Trends in scholary publishing - the impact of information technologies

Odile Hologne

Trends in scholary publishing

The impact of information technologies

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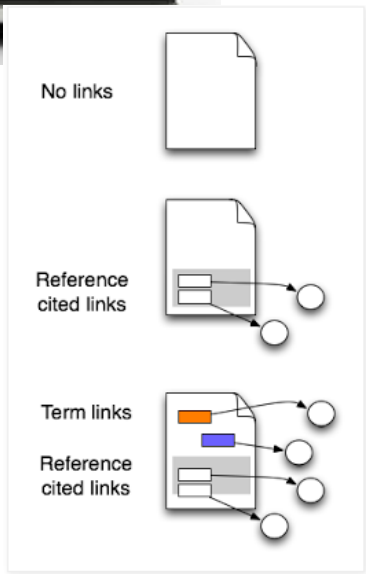
Twitter : Holo_08

The end of Gutenberg era ...



http://iphylo.blogspot.fr/2009/04/semantic-publishing-towards-real.html

A Quick Tour with in 6 questions

- What means « open » ?
- What is a journal ?
- What is an article ?
- What can we measure ?
- How to control text mining ?
- How to link data and articles ?
- Conclusion – What else ?

Open access

But what means « open » ?

Introduction

- What means « open »
  - ✓ put free PDF on line ?
  - ✓ Business models or APC
- We forget other aspects of openness
  - ✓ technical aspects
  - ✓ legal aspects

Journals : How open is it ?

Access	Reader Rights	Reuse Rights	Copyrights	Author Posting Rights	Automatic Posting	Machine Readability	Access
OPEN ACCESS	Free readership rights to all articles immediately upon publication	Generous reuse & remixing rights (e.g., CC BY license)	Author holds copyright with no restrictions	Author may post any version to any repository or website	Journals make copies of articles automatically available in trusted third-party repositories (e.g., PubMed Central) immediately upon publication	Article full text, metadata, citations, & data, including supplementary data, provided in community machine-readable standard formats through a community standard API or protocol	OPEN ACCESS
	Free readership rights to all articles after an embargo of no more than 6 months	Reuse, remixing, & further building upon the work subject to certain restrictions & conditions (e.g., CC BY-NC & CC BY-SA licenses)	Author holds copyright, with some restrictions on author reuse of published version	Author may post final version of the peer-reviewed manuscript ("postprint") to any repository or website	Journals make copies of articles automatically available in trusted third-party repositories (e.g., PubMed Central) within 6 months	Article full text, metadata, citations, & data, including supplementary data, may be crawled or accessed through a community standard API or protocol	
	Free readership rights to all articles after an embargo greater than 6 months	Reuse (no remixing or further building upon the work) subject to certain restrictions and conditions (e.g., CC BY-ND license)	Publisher holds copyright, with some allowances for author and reader reuse of published version	Author may post final version of the peer-reviewed manuscript ("postprint") to certain repositories or websites	Journals make copies of articles automatically available in trusted third-party repositories (e.g., PubMed Central) within 12 months	Article full text, metadata, & citations may be crawled or accessed without special permission or registration	
	Free and immediate readership rights to some, but not all, articles (including "hybrid" models)	———	Publisher holds copyright, with some allowances for author reuse of published version	Author may post submitted version/draft of final work ("preprint") to certain repositories or websites	———	Article full text, metadata, & citations may be crawled or accessed with permission	
CLOSED ACCESS	Subscription, membership, pay-per-view, or other fees required to read all articles	No reuse rights beyond fair use/ limitations & exceptions to copyright (all rights reserved copyright) to read	Publisher holds copyright, with no author reuse of published version beyond fair use	Author may not deposit any versions to repositories or websites	No automatic posting in third-party repositories	Article full text & metadata not available in machine-readable format	CLOSED ACCESS

http://sparc.arl.org/sites/default/files/hoii_guide_rev4_web.pdf (2013)

Articles : openness and quality

The Five Stars of Online Journal Articles — a Framework for Article Evaluation
David Shotton
Department of Zoology, University of Oxford
david.shotton@zoo.ox.ac.uk
doi:10.1045/january2012-shotton

- **Peer review**
  Ensure your article is peer reviewed, to provide assurance of its scholarly value, quality and integrity.
- **Open access**
  Ensure others have cost-free open access both to read and to reuse your published article, to ensure its greatest possible readership and usefulness.
- **Enriched content**
  Use the full potential of Web technologies and Web standards to provide interactivity and semantic enrichment to the content of your online article.
- **Available datasets**
  Ensure that all the data supporting the results you report are published under an open license, with sufficient metadata to enable their re-interpretation and reuse.
- **Machine-readable metadata**
  Publish machine-readable metadata describing both your article and your cited references, so that these descriptions can be discovered and reused automatically.

- Ex : cardioshare http://biordf.net/cardioSHARE/queries.html

OA to publications mandate in H2020

Each beneficiary must ensure OA to all peer-reviewed scientific publications relating to its results:

- **Deposit** a machine-readable copy of the published version or final peer-reviewed manuscript accepted for publication in a repository of the researchers choice (possibly OpenAIRE compliant)
- **Ensure OA** on publication or at the latest within 6 months (12 for SSH)
- **Aim to deposit** at the same time **the research data needed to validate the results ("underlying data")**
- Ensure **OA to the bibliographic metadata** that identify the deposited publication, via the repository

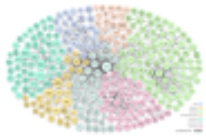
Celina Ramjoue (Head of Sector "Open Access to scientific Publications and Data", EC DG CNECT)

Data publication

Linked Data ou publication Web de données

Données sur le Web, dans un format structuré et non propriétaire, données du fichier identifiées par des URIs et reliées à d'autres

Données sur le Web, dans un format structuré et non propriétaire, données du fichier identifiées par des URIs



Publication Web

Données sur le Web, identifié ou pas, dans un format structuré et non propriétaire

Fichier sur le Web, identifié ou pas dans un format structuré

Fichier sur le Web, identifié ou pas, quel que soit le format

from http://5stardata.info/

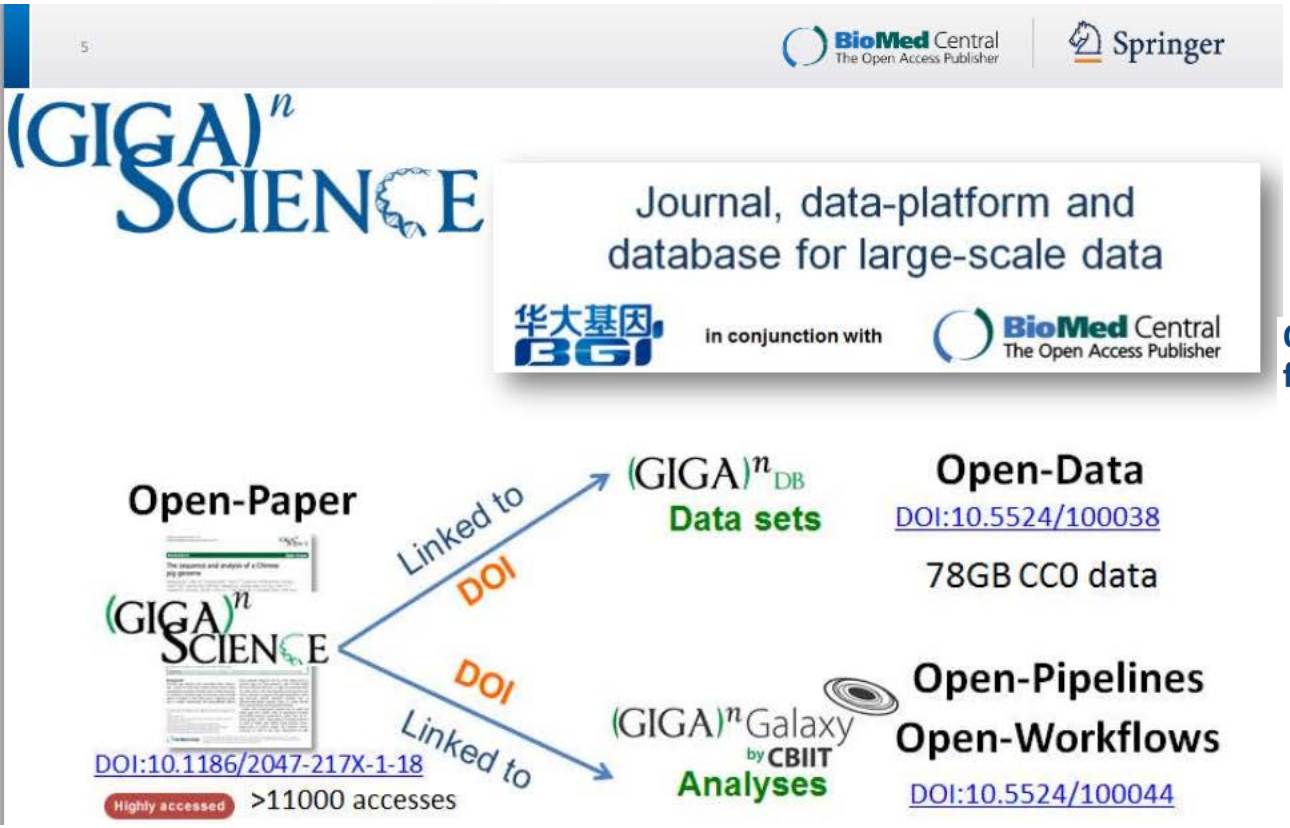
What is a journal ?

