

Protégé: Ontology Editor

Jie Zheng

University of Pennsylvania

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Two Accepted Formats Of OBO Foundry Ontologies

- OBO Format (*e.g.* GO, PATO)

```
[Term]
id: GO:0000001
name: mitochondrion inheritance
namespace: biological_process
def: "The distribution of mitochondria, including the mitochondrial genome, into daughter cells after
interactions between mitochondria and the cytoskeleton." [GOC:mcc, PMID:10873824, PMID:11389764]
synonym: "mitochondrial inheritance" EXACT []
is_a: GO:0048308 ! organelle inheritance
is_a: GO:0048311 ! mitochondrion distribution
```

OWL provides richer semantic support
than OBO format

- OWL (Web Ontology Language) Format (*e.g.* OBI, CLO)

```
<!-- http://purl.obolibrary.org/obo/OBI_0000073 -->

<owl:Class rdf:about="http://purl.obolibrary.org/obo/OBI_0000073">
  <rdfs:label xml:lang="en">sample preparation for assay</rdfs:label>
  <rdfs:subClassOf rdf:resource="http://purl.obolibrary.org/obo/OBI_0000094"/>
  <rdfs:subClassOf>
    <owl:Restriction>
      <owl:onProperty rdf:resource="http://purl.obolibrary.org/obo/OBI_0000417"/>
      <owl:someValuesFrom rdf:resource="http://purl.obolibrary.org/obo/OBI_0000456"/>
    </owl:Restriction>
  </rdfs:subClassOf>
  <obo:IAO_0000115 xml:lang="en">A sample_preparation_for_assay is a protocol_application including material_en.
biomaterial_transformations. definition_source: OBI.</obo:IAO_0000115>
  <obo:IAO_0000119 xml:lang="en">OBI branch derived</obo:IAO_0000119>
  <obo:IAO_0000117 xml:lang="en">PlanAndPlannedProcess Branch</obo:IAO_0000117>
  <obo:IAO_0000111 xml:lang="en">sample preparation for assay</obo:IAO_0000111>
  <obo:IAO_0000118 xml:lang="en">study</obo:IAO_0000118>
  <obo:IAO_0000114 rdf:resource="http://purl.obolibrary.org/obo/IAO_0000125"/>
</owl:Class>
```

Ontology Editors

- OBO Format Ontology

OBO Editor

- <http://www.oboedit.org/>
- *Bioinformatics*. 2007 Aug 15;23(16):2198-200. Epub 2007 Jun 1.

- OWL Format Ontology

Protégé

- <http://protege.stanford.edu/>

Web Protégé

- <http://webprotege.stanford.edu/>
- <http://protegewiki.stanford.edu/wiki/WebProtege>

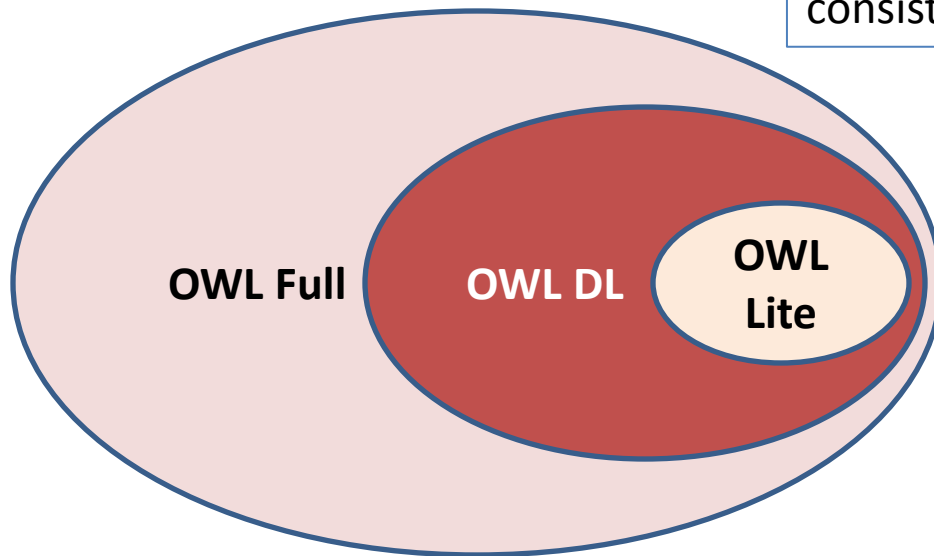
Web Ontology Language (OWL)

- A Semantic Web language
- Represent rich and complex knowledge about things, groups of things, and relations between things
- Builds on earlier languages, RDF, OIL and DAML+OIL
- Based on a Description Logic

OWL sublanguages

- OWL Lite
- OWL Description Logic (DL)
- OWL Full

provide the maximum expressiveness
support for the automated reasoning, inferences, and
consistency-checking



OWL 2

<http://www.w3.org/TR/owl2-overview>

OWL 2 defines three different tractable profiles:

