



*BioSharing – mapping the metadata
standards in the life sciences*

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BioSharing Content Lead



Outline

1. The sea of standards in the life sciences
 1. What is BioSharing?
 2. Work in progress
3. BioSharing WG and potential collaborations

There are more than 600 standards in the life sciences



Databases and tools implementing Standards; also training material on and around standards



MAGE-Tab
GCDML
SRAXml
FASTA
CML
SOFT
DICOM
GELML
SBRML
MITAB
MzML
ISA-Tab
SEDML...

AAO
CHEBI
OBI
VO
PATO
MOD
XAO
DO
PRO
TEDDY
BTO
IDO...

miame
MIAPA
MIRIAM
MIX
MIQAS
MIGEN
MIAPE
ARRIVE
MIASE
REMARK
MIQE
CONSORT
MISFISHIE....

Mapping Standards and Databases in the Life Sciences

“Which standard should I use for this data, considering I’d like to publish in X journal?”

“Are we using the most up-to-date version of this standard?”

“My data is in X format, which databases take that format?”



Promoting coherent minimum reporting guidelines for biological and biomedical investigations: the MIBBI project



(2008)

Chris F Taylor^{1,2}, Dawn Field^{2,3}, Susanna-Assunta Sansone^{1,2}, Jan Aerts⁴, Rolf Apweiler¹, Michael Ashburner⁵, Catherine A Ball⁶, Pierre-Alain Binz^{7,8}, Molly Bogue⁹, Tim Booth², Alvis Brazma¹, Ryan R Brinkman¹⁰, Adam Michael Clark¹¹, Eric W Deutsch¹², Oliver Fiehn¹³, Jennifer Foster¹⁴, Peter Ghazal¹⁵, Frank Gibson¹⁶, Tanya Gray^{2,3}, Graeme Grimes¹⁵, John M Hancock¹⁷, Nigel W Hardy¹⁸, Henning Hermjakob¹, Randall K Julian Jr¹⁹, Matthew Kane²⁰, Carsten Kettner²¹, Christopher Kinsinger²², Eugene Kolker^{23,24}, Martin Kuiper²⁵, Nicolas Le Novère¹, Jim Leebens-Mack²⁶, Suzanna E Lewis²⁷, Phillip Lord¹⁶, Ann-Marie Mallon¹⁷, Nishanth Marthandan²⁸, Hiroshi Masuya²⁹, Ruth McNally³⁰, Alexander Mehrle³¹, Norman Morrison^{2,32}, Sandra Orchard¹, John Quackenbush³³, James M Reecy³⁴, Donald G Robertson³⁵, Philippe Rocca-Serra^{1,36}, Henry Rodriguez²², Heiko Rosenfelder³¹, Javier Santoyo-Lopez¹⁵, Richard H Scheuermann²⁸, Daniel Schöber¹, Barry Smith³⁷, Jason Snape³⁸, Christian J Stoeckert Jr³⁹, Keith Tipton⁴⁰, Peter Sterk¹, Andreas Untergasser⁴¹, Jo Vandesompele⁴² & Stefan Wiemann³¹

POLICYFORUM

MEGASCIENCE

Science

'Omics Data Sharing



BLOG biosharing.org

(2009)

Dawn Field,^{1*}† Susanna-Assunta Sansone,^{1,2†} Amanda Collis,^{3†} Tim Booth,¹ Peter Dukes,⁴ Susan K. Gregurick,⁵ Karen Kennedy,⁶ Patrik Kolar,⁷ Eugene Kolker,⁸ Mary Maxon,⁹ Siân Millard,¹⁰ Alexis-Michel Mugabushaka,¹¹ Nicola Perrin,¹² Jacques E. Remacle,⁷ Karin Remington,¹³ Philippe Rocca-Serra,¹² Chris F. Taylor,¹² Mark Thorley,¹⁴ Bela Tiwari,¹ John Wilbanks¹⁵

