biosharing.org

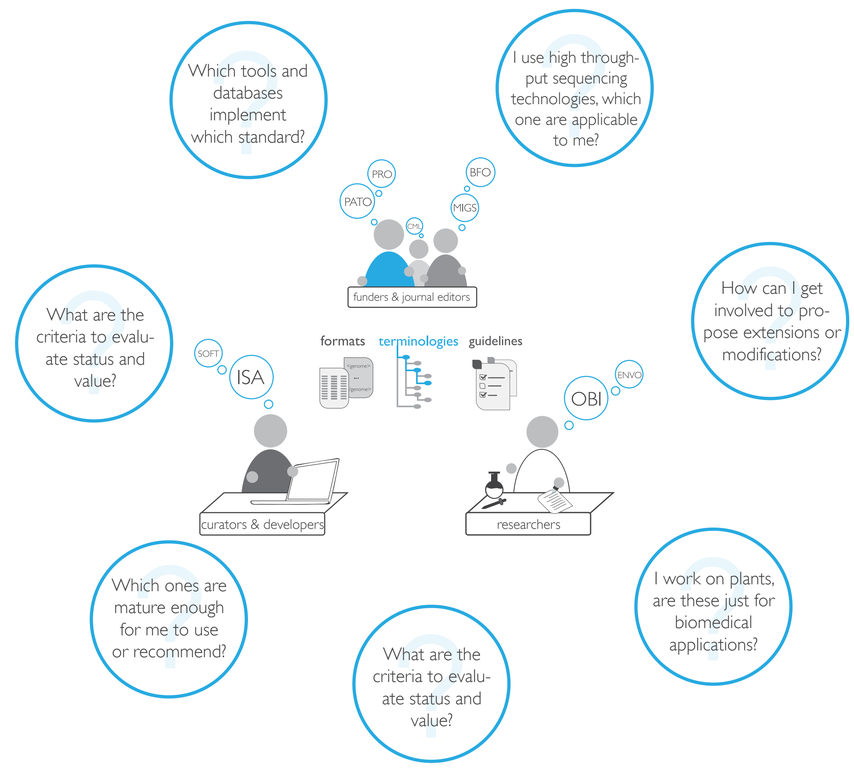
Standards, Policies and Communication

Susanna-Assunta **Sansone**,[1,2] Dawn **Field**,[2,3] Annapaola **Santarsiero**,[4] Eamonn **Maguire**,[1] Philippe **Rocca-Serra**,[1] Chris **Taylor**,[2,6] Lee **Harland**[5] and the **BioSharing communities**.

1. University of Oxford, UK; 2. MIBBI consortium; 3. NERC-NEBC, UK; 4. The Mario Negri Institute, Italy; 5. Pfizer Ltd, UK; 6. EBI, Cambridge, UK.

STANDARDS FOR 'REPRODUCIBLE' RESEARCH

- **Research community, funding agencies,** and **journals** participate in the development of standards for the bioscience domain (1) to ensure that shared experiments are reported with enough information to be comprehensible and (in principle) reproducible, compared or integrated.
- Similar trends in both the **regulatory arena** (2,3) and **commercial science** (4,5) that in particular has invested in procedures and tools that integrate external information with their own data to enhance the decision-making process.
- Escalating number of **community-developed standards** that can be classified in three categories:
  - **reporting requirements** (minimal information checklists to report the same core set of information)
  - **terminological artifacts** (e.g. controlled vocabularies and ontologies to describe the information)
  - **exchange formats** (to communicate the information)
- Proliferation of standards is a positive sign of stakeholders' engagement, but it also brings new sociological and technological challenges...but how much do we know about these standards?