- EL: polynomial time reasoning for schema and data
 - Useful for ontologies with large conceptual part
- QL: fast (logspace) query answering using RDBMs via SQL
 - Useful for large datasets already stored in RDBs
- RL: fast (polynomial) query answering using rule-extended DBs
 - Useful for large datasets stored as RDF triples

Protégé

- An ontology editor and information system building platform
- Website: <http://protege.stanford.edu/>
- Wiki:
http://protegewiki.stanford.edu/wiki/Main_Page
- Mailing list:
<http://protege.stanford.edu/support.php>
- Two types
 - Protégé desktop
 - Web Protégé

Protégé Desktop

- Features:
 - Ontology term operations: add, edit, delete
 - Ontology operations: merge, import
 - Description logic reasoner support
 - allow ontology consistency checking and knowledge inference based on asserted logical axioms
 - Plugins:
http://protegewiki.stanford.edu/wiki/Protege_Plugin_Library
- User documents (including tutorials)
 - <http://protegewiki.stanford.edu/wiki/Protege4UserDocs>
- Download (latest version):
 - <http://protege.stanford.edu/products.php#desktop-protege>
(On the page, click “Download” button on the bottom right)

WebProtégé

- Collaborative ontology development environment on the Web
<http://webprotege.stanford.edu>
- Features:
 - Ontology term operations: add, edit, delete
 - Change tracking
 - Threaded notes, discussions, watches and email notifications
 - Does **NOT** support reasoning

Protégé Desktop or WebProtégé?

- Protégé Desktop
 - Good for ontology developers
 - Supports reasoning
 - Can edit multiple ontology terms at one time
 - Many available plugins
 - Can manipulate ontologies which contain more than one OWL file
- WebProtégé
 - Good for domain experts to review an ontology and provide their comments
 - No software installation
 - Easy to view and comment on the ontology

Tutorials

- Ontology for Biomedical Investigations (OBI) will be used in the tutorial
 - http://purl.obolibrary.org/obo/obi/obi_core.owl


Using Protégé Desktop

- User interface
- Open an ontology (from URL, from a file)
- Preferences settings
- Add, edit, and delete a class
- Search a term
- Add, edit, and delete an individual
- Run reasoning
- Import an OWL file
- Merge OWL files
- Save an ontology
- Protégé Plugins: Entity URI

Using WebProtégé

- User interface
- Create/Upload an ontology
- Project share settings
- Add comments
- Watch a branch
- Update an ontology
- Download/Delete an ontology

Web Protégé

 WebProtege

other bcbc ontology icemr Upenn Funding technical OBIbasedBiobank - Dr... Mac - Apple - Mac La...

* Create Project ...

↑ Upload Project ...

Project Name	Description	Owner	Download
(EcoRSE) Données Metro		david.rouquet	↓
(EcoRSE) Référentiel V1	Référentiel d'indicateurs et de données élémentaires pour la description de territoires selon les trois piliers du développement durable (économique, social, environnemental). Distribué sous licence Creative Commons : Attribution + Pas d'Utilisation Commerciale + Partage dans les mêmes conditions (BY NC SA)	david.rouquet	↓
(EcoRSE) Référentiel V2 sept 2015		david.rouquet	↓
(OCD) Ontologia do Cidade Democrática	Ontologia do Cidade Democrática, orientada aos dados do portal: http://www.cidadedemocratica.org.br/	rfabbri	↓
(OPS) Ontologia de Participação Social	Ontologia de Participação Social, levantada na Plataforma Corais e capitaneada por organizações civis (e.g. Cidade Democrática) e do Estado (e.g. Secretaria Geral da Presidência da República)	rfabbri	↓
1234	1234	Ladone3	↓
2BDT	Trabalho	ernanibmurtinho	↓
2ndTeamStanfordCourse	Stanford Course Webprotege Demo	amanos	↓
3bdt-Bigdata	Trabalho	Carlos Bernardo	↓
3BDT-USP	Google Maps Usp	Yuka	↓
3BDT_Owl_RM46825_Exercicio5	Exercicio 5 - OWL	Ikaros Rapakulias	↓

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WebProtégé is developed by the Protégé team in the [Biomedical Informatics Research Group \(BMIR\)](#) at Stanford University, California, USA. The work is supported by Grant GM10 Sciences at the United States National Institute of Health. [Privacy Policy](#). [Terms of Use](#).

Upload Project

webprotege.stanford.edu/#List:coll=Home; Search

other bcbc ontology icemr Upenn Funding technical OBIbasedBiobank - Dr... Mac - Apple - Mac La...

protégé WebProtege

* Create Project ... Upload Project ...