POLICIES

STANDARDS

DATABASES



FORMATS



TERMINOLOGIES



REPORTING
GUIDELINES

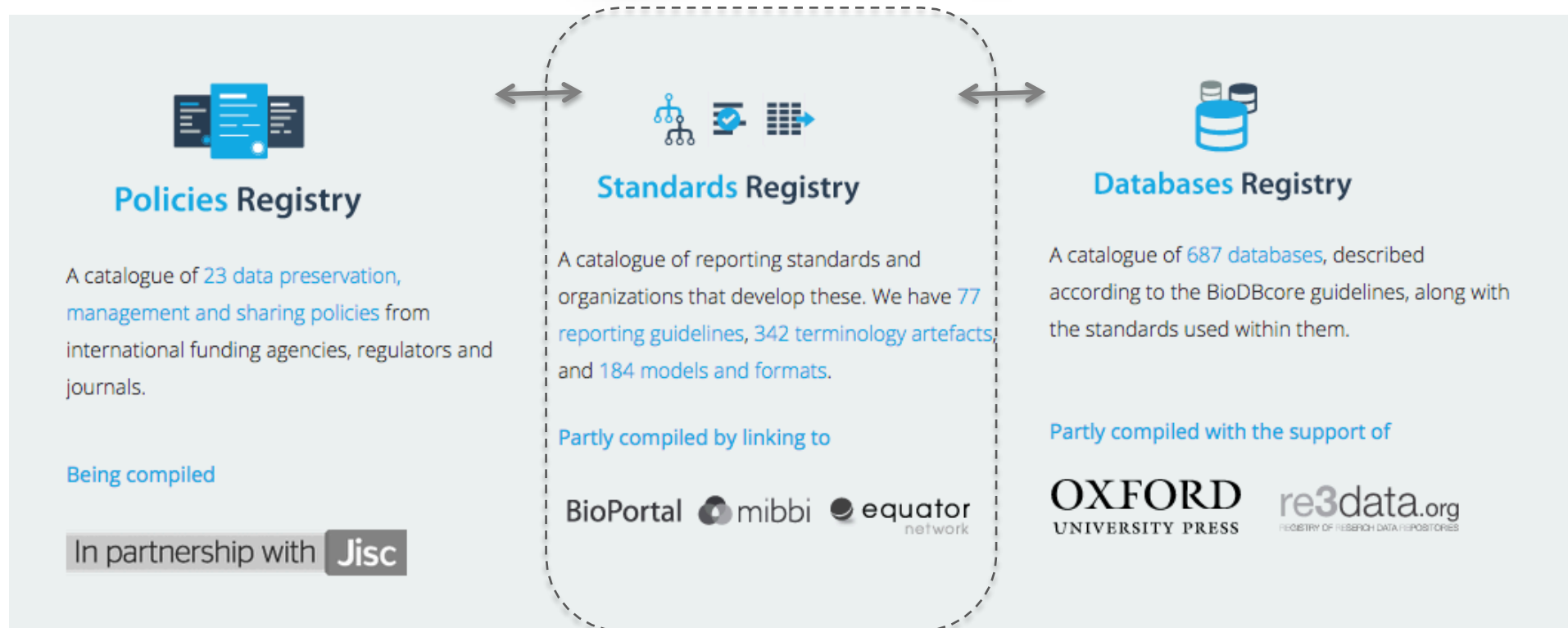


(2011)

- registry development,
- content collection,
- community engagement,
- funds raising
- creation of a WG in RDA and Force11; Advisory Board
- links with ELIXIR and NIH BD2K

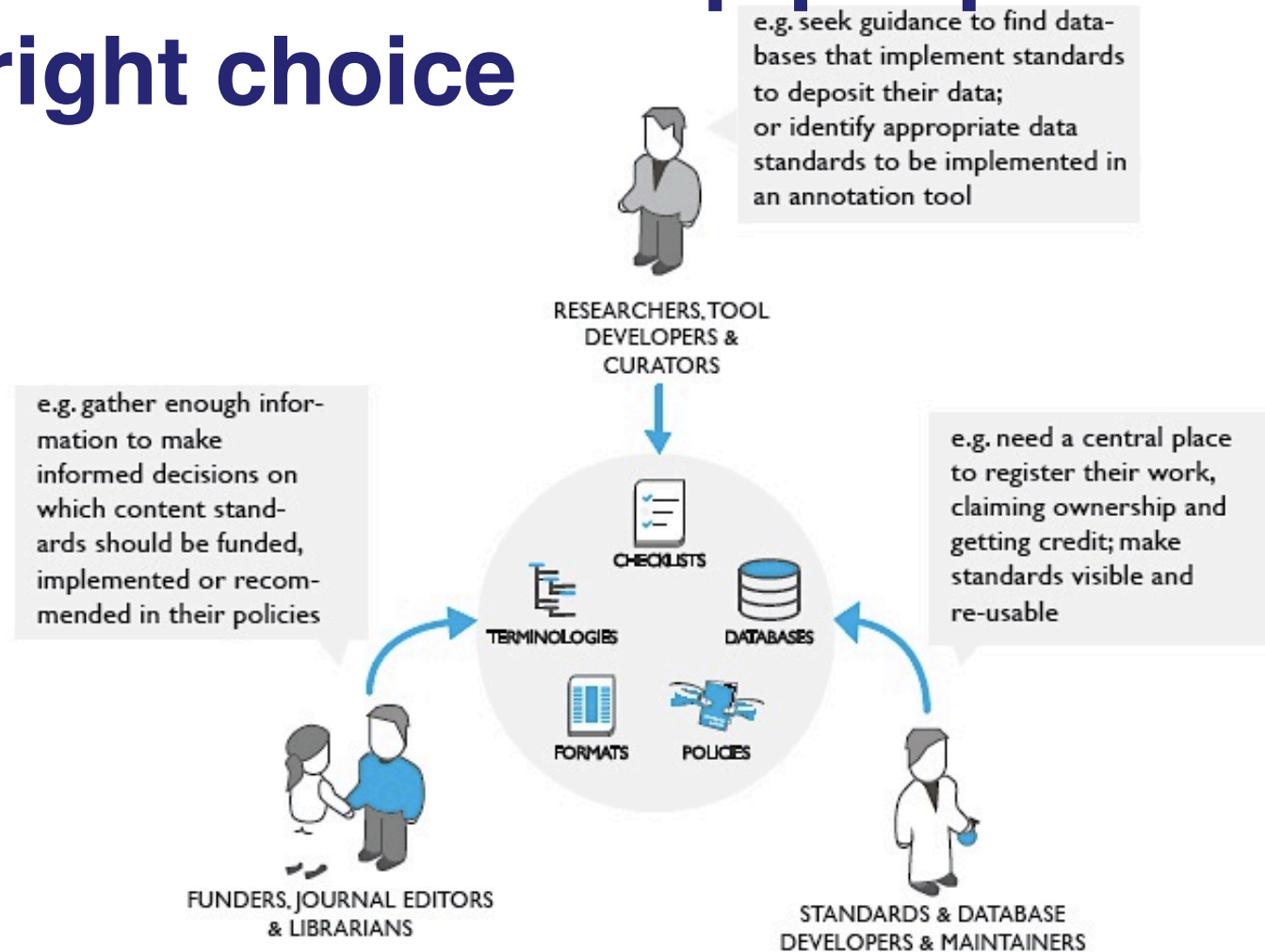
(2015)