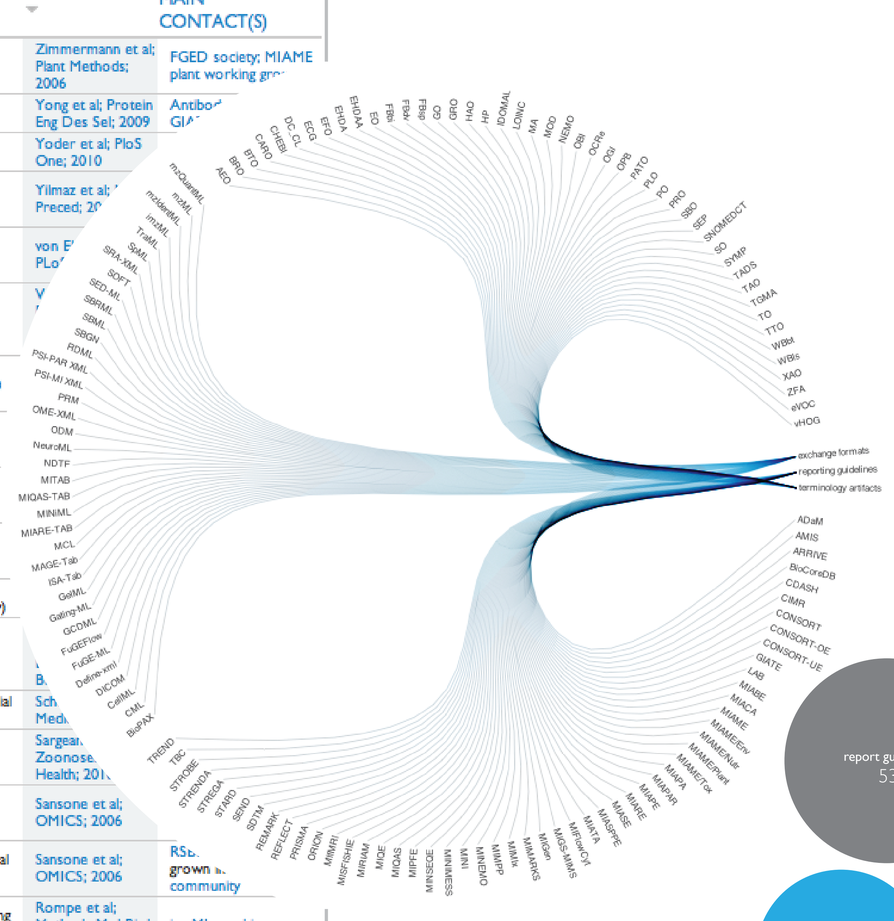


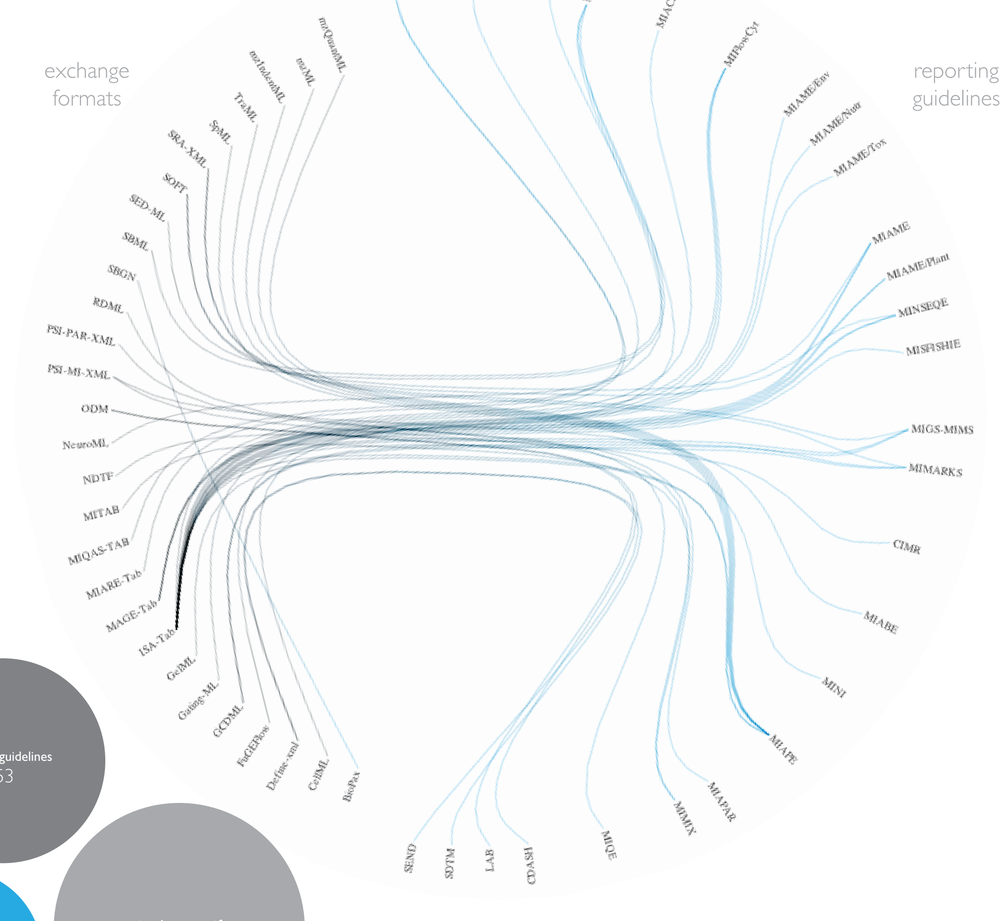
BIOSHARING CATALOGUE – OBJECTIVES

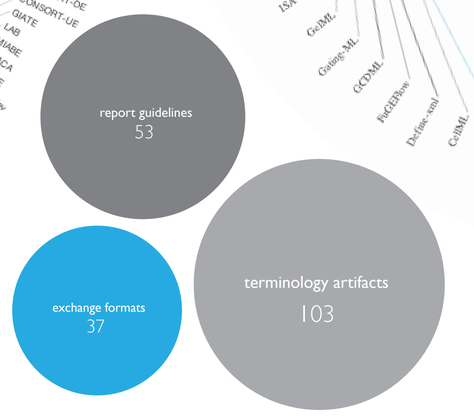
- Centralize bioscience standards and data policies, linking to other portals (e.g.6,7), open access resources (e.g.8,9) and systems implementing the standards (e.g. 10,11);
- Develop and maintain a set of criteria for assessing the quality and formal rigor of the standards, but also the interoperability and relations among them;
- Foster interoperability, addressing overlaps and duplication of efforts that hamper their wider uptake and interfere with the creation of standards-compliant systems.