From a technical point of view

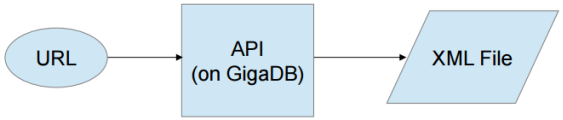
From dissemination to data processing

- Old
  - ✓ dissemination
  - ✓ to be readable by human
- Now
  - ✓ metadata processing
  - ✓ data access and data processing
  - ✓ to be readable by computers

A platform – a software



Open API to retrieve information from (GIGA)n DB



- **Only journal** where data and source code behind article + article can be mined through open API
- **Only journal** offering a home for complex image data (like fMRIs, eg) right next to article

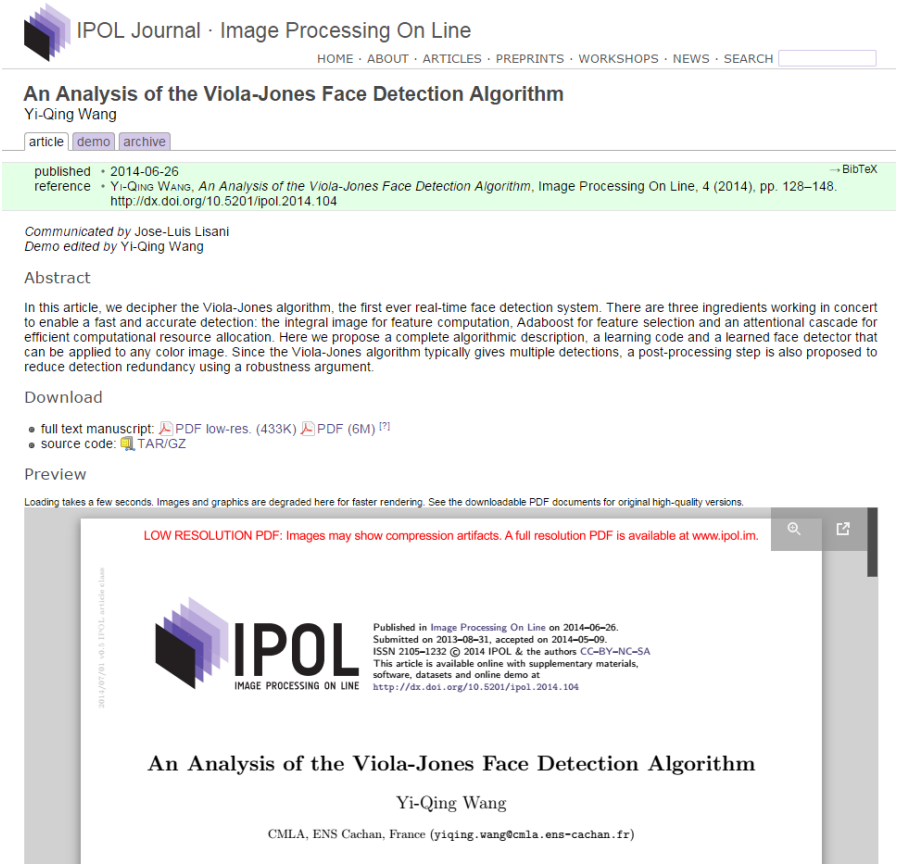
Amye Kenall http://www.gfii.fr/uploads/docs/GFII_Springer.pdf

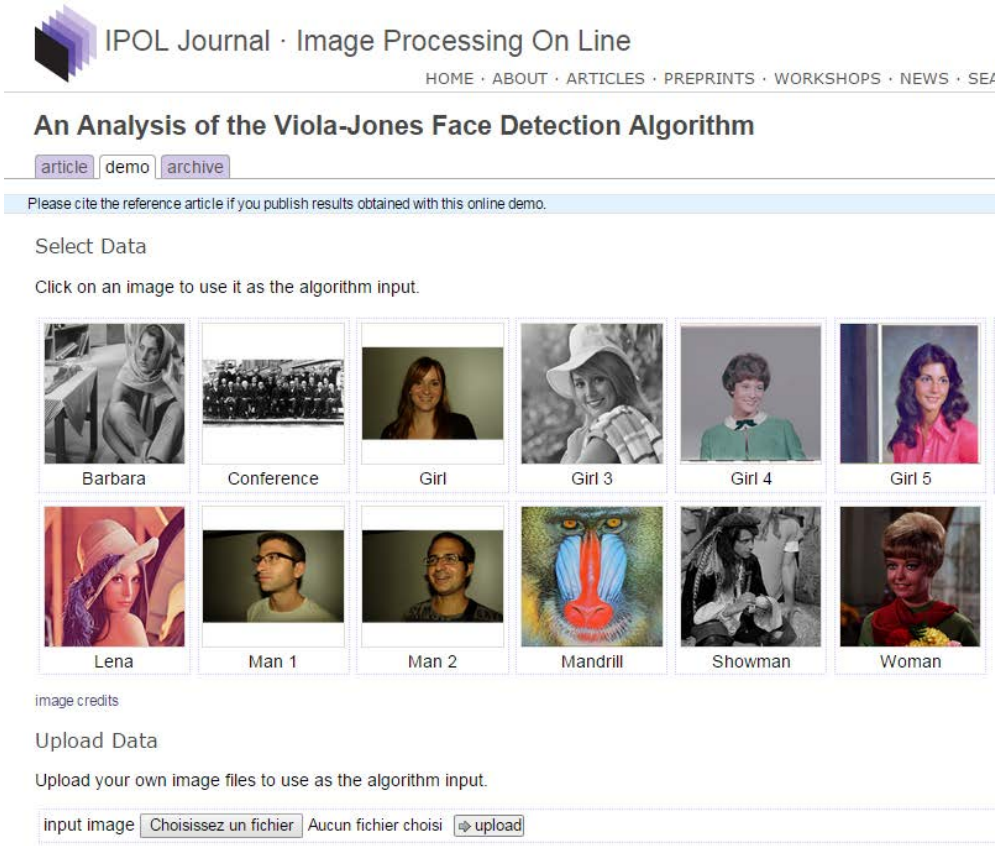
Be able to do queries on articles and data

What proteins is Pubmed article 9207092 written about? What organisms do these proteins belong to?

```
PREFIX sadi: <http://sadiframework.org/ontologies/properties.owl#>
PREFIX ss: <http://semanticscience.org/resource/>
PREFIX pubmed: <http://lsrn.org/PMID:>
SELECT ?protein ?organismName
WHERE {
        pubmed:9207092 ss:SIO_000252 ?protein .
        ?protein sadi:fromOrganism ?organism .
        ?organism sadi:hasName ?name .
        ?name ss:SIO_000300 ?organismName .
}
```