biosharing.org



A **web-based, curated and searchable registry** ensuring that **biological standards** and **databases** are *registered, informative and discoverable*; also monitoring the development and evolution of standards, their use in databases and the adoption of both in data **policies**.

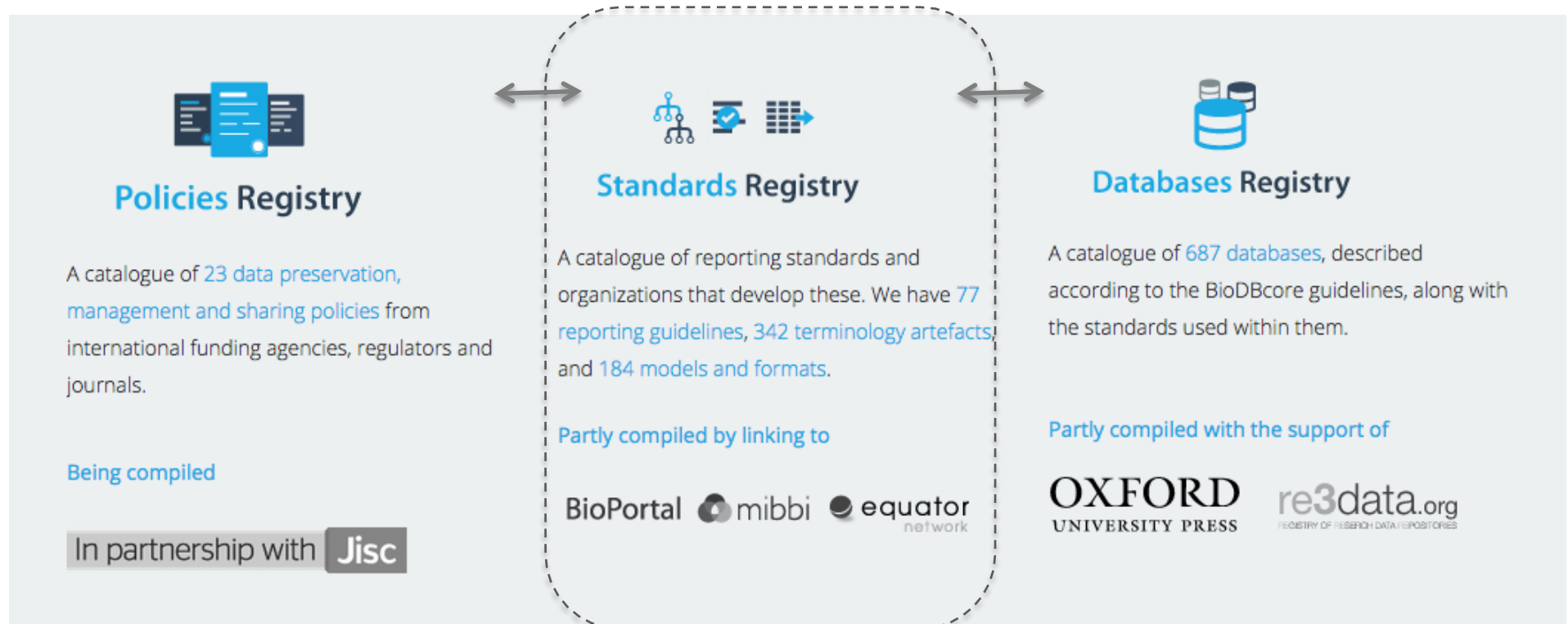
Our mission: To help people make the right choice



Researchers, developers and **curators** lack support and guidance on how to best navigate and select content standards, understand their maturity, or find databases that implement them;

Funders, journals and **librarians** do not have enough information to make informed decisions on which content standards or database to recommended in policies, or fund or implement