Project Name	Description	Owner
Bioinformatics Web Services ontology	The Bioinformatics Web Services ontology (OBIWs) is an ontology that extends the Ontology for y that supports consistent annotation of	jiezheng
ICEMR Amazonia		jiezheng
ICEMR Amazonia upd	project based on data dictionary received	jiezheng
ICEMR Indian 201602	erated on 2016-02-15	jiezheng
ICEMR Indian update		jiezheng
ICEMR PRISM	variables have been mapped to ontology	jiezheng
ICEMR PRISM - old v		jiezheng
ICEMR PRISM 20160212	The terminology used for ICEMR PRISM project generated on 2016-02-12	jiezheng
ICEMR protein array	metadata used for ICEMR protein array data	jiezheng
Informed Consent Ontology (ICO)	Informed Consent Ontology (ICO) represents the documentations and processes involved in informed consent. ICO aims to support informed consent data integration and reasoning in the clinical research space.	jiezheng
NIAID GSC BRC View	Representation of NIAID GSC and BRC Core Metadata using OBI. This is BFO 1.1 compatible version.	jiezheng

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Upload ontology

Project name: obi core

Project description: The OBI ontology core version.

File: Browse... obi_core.owl

OK Cancel

Sharing Settings

The screenshot shows the Protégé web interface with the 'obi core' ontology loaded. The 'Classes' panel on the left displays a hierarchical tree of classes, with 'data item' selected. A 'Sharing settings' dialog box is open in the center, showing the 'Private' sharing option selected. The dialog indicates that access is restricted to a list of users, currently containing 'jiezheng (you)' with 'Can edit' permissions. At the bottom of the dialog, there is a section to 'Add people who Can view' with a text input field and an 'Add' button. The background interface includes a top navigation bar with 'Project', 'Share', 'jiezheng', and 'Help' buttons, and a right sidebar with 'Discussions for data item' and 'Project feed' sections.

protégé

WebProtege obi core

Classes Properties Individuals Change

Classes

Create Delete Watch Branch Search

- owl:Thing
 - entity
 - continuant
 - generically dependent cont
 - information content enti
 - centrally registered i
 - conclusion based or
 - data item**
 - data about an ont
 - data set
 - measurement da
 - datum label
 - directive information
 - document
 - symbol
 - testable hypothesis
 - value specification
 - independent continuant
 - specifically dependent cont
 - occurrent
 - Project
 - SVNRepository
 - Version

Sharing settings

☐ Public
Appears in list of ontologies. No sign-in required.

☒ Private
Does not appear in the list of ontologies. Sign-in required.

Access is restricted to the people in the list below

Who has access

jiezheng (you)	Can edit ▼	X
----------------	------------	---

Add people who Can view ▼

Enter names (1 per line)

Add

OK Cancel

the fluorescent intensity stimulated

Add content to this tab Add tab

Discussions for data item

Post new topic

Project feed

Add Comments

The screenshot displays the Protégé ontology editor interface. The top bar includes the Protégé logo, a 'WebProtege' tab, and a project tab labeled 'obi core'. Below this, a navigation bar shows 'Classes', 'Properties', 'Individuals', 'Changes By Entity', and 'Project Dashboard'. The main workspace is divided into three panes: 'Classes' on the left, 'Class description for data item' in the center, and 'Discussions for data item' on the right. The 'Classes' pane shows a hierarchical tree of classes, with 'data item' selected. The 'Class description for data item' pane shows the 'Display name' as 'data item' and the 'IRI' as 'http://purl.obolibrary.org/obo/IAO_0000027'. The 'Discussions for data item' pane has a 'Post new topic' button. An 'Edit Note' dialog box is open in the foreground, containing a text input field with the text 'Can add chinese label?', a rich text editor toolbar with buttons for bold, italic, underline, list, and link, and a text area containing the Chinese characters '数据'. The dialog box has 'OK' and 'Cancel' buttons at the bottom right.



















Download/Delete An Ontology

protégé WebProtege

jiezheng Help

* Create Project ... Upload Project ...

Home
Owned By Me
Trash

Project Name	Description	Owner	Download	Delete
Bioinformatics Web Services ontology	The Bioinformatics Web Services ontology (OBIWs) is an ontology that extends the Ontology for Biomedical Investigations (OBI) to build an Ontology that supports consistent annotation of Bioinformatics Web services.	jiezheng		
ICEMR Amazonia	The terminology used for ICEMR Amazonia project	jiezheng		
ICEMR Amazonia updated	The updated terminology used for ICEMR Amazonia project based on data dictionary received on Jan 10th, 2016	jiezheng		
ICEMR Indian 20160215	The terminology used for ICEMR Indian project generated on 2016-02-15	jiezheng		
ICEMR Indian updated	The terminology used for ICEMR Indian project	jiezheng		
ICEMR PRISM	The terminology used for ICEMR PRISM project, all variables have been mapped to ontology terms.	jiezheng		
ICEMR PRISM - old version	The terminology used for ICEMR PRISM project	jiezheng		
ICEMR PRISM 20160212	The terminology used for ICEMR PRISM project generated on 2016-02-12	jiezheng		
ICEMR protein array	metadata used for ICEMR protein array data	jiezheng		

Download

Delete

Questions?