Journal and data processing





http://www.ipol.im/

What is an article

Evolution of scientific publishin

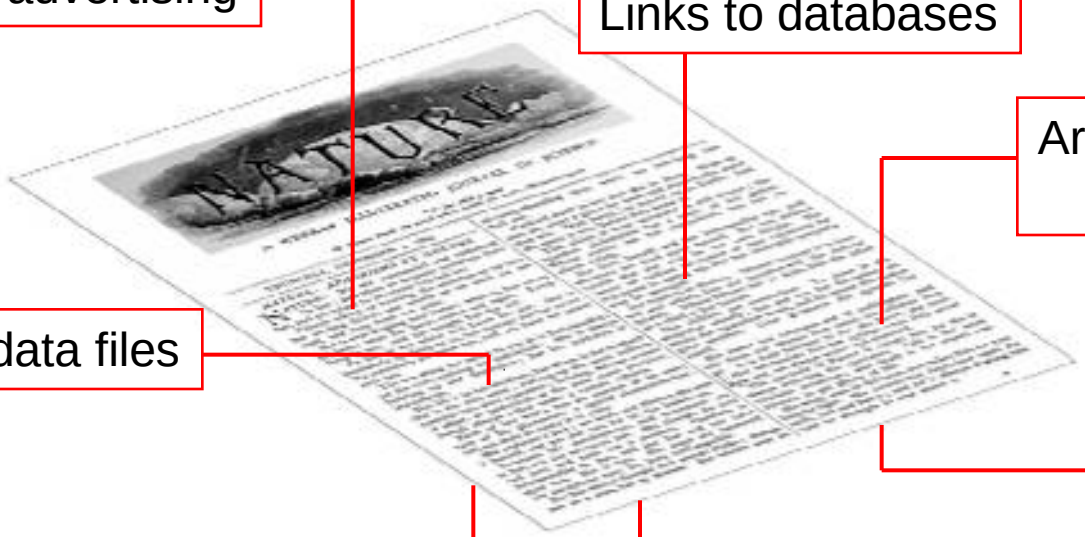
From articles to particles:
How Nature's semantically-enriched content boosts scientific discovery

Dr Jason Wilde
Director, Business Development
Nature Publishing Group
30th November 2011

Contextual advertising

Links to databases

Articles about the same entity



Related data files

New sources of relevant information

Faceted search

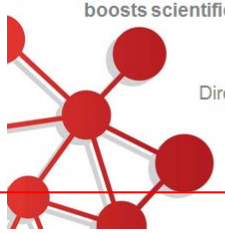
Vendors & Suppliers

Articles need to move from being 2D into a 3D entity in the information space.

Behind the scenes - interface

From articles to particles:
How Nature's semantically-enriched content boosts scientific discovery

Dr Jason Wilde
Director, Business Development
Nature Publishing Group
30th November 2011



Sequence-specific regulator Prdm14 safeguards mouse ESCs from entering extraembryonic endoderm fates

Prdm14 is a PR-domain and zinc-finger protein whose expression is restricted to the pluripotent cells of the early embryo, embryonic stem cells (ESCs) and germ cells. Here, we show that Prdm14 safeguards mouse ESC (mESC) maintenance by preventing induction of extraembryonic endoderm (ExEn) fates. Conversely, Prdm14 [illegible] during embryoid body formation. Prdm14 occupies and represses genomic loci encoding ExEn differentiation factors, while also binding to and promoting expression of genes associated with ESC self-renewal. Prdm14-associated genomic regions substantially overlap those occupied by Nanog and Oct4, are enriched in a chromatin signature associated with distal regulatory elements and contain a unique DNA-sequence motif recognized by Prdm14 *in vitro*. Our work identifies a new member of the mESC transcriptional network, Prdm14, which plays a dual role as a context-dependent transcriptional repressor or activator.

In the mammalian embryo, each cell of the inner cell mass (ICM) of the blastocyst is destined to choose between two prospective fates: that of the epiblast, which gives rise to all tissues of the embryo proper, and that of the primitive endoderm, which develops into the visceral and parietal extraembryonic endoderm, providing nutrient exchange and inductive signals for the embryo.

Segregation of the epiblast and the primitive endoderm begins in the early ICM, where Nanog and Gata6, master regulators of pluripotency and endoderm formation, respectively, are expressed in a progressively mutually exclusive manner. Indeed, within the early ICM, two cell subpopulations with distinct expression profiles exist: one characterized by the upregulation of certain primitive endoderm genes (for example, *Gata4* and *Gata6*) and the other characterized by expression of certain early epiblast genes (for example, *Nanog* and *Fgf4*). The FGF-Grb2-MAPK signaling pathway is important for breaking of the expression symmetry by upregulation of Gata6 and downregulation of Nanog, although even after the initial establishment of this asymmetry, cells of the ICM retain the ability to switch their lineage choice. Eventually, however, Nanog-positive cells form the epiblast, whereas Gata6-positive cells commit to the primitive endoderm fate, induce transcription of specific adhesion molecules such as Lamb1 and Dab2, and migrate to the ICM surface, where they later diversify into parietal and visceral extraembryonic endoderm lineages.

Because of its biochemical, genomic and genetic tractability, the mESC model provides a useful tool for studies of molecular mechanisms governing early cell fate transitions and can be used to investigate the fate choice between the pluripotent epiblast and ExEn. Similar to its function in [illegible]ering ExEn fates, whereas ectopic expression of any of the transcription factors Gata4, Gata6, Sox7 or Sox17 is sufficient to induce mESC differentiation to [illegible]

In search of new regulators of mESC self-renewal and repression of the ExEn differentiation pr[illegible]DM protein family of putative transcriptional regulators, which is characterized by the presence of tandem zinc fingers and a PR (PRDI-BF1 and RIZ) domain. Th[illegible]s a sequence-dependent transcriptional repressor and a potent regulator of cell fate decisions in various tissues. Moreover, the critical [illegible]development, differentiation and stem cell maintenance is beginning to emerge. Among the 16 PRDM proteins present in mammalian genomes, Prdm14 [illegible]e[illegible]orula, the ICM of blastocysts, the early epiblast, mESCs and primordial germ cell (PGCs). Moreover, within the early ICM, Prdm14 is enriched in Nanog-expressing cells but not in Gata6- and Gata6-expressing cells, in contrast to Oct4, which is uniformly expressed in both cell populations. Prdm14 is essential for mouse germline formation, but its role in the [illegible]

Here, we demonstrate that Prdm14 is a sequence-dependent transcriptional regulator that protects mESCs from entering ExEn fates. Using a combination of cell biology, genomic and biochemical approaches, we identified Prdm14-regulated genes, Prdm14's genomic binding patterns and its unique DNA-sequence specificity.

Results

Differentiation to ExEn fates upon Prdm14 knockdown

To examine whether Prdm14 contributes to the maintenance of the mESC state, we treated mESCs with Prdm14-targeting short interfering RNA (siRNA), leading to a partial Prdm14 mRNA and protein depletion (Supplementary Fig. 1a), and cultured cells under conditions compatible with self-renewal. Within 3 d of transfection, Prdm14 siRNA–treated cells were morphologically indistinguishable from cells transfected with control nontargeting siRNA or from untreated, wild-type (WT) mESCs (not shown). However, 5–7 d after initial treatment and specifically in the Prdm14 siRNA-transfected samples, we noted the appearance of dispersed refractive cells, which morphologically resembled previously described ExEn cells (Fig. 1a) and which lost alkaline phosphatase and Nanog expression (Fig. 1b,c). Consistent with ExEn differentiation, the vast majority—if not all—of these dispersed cells stained positively for ExEn markers, such as the transcription factor Gata4 and surface molecules Lamb1 and Dab2 (Fig. 1c; Supplementary Fig. 1b). The described knockdown phenotype was recapitulated with an independent, non-overlapping Prdm14 siRNA (Supplementary Fig. 2). In contrast, control siRNA–treated cells did not exhibit differentiated morphology or ExEn marker staining (Fig. 1a–c; Supplementary Fig. 1b; Supplementary Fig. 2). Of note, a substantial subpopulation of cells treated with Prdm14 siRNA retained ESC morphology and Nanog expression and stained negatively for Gata4, Lamb1 and Dab2 (Fig. 1 and Supplementary Fig. 2). This suggests that a partial knockdown of Prdm14 is insufficient to abrogate self-renewal in some cells and/or a cell subset that retains ESC characteristics corresponds to the cells that remained untransfected. Although, given those caveats, we could not determine whether Prdm14 is absolutely required for self-renewal, our data suggest that Prdm14 protects mESCs from spontaneous differentiation to ExEn fates.