Three interlinked registries



Standards and databases cross-linked

biosharing

STANDARD

STANDARDS > EXCHANGE FORMAT > BSG-000078

ISA-Tab - Investigation Study Assay Tabular

EXCHANGE FORMAT

General Information

General-purpose ISA-Tab file format - an extensible, hierarchical structure that focuses on the description of the experimental metadata (i.e. sample characteristics, technology and measurement types, sample-to-data relationships)

Developed in UK

Database scope and data types

FUNCTIONAL GENOMICS BIOLOGICAL MATERIAL REPORT EXPERIMENT DEVICE FILE ASSAY REAGENT MATRIX

Support

documentation http://isatab.sourceforge.net/docs/ISA-TAB_release-candidate-1_v1.0_24nov08.pdf
Mailing List [isaforum\[at\]googlegroups.com](mailto:isaforum[at]googlegroups.com)
Contact [Philippe Rocca-Serra](#)
Homepage <http://isatab.sourceforge.net/format.html>

Implementing Databases

MetaboLights
MetaboLights is a database for Metabolomics experiments and derived information. The database is cross-species, cross-technique and covers metabolite structures and their reference spectra as well as their biological roles, locations and concentrations, and experimental data from metabolic experiments. We offer user-submission tools and have strong reporting capabilities. We will utilise and further develop de-facto standard formats where various components are encapsulated, such as the encoded spectral and chromatographic data, and

Credit

Record Maintainer

This record is maintained by [proccaserra](#)

Development Group

[ISA community](#)

Funders

[BBSRC](#)

Publications

ISA software suite: supporting standards-compliant experimental annotation and enabling curation at the community level.

biosharing

DATABASE

DATABASES > BIODBCORE-000168

MetaboLights

Abbreviation: MTBLS

General Information

[Tweet to @MetaboLights](#)

MetaboLights is a database for Metabolomics experiments and derived information. The database is cross-species, cross-technique and covers metabolite structures and their reference spectra as well as their biological roles, locations and concentrations, and experimental data from metabolic experiments. We offer user-submission tools and have strong reporting capabilities. We will utilise and further develop de-facto standard formats where various components are encapsulated, such as the encoded spectral and chromatographic data, and associated information about the chemical structure, as well as metadata describing assays and the study as a whole. We are dedicated to collaborate closely with major parties in world-wide metabolomics communities, such as the Metabolomics Society and the associated Metabolomics Standards Initiative (MSI).

Developed in UK, EU

Taxonomic range

ALL

Database scope and data types

METABOLITE METABOLOMICS LIPIDOMICS MASS SPECTROMETRY NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY FLUOROMICS PUBLICATIONS

Tools

ISACreator <http://www.isa-tools.org/>

Access / Retrieve Data

Conditions of Use

Data Access

Continuous Release <http://metabolomexchange.org/provider>

Related Standards

Reporting Guidelines

[Core information for Metabolomics Reporting](#)

Terminology Artifacts


[Mass Spectrometry](#)
[Ontology for Biomedical Investigations](#)
[Chemical Entities of Biological Interest](#)
[Nuclear Magnetic Resonance Controlled Vocabulary](#)

Exchange Formats

[Investigation Study Assay Tabular](#)
[Nuclear Magnetic Resonance Markup Language](#)

Terminologies linked to NCBO BioPortal

OBI – Ontology for Biomedical Investigations


 OBO TERMINOLOGY ARTIFACT


General Information

"Ontology for Biomedical Investigations" is a standard, specialising in the fields described under "scope and data types", below. Until this entry is claimed, more information on this project can be found at <http://purl.bioontology.org/ontology/OBI>. This text was generated automatically. If you work on the project responsible for "Ontology for Biomedical Investigations" then please consider helping us by claiming this record and updating it appropriately.

Last updated: June 22, 2015, 3:04 p.m.

Scope and data types

 DATA TRANSFORMATION

 EXPERIMENT

 MATERIAL ENTITY

 REAGENT

 DEVICE

 DATA

 ASSAY

 REPORT

 MATRIX

Support

No support links provided.

Additional Information

Homepage <http://purl.bioontology.org/ontology/OBI>

Implementing Databases (4)

[Stem Cell Discovery Engine](#)
Comparison system for cancer stem cell analysis

[Virus Pathogen Database and Analysis Resource \(ViPR\)](#)
The Virus Pathogen Database and Analysis Resource (ViPR, www.ViPRbrc.org) is an integrated repository of data and

OBI Ontology Display

View in [BioPortal](#).

entity

Obsolete Class

Project

SVNRepository

Version

Disclaimer: This widget assumes the availability of the ontology resources in the NCBO BioPortal.

Tracking evolution, e.g. deprecations and substitutions

✖ DEPRECATED

View as Grid | View as Table

Best Match | Sort Descending | Sort Ascending


No Publication | Has Publication

No Maintainer | Has Maintainer

Deprecated | Current

Closed Access | Restricted Access | Open Access

9 records in view



Bilateria anatomy

TERMINOLOGY ARTIFACT

DEPRECATED

Systems 1

Publications 0


In Collections 0

No taxa defined.

2 Data types, including:

ANATOMY

BLATERA



Platynereis Developmental STage

TERMINOLOGY ARTIFACT

DEPRECATED

Systems 0

Publications 0

In Collections 0


No taxa defined.