PROTOTYPE (AS OF APRIL 2011)

STANDARD	FULL NAME	TYPE	DOMAIN(S) COVERED	PUBLICATION	ORGANIZATION; MAIN CONTACT(S)
MIAME/Plant	Minimum Information About a Microarray Experiment involving Plants	reporting guideline	plant (transcriptomics)	Zimmermann et al; Plant Methods; 2006	FGED society; MIAME plant working gro
GIATE	Guidelines for Information About Therapy Experiments	reporting guideline	cancer therapy	Yong et al; Protein Eng Des Sel; 2009	Antibo GIA
HAO	Hymenoptera Anatomy Ontology	terminology artifact	anatomy (Hymenoptera)	Yoder et al; PloS One; 2010	
MIMARKS	Minimum Information about a MARKer gene Sequence	reporting guideline	biodiversity	Yilmaz et al; Preced; 20	
STROBE	STrengthening the Reporting of OBservational studies in Epidemiology	reporting guideline	epidemiology	von E PLo	
MCL	Microbiological Common Language	exchange format	microbiology	V	
IDOMAL	Infection Disease Ontology Malaria	terminology artifact	infection disease (malaria)		
MIAPE	Minimum Information About a Proteomics Experiment	reporting guideline	proteomics		
AMIS	Article Minimum Information Standard	reporting guideline	literature standard		
ORION	Outbreak Reports and Intervention studies Of Nosocomial infection	reporting guideline	infection control		
Gating-ML	Gating-ML	exchange format	data transformation methods (flow cytometry)		
XAO	Xenopus Anatomy Ontology	terminology artifact	anatomy; development (Xenopus)	B	
CONSORT	CONSOlidated standards of Reporting Trials	reporting guideline	randomized controlled trial (clinical)	Sch Med	
REFLECT	Reporting guidElines For randomized controLled trials for livEstoCk and food safeTy	reporting guideline	livestock trials	Sargeant Zoonose Health; 201	
MIAME/Nutr	Minimum Information about a Nutrigenomics experiment	reporting guideline	nutrigenomics (functional genomics)	Sansone et al; OMICS; 2006	
MIAME/Tox	Minimum Information about a array-based toxicogenomics experiment	reporting guideline	toxicogenomics (functional genomics)	Sansone et al; OMICS; 2006	RSb grown community
imzML	imaging mz Markup Language	exchange format	mass spectrometry imaging (proteomics)	Rompe et al; Methods Mol Biol; 2011	imzML working group
ISA-Tab	Investigation Study Assay Tabular	exchange format	experimental description (genomics, functional genomics)	Rocca-Serra et al; Bioinformatics; 2010	ISA community ; Philippe Rocca-Serra







NEXT STEPS

- Content: adding new entries and improve their classifications (domains);
- Activity: tracking the status and progress of each standard;
- Views: creating new functionalities to explore and visualize the standards;
- Relations: adding relations between standards and link to policies, where relevant;
- Implementations: linking to standards-compliant systems and research data; and
- **Contribute and help us to build the catalogue!**

COMMUNITIES

in partnership with BioMed Central The Open Access Publisher

nature precedings — Pre-publication research and preliminary findings

ISB International Society for Biocuration · DRYAD · mibbi · SIGS · FuGE · isatools · OBO · BioPortal · OLS · OMICS · Pistoia Alliance · UK PUBMED CENTRAL · gsc genomic STANDARDS consortium · science commons · Proteomics Standards Initiative · Sage BIONETWORKS

BIOSHARING - MISSION STATEMENT

BioSharing works at the global level to build stable linkages in particular between journals, funders, implementing data sharing policies, and well-constituted standardization efforts in the biosciences domain, to expedite the communication and the production of an integrated standards-based framework for the capture and sharing of high-throughput genomics and functional genomic bioscience data, in particular. This objective is achieved via the creation of **web-based catalogues** and a **communication forum**.

references

1. Field, Sansone et al, Science, 2009
2. Shabo et al, Pharmacogenomics, 2006
3. US FDA, "CDER Data Standards Plan Version 1.0"
4. Barnes et al, Nat Rev Drug Discov, 2009
5. www.pistoiaalliance.org
6. www.mibbi.org
7. bioportal.bioontology.org
8. www.biomedcentral.com/bmcresnotes
   call for contributions on data standardization and sharing
9. precedings.nature.com
10. www.neuinfo.org
11. www.bioinformatics.ca/links_directory

funded by

bbsrc biotechnology and biological sciences research council · NATURAL ENVIRONMENT RESEARCH COUNCIL · NEBC

part of

isacreator configurator · isacreator · bii · converter · Rtatab · isa-tools.org

Nature Precedings : doi:10.1038/npre.2011.5936.1 Posted 3 May 2011