Prdm14 depletion leads to the induction of ExEn genes

Gene expression profiling by RNA-seq identified 480 upregulated and 173 downregulated genes in the Prdm14 knockdown sample, as compared to the control siRNA–treated sample (at 1.4-fold change cutoff and criteria representing statistical significance, false discovery rate (FDR) < 0.0001; genes listed in Supplementary Data 1). Examination of upregulated genes showed a striking

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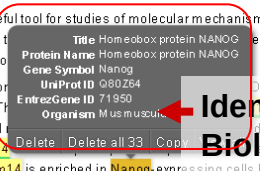

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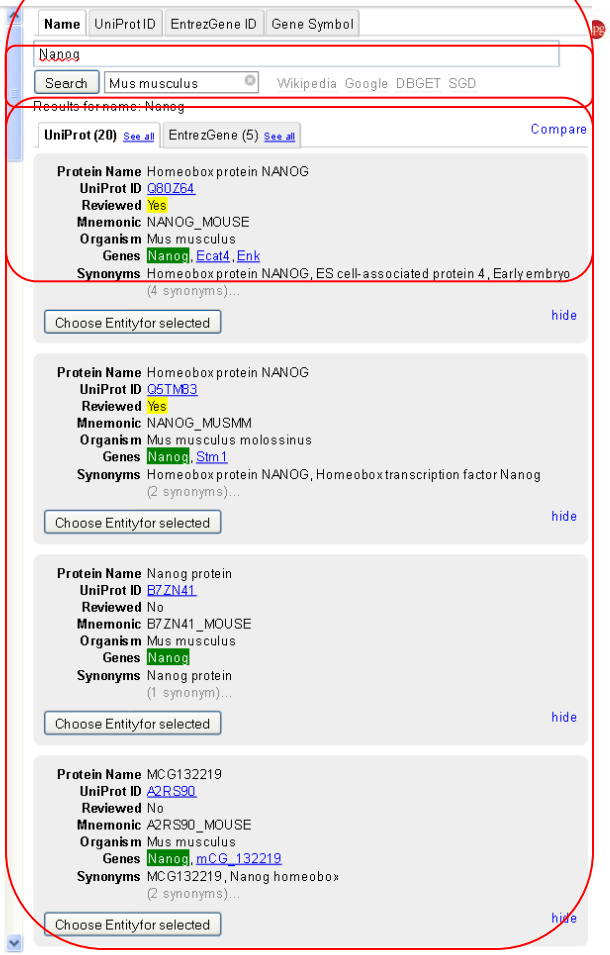
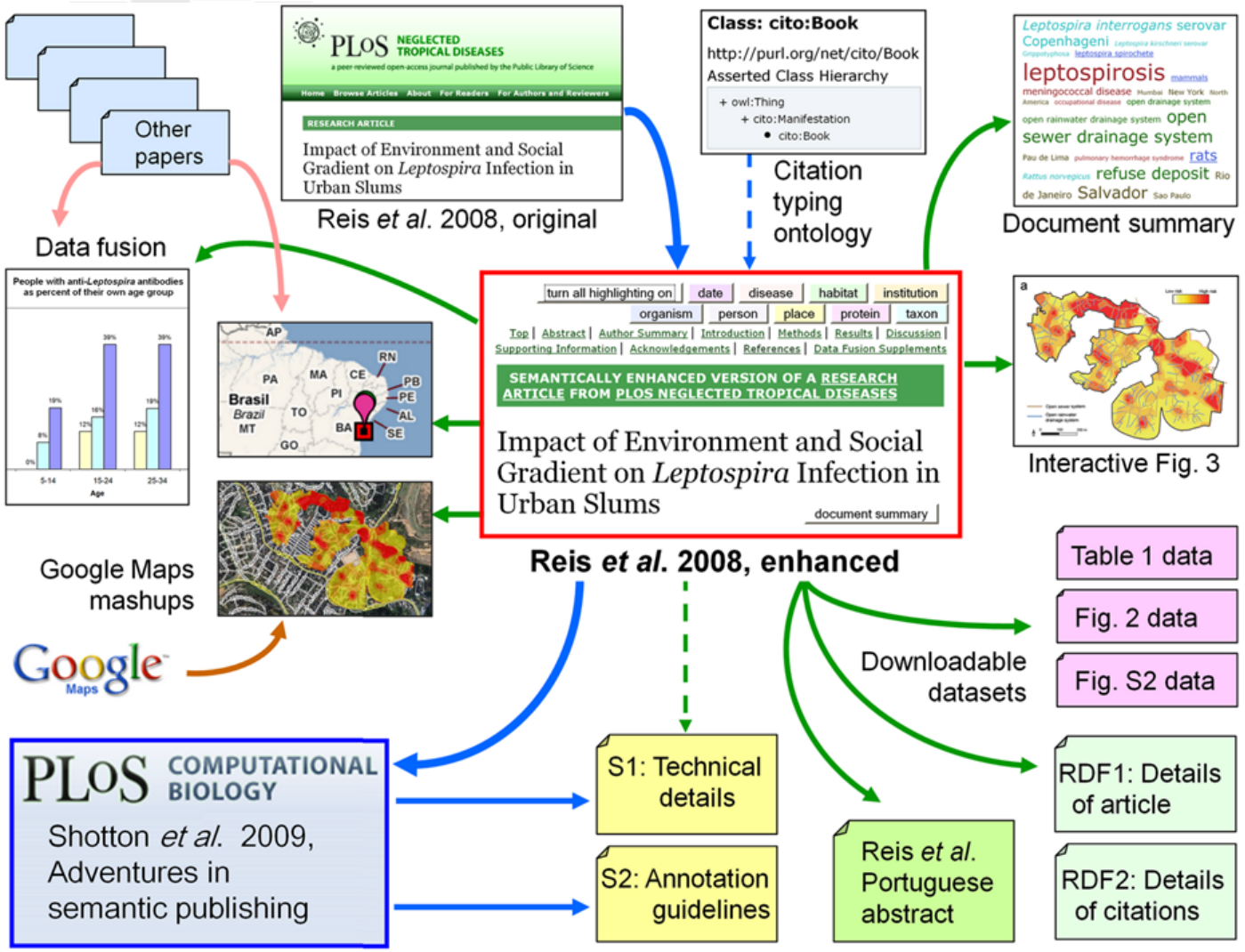


nature publishing group npg



http://iphylo.blogspot.fr/2009/04/semantic-publishing-towards-real.html

Negative results

Log on

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JOURNAL OF NEGATIVE RESULTS IN BIOMEDICINE

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About *Journal of Negative Results in Biomedicine*

Aims and scope | Open access | Article-processing charges | Indexing services | Publication and peer review process | Editorial policies | Citing articles in *Journal of Negative Results in Biomedicine* | Why publish your article in *Journal of Negative Results in Biomedicine*?

This page includes information about the aims and scope of *Journal of Negative Results in Biomedicine*, editorial policies, open access and article-processing charges, the peer review process and other information. For details of how to prepare and submit a manuscript through the online submission system, please see the instructions for authors.

Aims & scope

Journal of Negative Results in BioMedicine is an open access, peer-reviewed, online journal that provides a platform for the publication and discussion of unexpected, controversial, provocative and/or negative results in the context of current tenets.

Journal of Negative Results in BioMedicine aims to encourage scientists and physicians of all fields to publish results that challenge current models, tenets or dogmas. The journal invites scientists and physicians to submit work that illustrates how commonly used methods and techniques are unsuitable for studying a particular phenomenon. *Journal of Negative Results in BioMedicine* strongly promotes and invites the publication of clinical trials that fall short of demonstrating an improvement over current treatments. The aim of the journal is to provide scientists and physicians with responsible and balanced information in order to improve experimental designs and clinical decisions.

Articles published in traditional journals frequently provide insufficient evidence regarding negative data. They hardly allow a rigorous evaluation of the quality of these results. In addition, controversial results that refute a current model or simply negative results within a current dogma, frequently meet considerable resistance before they are acknowledged. This is particularly the case if current techniques and technologies are too crude to shed further light on the findings. As more sophisticated techniques become available such findings may turn out to have been groundbreaking only decades later.