3 Data types, including:

LIFE CYCLE

PLATYNEREIS

LIFE CYCLE STAGE



Amphibian gross Anatomy Ontology

TERMINOLOGY ARTIFACT

DEPRECATED

Systems 0

Publications 1


In Collections 0

No taxa defined.

2 Data types, including:

AMPHIBIA

ANATOMY



Dendritic cell

TERMINOLOGY ARTIFACT

DEPRECATED

Systems 0

Publications 0

In Collections 0

No taxa defined.

4 Data types, including:

DENDRITIC CELL

ANATOMY

FUNCTION

MORPHOLOGY



INOH Event Ontology

TERMINOLOGY ARTIFACT

DEPRECATED

Systems 0

Publications 0



New Taxonomy database

TERMINOLOGY ARTIFACT

DEPRECATED

Systems 1

Publications 1



NMR-CV

TERMINOLOGY ARTIFACT

DEPRECATED

Systems 1

Publications 0



mzData

MODEL AND FORMAT

DEPRECATED

Systems 0

Publications 1

Tracking evolution, e.g. deprecations and substitutions

✖ DEPRECATED

View as Grid | View as Table

Best Match | Sort Descending | Sort Ascending


No Publication | Has Publication

No Maintainer | Has Maintainer

Deprecated | Current

Closed Access | Restricted Access | Open Access

9 records in view



Bilateria anatomy


TERMINOLOGY ARTIFACT
DEPRECATED

Systems: 1

Publications: 0

In Collections: 0

No taxa defined.



Platynereis Developmental STage


TERMINOLOGY ARTIFACT
DEPRECATED

Systems: 0

Publications: 0

In Collections: 0

No taxa defined.



Amphibian gross Anatomy Ontology


TERMINOLOGY ARTIFACT
DEPRECATED

Systems: 0

Publications: 1

In Collections: 0

No taxa defined.



Dendritic cell

TERMINOLOGY ARTIFACT
DEPRECATED

Systems: 0

Publications: 0

In Collections: 0

No taxa defined.

This record was deprecated on April 8, 2015 for the following reason(s):

This resource is obsolete, and has been subsumed (together with mzXML) into mzML. Please use mzML instead (<https://www.biosharing.org/bsg-000112>). For more information, see <http://www.psdev.info/groups/mass-spectrometry>

mzData

MODEL AND FORMAT

General Information

mzData is an XML format for representing mass spectrometry data in such a way as to completely describe the instrumental aspects of the experiment. This format is deprecated and has been superseded by mzML.

This record is replaced by:
[mz Markup Language](#)

Record added: Feb. 23, 2015, 1:23 p.m.
Last updated: April 8, 2015, 7:24 p.m.

Search filter, refine

Core functionalities:

- search and filtering, e.g. by funder, domain, type of standard
- Refine by publication, maintainer etc.
- add new records, edit existing records
- “claim” records
- person’s profile (as maintainer of records) associated to the ORCID profile (for credit)
- visualization and views of content and linking

Annotation Sources:

- 4 axis: (material, process, quality, information)
- NIF,OBI,CL,GO,IAO,EDAM

The screenshot displays a web application for searching and refining biological standards. The interface is divided into a sidebar for filtering and a main grid for results.

Filters (Left Sidebar):


- Standard Type:**
 - TERMINOLOGY ARTIFACT: 337
 - EXCHANGE FORMAT: 178
 - REPORTING GUIDELINE: 70
- Domains:**
 - DNA: 54
 - ANATOMY: 44
 - PROTEIN: 35
 - HOMO SAPIENS: 31
- Taxonomies:**
 - ALL: 18
 - HOMO SAPIENS: 16
 - HOMO SAPIENS: 5
 - ARCHAEA: 3
- Countries:**
 - USA: 28
 - CANADA: 9
 - UK: 9
 - GERMANY: 8
- Maintainers:**
 - NIF: 35

Search Results (Main Grid):


Showing records 1 - 50 of 585.


The results are displayed in a grid of six cards, each representing a different standard:

- AAO (Amphibian gross Anatomy Ontology):** Terminology Artifact. 0 Systems, 0 Publications. No taxa defined. 2 Data types: ANATOMY, AMPHIBIA.
- ABA (ABA Adult Mouse Brain):** Terminology Artifact. 0 Systems, 0 Publications. No taxa defined. 2 Data types: BRAIN, MUSCULUS.
- ABCD (Access to Biological Collection Data):** Exchange Format. 0 Systems, 0 Publications. No taxa defined. No data types defined.
- ABCDDNA (Access to Biological Collection Data DN...):** Exchange Format. 0 Systems, 0 Publications. No taxa defined. 4 Data types: DNA, BIOLOGICAL DIVERSITY, DNA SEQUENCE DATA, SEQUENCE.
- .ACE format (.ACE format):** Exchange Format. 0 Systems, 0 Publications. No taxa defined. 5 Data types: CONTIG ASSEMBLY, DNA SEQUENCE DATA, CONTIG, GENOME, DNA.
- ACGT (Cancer Research and Management ACGT):** Terminology Artifact. 0 Systems, 0 Publications. No taxa defined. No data types defined.

 biodiversity

Standards , Databases

 Reset

 Search

 No Publication

 Has Publication

 No Maintainer

 Has Maintainer

 Deprecated

 Current

 Closed Access

 Restricted Access

 Open Access

Domains

BIODIVERSITY	6
DNA	1
TAXONOMY	1
BIOLOGICAL DIVERSITY	1

Taxonomies

ALL	2
ANIMALIA	1
BACTERIA	1
FUNGI	1

Countries

CANADA	2
ALL	1
BRAZIL	1
DENMARK	1

Maintainers

...	...
-----	-----



ABCD

Access to Biological Collection Data
EXCHANGE FORMAT

 Systems	0
 Publications	0

No taxa defined.

