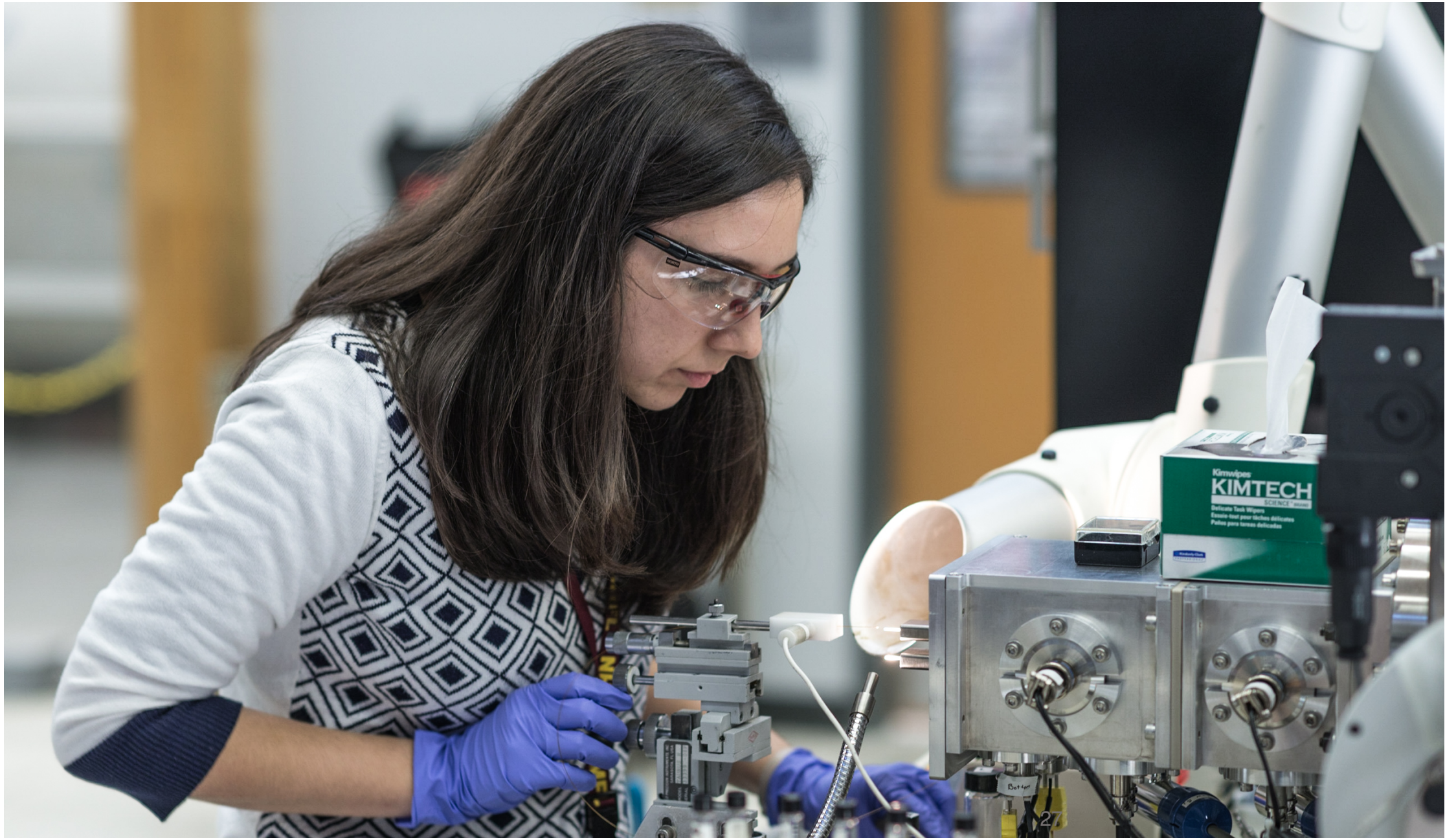
1. Complexity

- Time intensive project
 - True ontologies have complex relationships that go beyond mere classes
- Must reorient thinking from top-down hierarchy to “class is subclass of”
- Can be difficult to wrangle/visualize* multidimensional relationships

2. Comprehensiveness

- If resources (staff, funds, time) are limited, scale to local needs
 - Focus on how/why/where ontology will be used
- Develop overall ontology structure, then select one node to expand, e.g. device>>magnetic device>>electromagnet
 - Expand classes it has relationships to— an electromagnet **has a** magnetic property, so expand **subclasses of** the magnetic property class

* See Resources slide for Observable visualizations links





Sources

Resources

- **Basic Formal Ontology** (<https://github.com/bfo-ontology/BFO-2020>)
- **Basic Formal Ontology OWL Classes** (https://github.com/BFO-ontology/BFO/blob/master/bfo_classes_only.owl)
- **bfo_usedit_owl_20191015.xlsx** (https://github.com/aglerum/usedit/blob/master/ontology/bfo_usedit_owl_20191015.xlsx)
- **bfo-usedit_2020-02-29.owl** (https://github.com/aglerum/usedit/blob/master/ontology/bfo-usedit_2020-02-29.owl)
- **Taxonomic Structure for USEdit Ontology As of January 6, 2020** (<https://observablehq.com/d/3e4632b27c56668c>)
- **USEdit Agentive Taxonomy As of March 22, 2019** (<https://observablehq.com/d/aa7a4f1ec06e20c4>)

Image Citations

- **Slides 1, 2, 4, 6, 7, 10, 16, 17, 24, 26, 27.** FSU Branding assets (<https://brandfolder.com/floridastateuniversity/fsu-digital-assets>)
- **Slides 13 (left).** Onychoteuthidae (Hook Squid) (https://commons.wikimedia.org/wiki/File:Onychoteuthis_banksii2.jpg?uselang=en#Licensing)
- **Slides 13 (middle).** Taoniinae (Glass squid B). https://commons.wikimedia.org/wiki/File:Sandalops_melancholicus.jpg)
- **Slides 13 (right).** Architeuthidae (Giant Squid). https://commons.wikimedia.org/wiki/File:Architeuthis_princeps_image_modified.PNG?uselang=en#Licensing)
- **Slide 15.** GO graph (<https://geneontology.org/docs/ontology-documentation/>)
- **Slide 18.** Smith, Barry. Figure 1: The BFO 2.0 is_a Hierarchy. Basic Formal Ontology 2.0 (<https://raw.githubusercontent.com/BFO-ontology/BFO/master/docs/bfo2-reference/BFO2-Reference.pdf>)

Where are they now?

- **Claudius Mundoma** - Director of Shared Instrumentation Facilities, Stanford University
- **Michael Meth** - Dean of SJSU University Library, San José State University
- **Renaine Julian** - Director of STEM Libraries, Florida State University
- **Nicholas Ruhs** - Research Data Management Librarian, Florida State University
- **Annie Glerum** - Alma Systems and Reports Librarian, Florida State University
- **Leah Booher** - Information Manager, Heron Bridge Education
- **Mark Lopez** - Digital Collections Specialist, Library of Congress
- **David Rodriguez** - Digital Services Librarian, Florida State University



Thank You!

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