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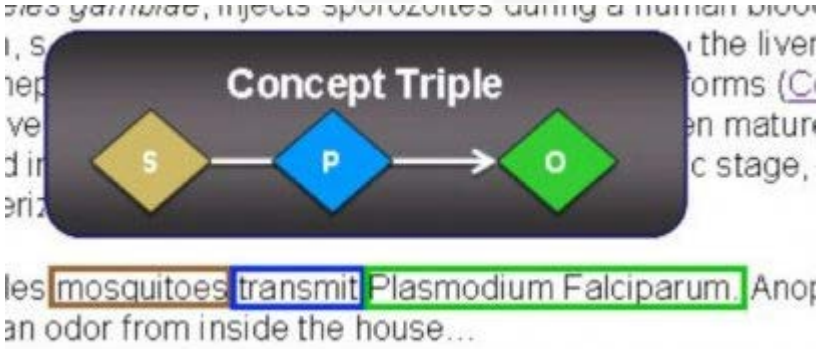


http://dx.doi.org/10.1038/ng0411-281

Figure 2: A proposal for the future of scholarly communication.

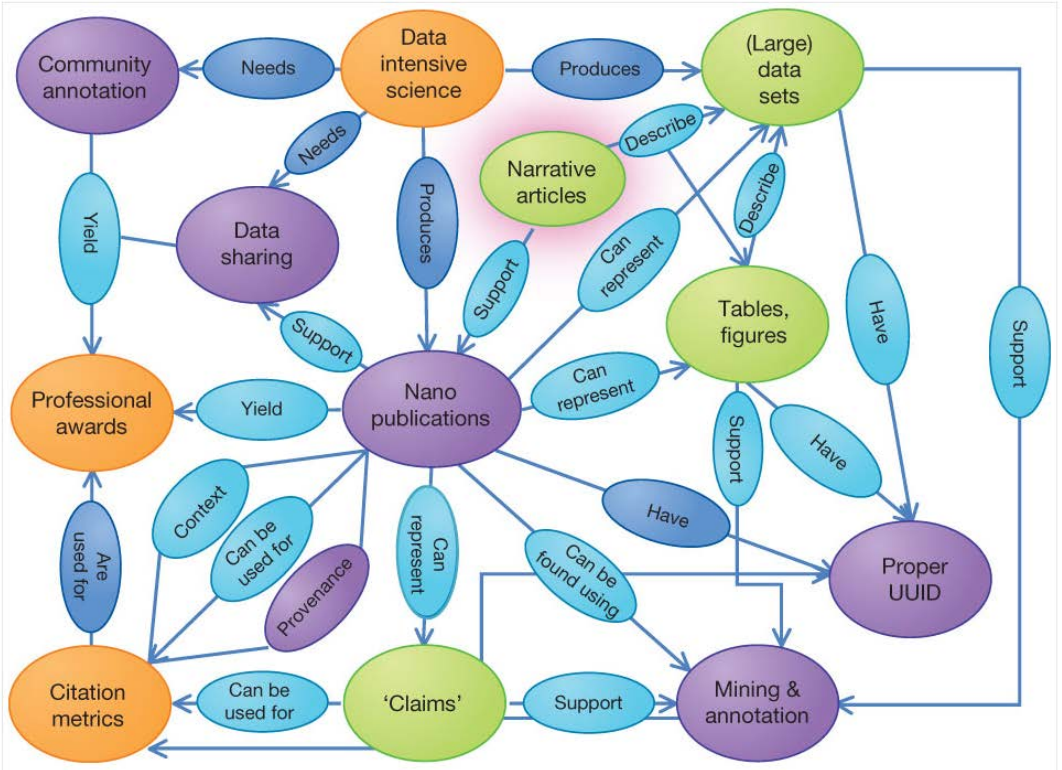
From

The value of data

Barend Mons, Herman van Haagen, Christine Chichester, Peter-Bram 't Hoen, Johan T den Dunnen, Gertjan van Ommen, Erik van Mulligen, Bharat Singh, Rob Hooft, Marco Roos, Joel Hammond, Bruce Kiesel, Belinda Giardine, Jan Velterop, Paul Groth & Erik Schultes

Nature Genetics **43**, 281–283 (2011) | doi:10.1038/ng0411-281

Published online 29 March 2011



What can we measure ?

Metrics

The San Francisco Declaration on Research Assessment (DORA), initiated at the 2012 Annual Meeting of the American Society for Cell Biology by a group of editors and publishers of scholarly journals, recognizes the need to improve the ways in which the outputs of scientific research are evaluated.

What does DORA say?

DORA makes one general and 17 specific recommendations.

General recommendation:
Do not use journal-based metrics, such as Journal Impact Factors (JIFs), as surrogate measures of the quality of individual research articles, to assess an individual scientist's contributions, or in hiring, promotion, or funding decisions.

For Organizations That Supply Metrics
- Be transparent
- Provide access to data
- Discourage data manipulation
- Provide different metrics for primary literature and reviews

For Publishers
- Cease to promote journals by Impact Factor; provide an array of metrics
- Focus on article-level metrics
- Identify different author contributions
- Open the bibliographic citation data
- Encourage primary literature citations

For Research Institutions
- When hiring and promoting, state that scientific content of a paper, not the JIF of the journal where it was published, is what matters
- Consider value from all outputs and outcomes generated by research

For Funding Agencies
- State that scientific content of a paper, not the JIF of the journal where it was published, is what matters
- Consider value from all outputs and outcomes generated by research

For Researchers
- Focus on content
- Cite primary literature
- Use a range of metrics to show the impact of your work
- Change the culture!

San Francisco DORA
Declaration on Research Assessment

See the full text of DORA at **www.ascb.org/SFdeclaration.html.** Sign the Declaration!

Evaluation

What kind of new metrics ?

Impact

usage	peer-review	citations	alt-metrics
downloads views	expert opinion		storage links bookmarks conversations

Métriques

Journal : Ecography (2013)
Facteur d'impact à 2 ans : 4,207
Facteur d'impact à 5 ans : 5,776
Notoriété à 2 ans : Excellente (biodivers.conserv. ; ecology)

Article
Nb de consultations de cette notice : 80

Web of Science® Times Cited : 181

Altmetric 6

See more details

Tweeted by **11**
On **1** Facebook pages

429 readers on Mendeley
4 readers on CiteULike

Next step : over the audience

- Need to qualify the citation

Citation Function	Description
Based_on^{+}	A work is based on the cited work
Corroboration^{+}	Two works corroborate each other
Discover^{+}	Acknowledge the invention of a technique
Positive^{+}	The cited work is successful
Practical^{+}	The cited work has a practical use
Significant^{+}	The cited work is important
Standard^{+}	The cited work is a standard
Supply^{+}	Acknowledge the supplier of a material
Contrast$^{=}$	Compares two works in a neutral way
Co-citation$^{=}$	Citations that appear closely
Neutral$^{=}$	The cited work not belonging to other functions
Negative^{-}	The weakness of the cited work is discussed

Table 1: Annotation Scheme for Citation Function: $^{+}$ represents POSITIVE sentiment, $^{=}$ represents NEUTRAL sentiment, and $^{-}$ represents negative sentiment

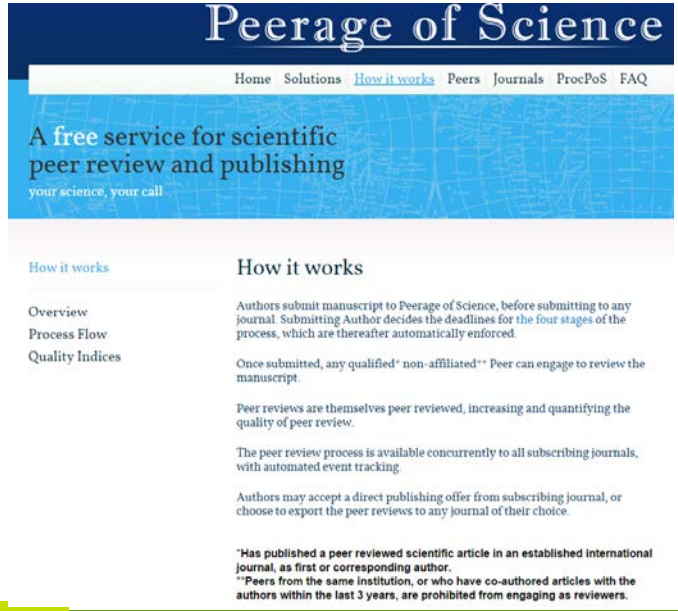
http://www.aclweb.org/anthology/R13-1052