No data types defined.



AC

Audubon Core Multimedia Resources
Metad...
TERMINOLOGY ARTIFACT

 Systems	0
 Publications	0

No taxa defined.

No data types defined.



The Barcode of Life Data Systems

Standards	1
 Publications	1

1 Taxa types, including:



2 Data types, including:



Canadensys

Standards	1
 Publications	0

No taxa defined.

1 Data types, including:



DWC

Darwin Core
TERMINOLOGY ARTIFACT

 Systems	2
 Publications	0

No taxa defined.



FLOW

Standards	1
 Publications	0

1 Taxa types, including:



Global Biodiversity Information Facility

Standards	1
 Publications	1

4 Taxa types, including:



GUID and LSID Applicability Statements

Globally Unique Identifier and Life Sci...
REPORTING GUIDELINE


 Systems	0
 Publications	0

No taxa defined.

Create your own Collection

Collections

Contribute by adding a collectionAny problems? Please tell us!



BioSharing collections link together a related set of policies, databases and standards which are relevant to a particular project or organisation.

Search CollectionsSearchReset

View as GridView as Table

Best MatchSort DescendingSort Ascending


No PublicationHas Publication

No MaintainerHas Maintainer

DeprecatedCurrent

Closed AccessRestricted AccessOpen Access

7 records in view




bioCADDIE Collection of Standards

Standards19

Policies0

Databases0




Biodiversity Information Standards (TDWG)

Standards11

Policies0

Databases0




BioMed Central Journal Guidelines

Standards15

Policies1

Databases40




eTRIKS Standards Starter Pack

Standards29

Policies0

Databases2




Metabolomics Standards and Databases

Standards5

Policies0

Databases2




NIH-supported data repositories

Standards0

Policies0

Databases56



Scientific Data Journal Guidelines

Standards5

Policies1

Databases58

COLLECTIONS

bioCADDIE bioCADDIE Collection of Standards

The collection of terminology artifacts and models being considered for the bioCADDIE Metadata Working Group.

This Collection is maintained by: [agbeltran](#)

[Homepage](#)[Reference](#)

Search within this collection

[Policies , Standards , Databases](#)

[View as Grid](#) | [View as Table](#)

19 records in view

Best Match

Sort Descending

Sort Ascending

No Publication

Has Publication

No Maintainer

Has Maintainer

Deprecated

Current

Closed Access

Restricted Access

Open Access

Standard Type

MODEL AND FORMAT	13
TERMINOLOGY ARTIFACT	5
REPORTING GUIDELINE	1

BioProject XML Schema

MODEL AND FORMAT

Systems	4
Publications	1
In Collections	1

No taxa defined.

10 Data types, including:

TRANSCRIPT ASSEMBLIES	GENOMIC ASSEMBLIES
EPIGENETICS	CELLULAR ORGANISMS

BRIDG Model

MODEL AND FORMAT

Systems	0
Publications	0
In Collections	1

2 Taxa types, including:

HOMO SAPIENS	ANIMALIA
--------------	----------

3 Data types, including:

CLINIC	CLINICAL STUDY
--------	----------------

CDISC Operational Data Model

MODEL AND FORMAT

Systems	1
Publications	0
In Collections	2

1 Taxa types, including:

HOMO SAPIENS

4 Data types, including:

CLINICAL TRIAL	WORKFLOW
CLINICAL STUDY	REPORT

CDISC Study/Trial Design Model

MODEL AND FORMAT

Systems	0
Publications	0
In Collections	2

1 Taxa types, including:

HOMO SAPIENS

5 Data types, including:

CLINICAL TRIAL	CELL LINE
EXPERIMENTAL DESCRIPTIONS	CLINICAL STUDY

COLLECTIONS



BioMed Central
The Open Access Publisher

BioMed Central Journal Guidelines

This collection houses all the databases and standards mentioned in the submission checklist for the BioMed Central stable of journals. The checklist itself is listed as a policy document in this collection.

This Collection is maintained by: [AmyeKenall](#)

[Homepage](#)

[Reference](#)

Policies , Standards , Databases

[View as Grid](#) | [View as Table](#)

Best Match

Sort Descending

Sort Ascending

No Publication

Has Publication

No Maintainer

Has Maintainer

Deprecated

Current

Standard Type

REPORTING GUIDELINE 13

MODEL AND FORMAT 2

TERMINOLOGY ARTIFACT 0

Domains

HOMO SAPIENS 6

PROTEIN 5

DNA 4

CLINICAL TRIAL 4

[SHOW MORE](#)

Taxonomies

ANY 28

HOMO SAPIENS 10

Showing records 1 - 50 of 56.

« 1 2 »



Addgene

Standards 2

Publications 3

In Collections 2

No taxa defined.

5 Data types, including:

PLASMID REPOSITORY REFERENCES
DNA NON-PROFIT



ArrayExpress

Standards 6

Publications 2

In Collections 2

1 Taxa types, including:

ANY

7 Data types, including:

HIGH THROUGHPUT GENOMICS (RNA-SEQ)
NUCLEOTIDE CHIP-SEQ



ARRIVE

REPORTING GUIDELINE

Systems 0

Publications 2

In Collections 1

No taxa defined.

4 Data types, including:

IN-VIVO STUDY METAZOA
LIVING ANIMAL ANIMAL RESEARCH



BioMed Central Journal Submission Check...

2015

Publications 0

In Collections 1

1 Taxa types, including:

ANY

No data types defined.



NCBI BioSample

Standards 1

Publications 1

In Collections 1

No taxa defined.

7 Data types, including:

ASSAY SEQUENCE DATA
EXPRESSION STUDIES



caNanoLab



Case Reports

REPORTING GUIDELINE



CHEERS

REPORTING GUIDELINE



CONSOLIDATED standards of Reporting Trials

REPORTING GUIDELINE



CONSORT - OE

REPORTING GUIDELINE

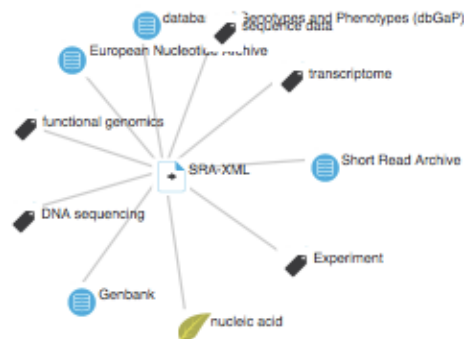
WIP – surveys, advisory board & WGs

1. Maximize categorization to improve searching, continue curation, add records, increase maintainers/vetting of records
2. Schema views: progressively visualize formats and reporting guidelines as tested for terminologies (via BioPortal)

SRA-XML - Short Read Archive eXtensible Markup Language

EXCHANGE FORMAT

Connectivity



Schemas

Name: SRA-XML
Version: 1.5

[Download](#) [Show](#)

Name: SRA-XML
Version: 1.4

[Download](#) [Show](#)

Name: SRA-XML
Version: 1.3

[Download](#) [Show](#)

Name: SRA-XML
Version: 1.2

[Download](#) [Show](#)