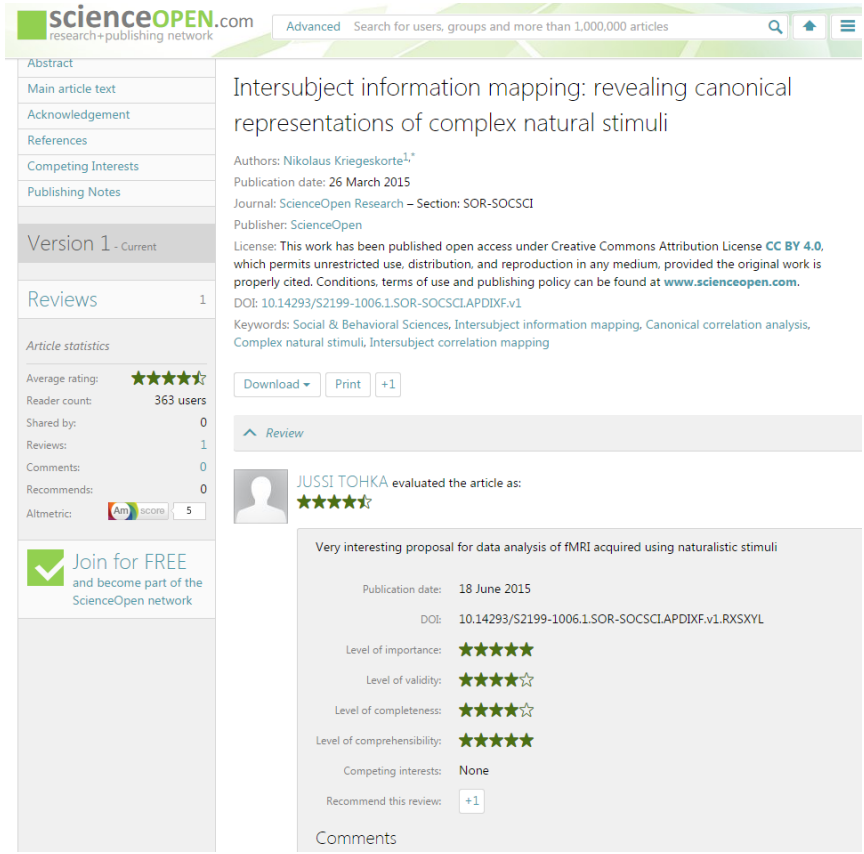
How to change peer reviewing ?

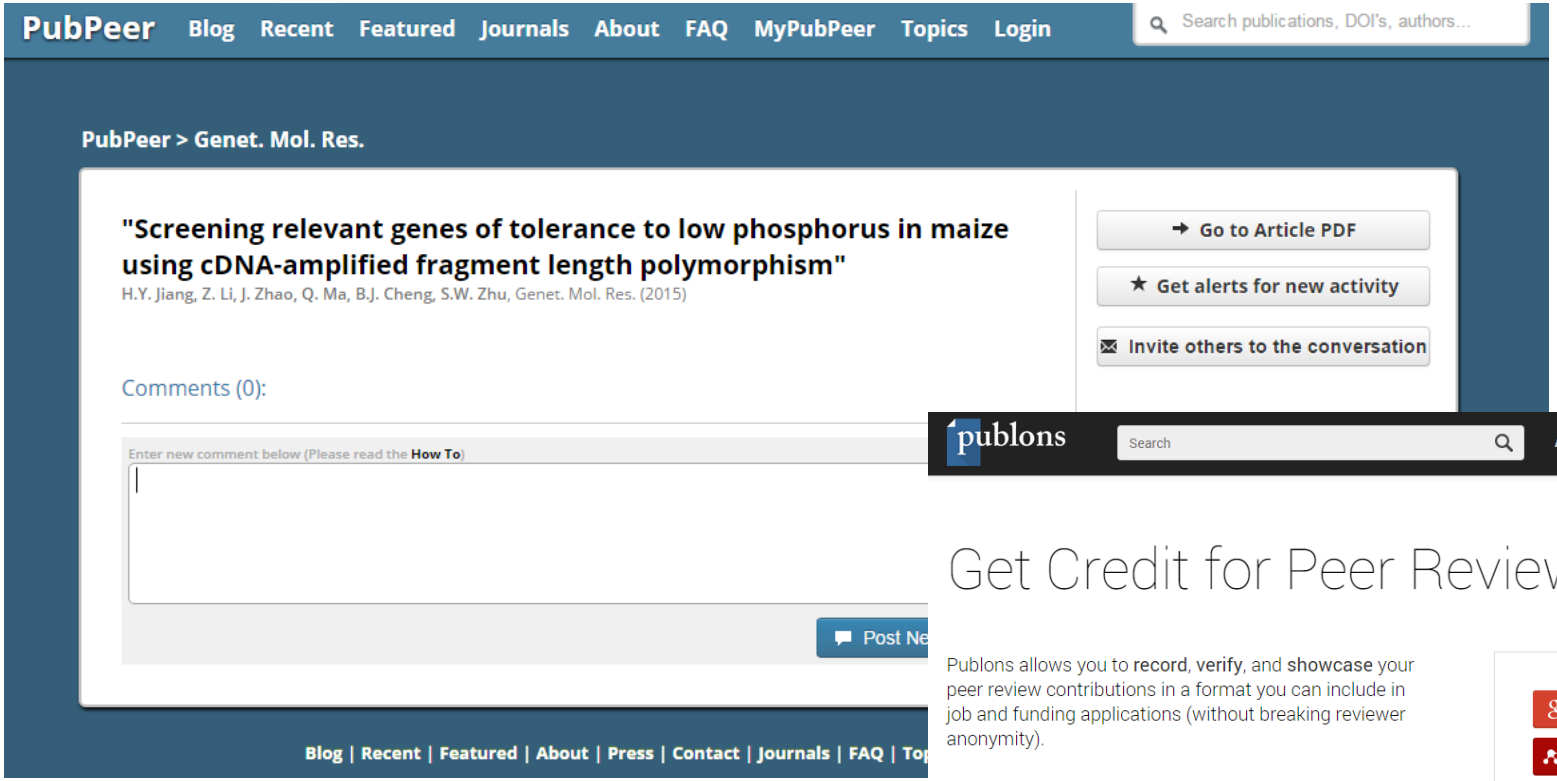
Peer reviewing

Debats on research integraty, transparence

- Review Post publication
- The end of anonymous PR?
- Review citable
- New Players



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H.Y. Jiang, Z. Li, J. Zhao, Q. Ma, B.J. Cheng, S.W. Zhu, Genet. Mol. Res. (2015)
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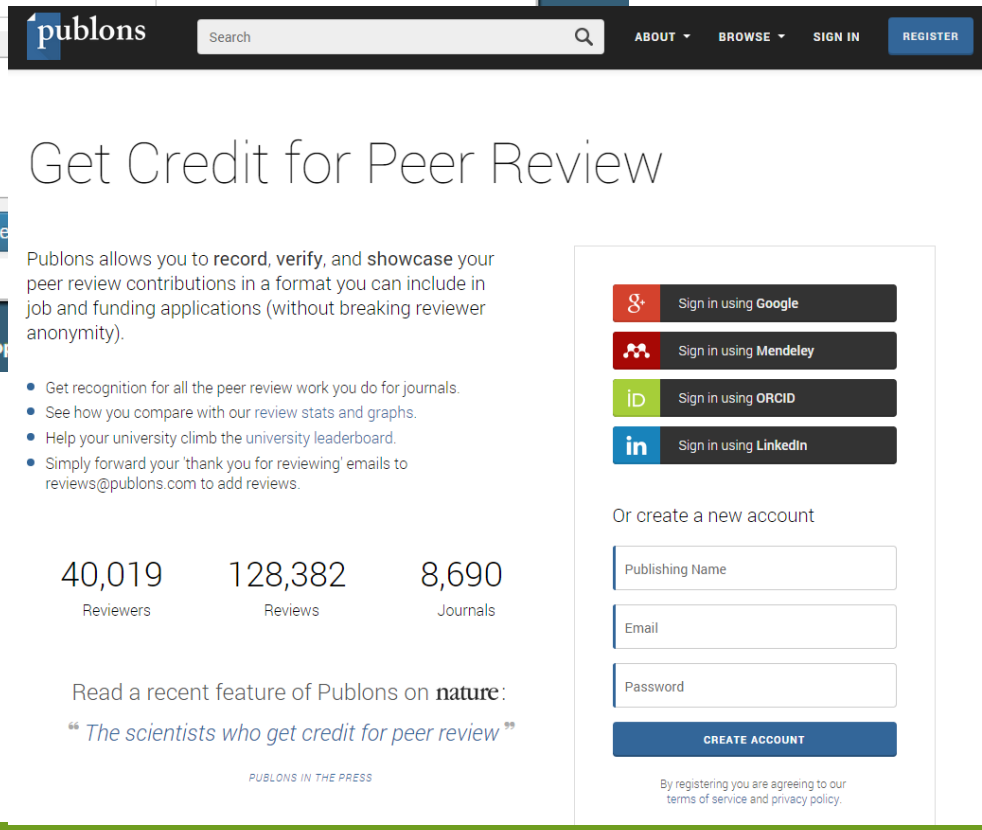
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See how you compare with our review stats and graphs.
Help your university climb the university leaderboard.
Simply forward your 'thank you for reviewing' emails to reviews@publons.com to add reviews.
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128,382
Reviews
8,690
Journals
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Sign in using Mendeley
Sign in using ORCID
Sign in using LinkedIn
Or create a new account
Publishing Name
Email
Password
CREATE ACCOUNT
By registering you are agreeing to our terms of service and privacy policy.