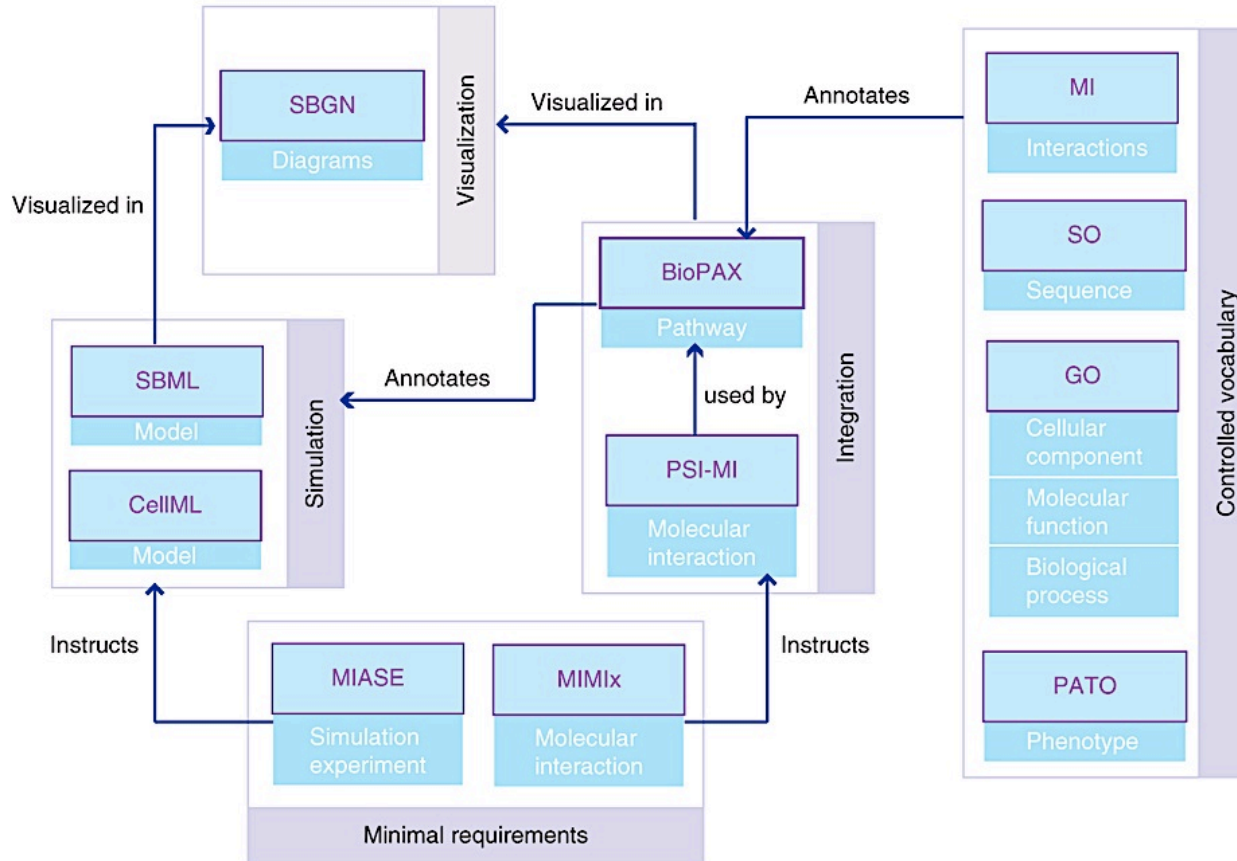


3. Export of metadata elements: as part of



WIP – surveys, advisory board & WGs

4. Create relation or “usage maps and guides”, e.g.:




The relationship among popular standard formats for pathway information.

Demir, *et al.*, The BioPAX community standard for pathway data sharing, Nat Biotech. 2010.

5. Metrics of maturity, usability and popularity, kick-started by Tenenbaum, Sansone, Haendel. A sea of standards for omics data: sink or swim? ***J Am Med Inform Assoc*** (2014).

6. Embed in the ecosystem of complementary registries

The BioSharing Registry: connecting data policies, standards & databases in life sciences



i Group details

Status: Recognised & Endorsed

Chair(s): Susanna-Assunta Sansone, Rebecca Lawrence, & Simon Hodson

Secretariat Liaison: Herman Stehouwer

TAB Liaison: Peter Wittenberg and Simon Cox

Case Statement: [Download](#)

Green = 0 - 6 months
WG is just starting

The products are

- **principles** for linking information about **databases**, **content standards** and journal / funder **policies** in the **life sciences**
- and a curated **registry** to access and cross-search the information, on which a variety of stakeholders can base their decisions

This is a joint



WG

The work will benefit from the existing biosharing.org

Information Resources

also part of  **elixir**
UNITED KINGDOM

Collaboration and communication

Key points:

- We all provide information to those seek guidance to use, do or recommend something (databases, tools, standards, training material etc.)
- Designed with a slightly different focus and user needs; focus on curating/cataloguing certain information
- Have different entry points and UIs to fit the specific scope/user needs is good, so federation is key, e.g. cross-referencing
- Pool resources where appropriate

Operational Team – based at the



Susanna
Sansone, PhD

Philippe
Rocca-Serra, PhD

David
Johnson, PhD

Allyson
Lister, PhD



Peter
McQuilton, PhD

Alejandra
Gonzalez-Beltran, PhD

Milo
Thurston, PhD

Eamonn
Maguire, DPhil / *Contractor*

Where we are and present



WED - Session 1

- RDAWDS Publishing Data Workflows

THUR - Session 6

- Joint meeting of IG Metadata, WG Metadata Standards Catalog & WG BioSharing Registry: Connecting data policies, standards & databases in life sciences"

FRI - Sessions 8 and 9

- Joint meeting of IG ELIXIR Bridging Force & WG BioSharing Registry: Life Sciences and Sensitive Data"
- Joint meeting of IG Domain Repositories, IG Agriculture Data Interest Group (IGAD), WG BioSharing Registry, IG RDA/CODATA Materials Data, Infrastructure & Interoperability & WG Wheat Data Interoperability"

Proponents, core WG members and adopters

Jessica Tenenbaum (Duke University, USA; Chair Elect for the American Medical Informatics Association's Genomics WG), *Co-Chair of the Advisory Board*

Melissa Haendel (OHSU, USA; Force11; Monarch Initiative), *Co-Chair of the Advisory Board*

Simon Hodson (CODATA), *Co-Chair of the RDA/Force11 WG*

Rebecca Lawrence (F1000), *Co-Chair of the RDA/Force11 WG*

Michael Ball (BBSRC)

Theo Bloom (BMJ)

Jennifer Boyd (OUP)

Scott Edmunds (GigaScience, BGI)

Emma Ganley (PLOS)

Jeff Grethe (USCD; NIF, NIDDK Information Network and NIH BD2K bioCADDIE)

Rafael Jimenez (ELIXIR)

Amye Kenall (BMC)

Varsha Khodiyar(NPG)

Thomas Lemberger (EMBO Press)

Jennifer Lin (CrossRef)

Jonathan Tedds (Ubiquity Press Open Health Data journal; University of Leicester, UK)

Todd Vision (UNC Chapel Hill & NESCent, USA; Dryad)

Michael Witt (re3data; Purdue University Libraries)

Joe Shell (Elsevier/Mendeley)

Linda Naughton (JISC)