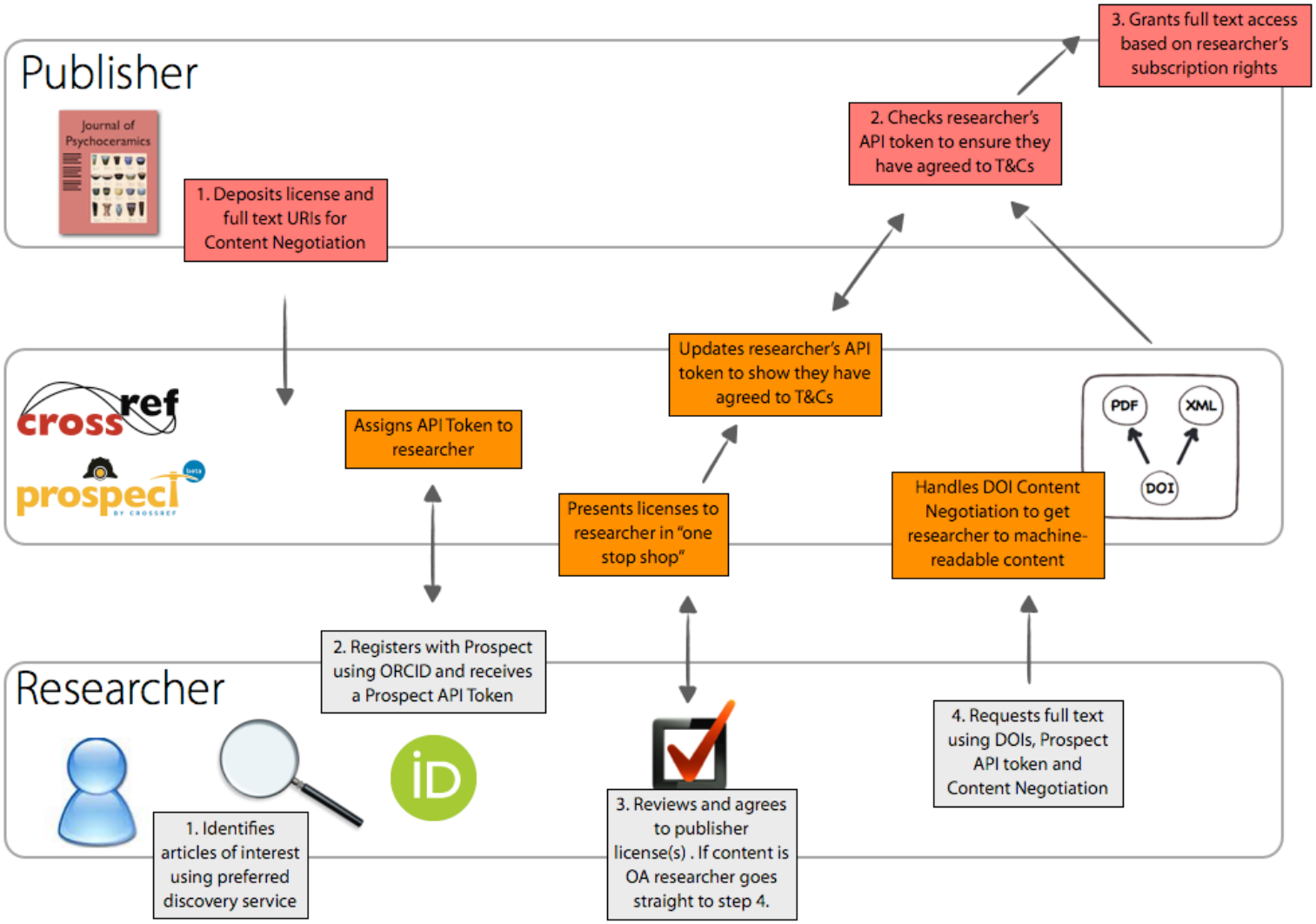
Text mining

How to control it

Challenges

- The need : Textual big data : we can't read everything
- To extract information from unstructured text
- Without having nothing more to pay to the publishers
  - ✓ a « natural right » to do it
  - ✓ download without restriction

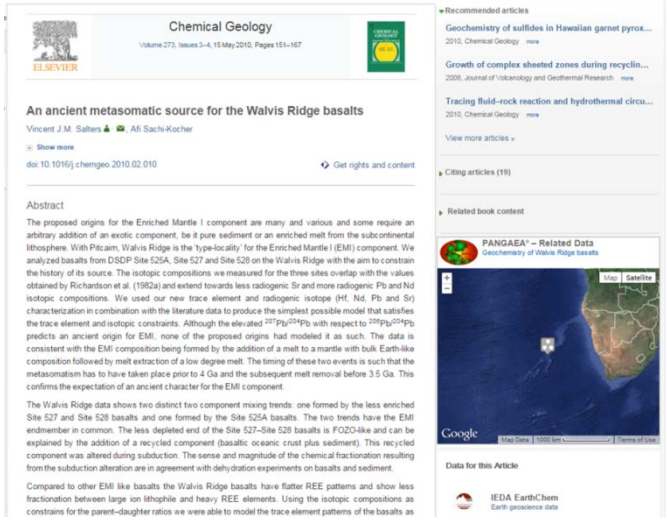
But … They organize the control …



How to link articles and data ?

Data and journals

- Data linked to articles in « old journals »
- Data journals



- Data must be in data repositories (avoid supplementary materials)

But which one ?

- Only one (linked with the publication workflow)
  - ✓ linked to the journal (ex : Giga Science)
  - ✓ Outside the journal
- Many ?
  - ✓ Is there any quality standards ?

How to assess a data repository ?

SCIENTIFIC DATA

To assist our authors, *Scientific Data* maintains a list of repositories that are compatible with our data deposition policies[1]. Please provide the following information to help us evaluate the suitability of your repository for inclusion in this list[2]:

Basic details

1. Repository Name:
2. Repository URL:
3. If indexed by BioSharing[3] provide the ID or the URL for your database record:
4. If indexed by re3data[3] provide the ID or the URL for your database record:
5. How large is your current user base?
6. How many datasets are currently hosted by the repository?
7. How long has your resource been available to the community?
8. Do you accept data submissions from the entire scientific community? If data submission is restricted to certain groups, please describe who may deposit data.

File limitations

9. What type of experimental data can be hosted by the repository? If the repository only accepts specific file formats please state what these are.
10. What is the maximum file size that can be handled by the repository?
11. Are there any limitations to the amount of data that an individual is able to upload?

Licensing

12. Are there are any terms of use or registration processes that data users must agree to, prior to gaining access to the data? Under what licence is data access provided? If you do not provide free and open access to the data hosted, please state the reason for this.
13. Can data depositors choose which licence they wish to use for their particular dataset?

Data persistency and stability of access

14. What type of identifier is assigned to hosted datasets? N.B. We strongly encourage new repositories to mint DataCite DOIs.
15. Are researchers able to modify or remove datasets after publication?
16. Is there a versioning system in place?
17. Do you guarantee persistent access to datasets, and for how long?

Costs

18. What is the cost to researchers wishing to host their research data?
19. What are the current and long-term cost recovery (sustainability) plans?

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20. If any proportion of the running costs are currently met by an academic grant, what is the plan for maintaining access to hosted data should funding be withdrawn in the future?

Peer review

21. Are you able to facilitate confidential peer review of hosted datasets by the scientific peer reviewers invited to review the data by *Scientific Data*? N.B. *Scientific Data* peer reviewers must be able to access datasets in a manner in which they remain anonymous to repository managers, as well as repository users.
22. If possible please provide examples of currently hosted research datasets, with associated peer-reviewed publications

Curation and metadata

23. Is there any curation support for researchers uploading their datasets?
24. Do you capture any metadata about hosted datasets in a standardised form?

Notes

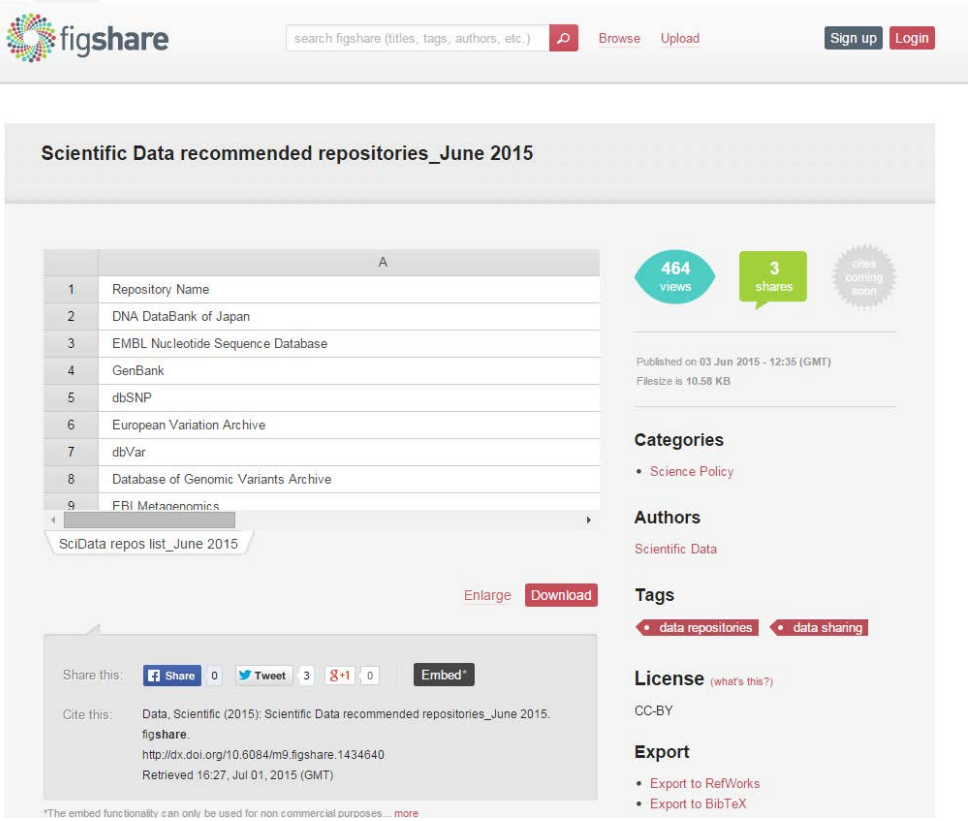
[1] This list is not intended to be a comprehensive list of research data resources, and should not be considered as a substitute for other data repository accreditation efforts.

[2] The aim of this evaluation process is to identify those repositories which are able to serve the wider community, and so are appropriate for Scientific Data to recommend to authors. We are glad to consider descriptions of data stored in project-specific or community-specific repositories on a case-by-case basis, even if the host repository is not selected for listing on our recommended repository list. Therefore please be aware that a decision not to list a repository as recommended should not be interpreted as a comment on the quality and utility of a repository for the immediate community it serves.

[3] BioSharing (http://www.biosharing.org) is a repository indexing service for life science, environmental and biomedical databases, whilst re3data (http://www.re3data.org) indexes data repositories in all other fields.

http://www.nature.com/sdata/data-policies#repo-suggest

The list approved by Scientific data



http://www.nature.com/sdata/data-policies/repositories

http://figshare.com/articles/Scientific_Data_recommended_repositories_June_2015/1434640

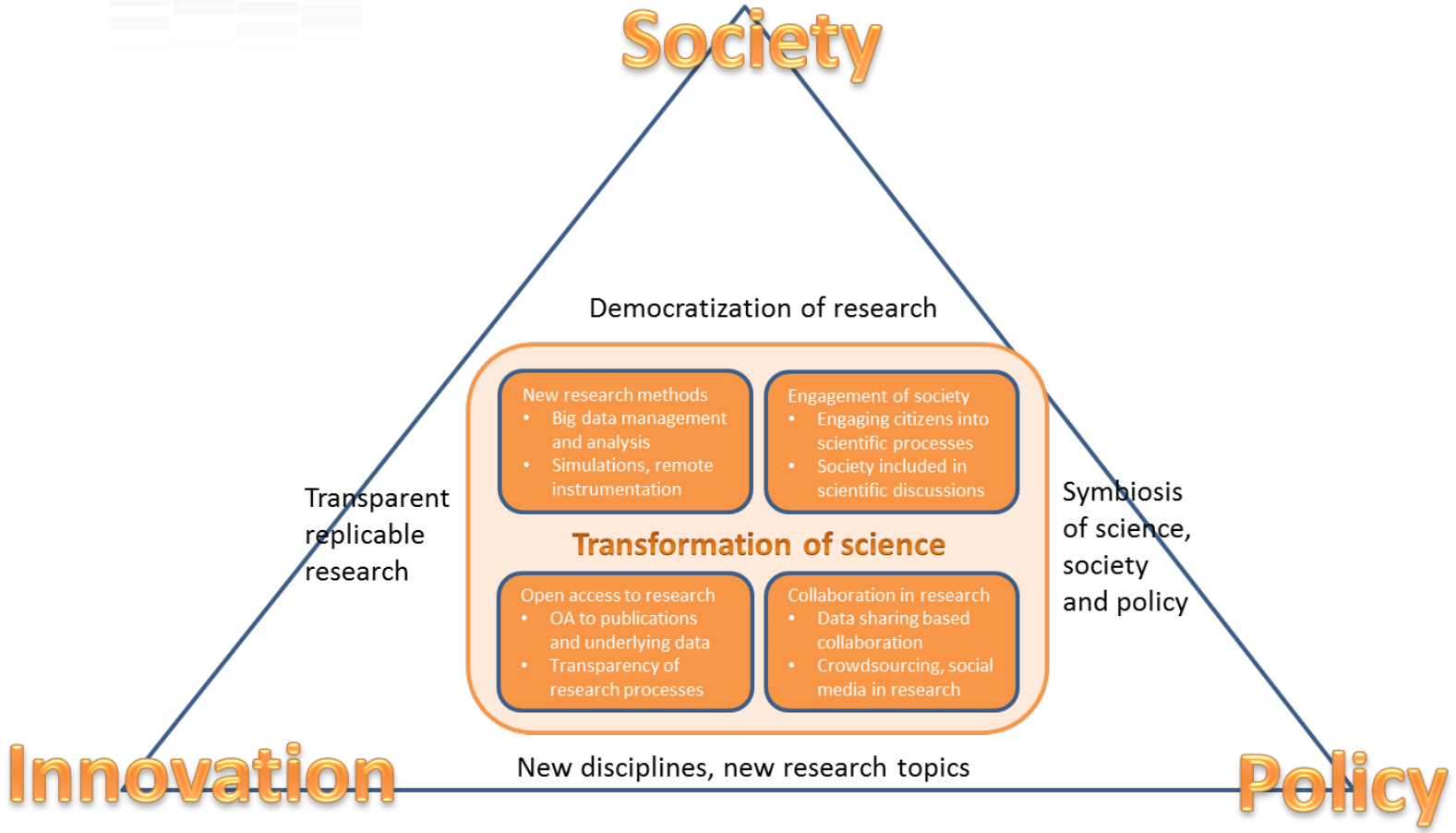
Conclusion

Or some perspectives

New tools for the scientific process

https://101innovations.wordpress.com/

How journals can tackle this challenges ?



https://ec.europa.eu/digital-agenda/en/open-science

- Rethink the scientific publishing process :
  - ✓ less and less frontiers betwen e-labnotebooks and results dissemination and treatment
- What are you waiting from your publisher :
  - ✓ only to put PDF on line
  - ✓ what else ?
- What is the publisher of the future ?