

# オープンサイエンスの先にあるもの “Beyond” Open Science Is What?

土屋俊

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of Higher Education

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## Why is “open science” good? For two reasons:

1. Because scholarly knowledge advances itself in better ways than otherwise once made universally sharable, and
2. because the public deserves to appreciate the results of the research it funds.

But

- publicly funded research shares only a small part of all research done, and does the “international” public deserve?

Si la science n'a pas de patrie, l'homme de science doit en avoir une, et c'est à elle qu'il doit reporter l'influence que ses travaux peuvent avoir dans le monde. (L. Pasteur, 1888)

- knowledge requires training to appreciate, and indeed science has been “esoteric” and successful
- it is not the case that everybody has been able to have access to all knowledge.
- But what is “Open” Science anyway?

## “Components” of Open Science, partily à la FOSTER

- Open source: Apache License, BSD license, GNU General Public License, and many more, since a long time ago;
- Open access: “free and unrestricted online availability” of “peer-reviewed journal literature” (BOAI, 2002);
- Open data: “Data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and sharealike” (Open Data Handbook, 2011-2012);
- Open reproducible research: “The act of practicing Open Science to enable the independent reproducibility of the research results” (Stodden, 2009); and a
- Open educational resources(OER) and “MOOC”s: “materials offered freely and openly to use and adapt for teaching, learning, development and research” (Commontwealth of Learning)

## Naive questions(1): Is open science a better science?

- 1 Open access: “Accelerates research, enrich education, share the learning of the rich with the poor and the poor with the rich”
- 2 Open data: Decreases costs, promotes new research, facilitates education of future researchers, expands unnoticed possibility *etc*
- 3 Open source: “Given enough eyeballs, all bugs are shallow,” ( *i.e.* the more widely available the source code is for public testing, scrutiny, and experimentation, the more rapidly all forms of bugs will be discovered.)
- 4 Open reproducible research: Improves reliability of scientific research
- 5 Open educational resources: Promotes education

## Naive questions(2): Is “Open science” a scholarly communication concept, or a science practice concept?

1 Is open science cheaper?

Good science does not have to be cheap

2 Is open science “innovative”?

Probably **NO**

3 Is open science consistent with industrial innovations?

Industry does not pay if it does not have to, and pays more than the public if only just for their own purposes

4 Is open science sustainable?

Who pays for science?

Everything ending up with, or starting with **MONEY!**

# Open access in near past and future

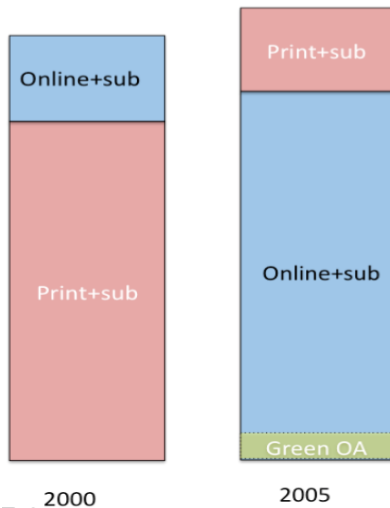
- Funders emerging
  - ▶ RCUK/HEFCE/JISC
  - ▶ NWO
  - ▶ Global Research Council
- Open access is easy to achieve when it is tied up to “research assessment, ” a lesson from UK’s REF2014, 2020, but “research assessment” is for resource allocation, not for the promotion of science
- Open access secularized into business models
  - ▶ “Cascade” editing may be going to be prevalent with publishers with quality journals
  - ▶ No sales to libraries necessary any more
  - ▶ The Second Flipping [▶ Picture](#)
- “Predatory” publishers emerging anyway, with dubious quality assurance

## Flipping for the second time [▶ BACK](#)



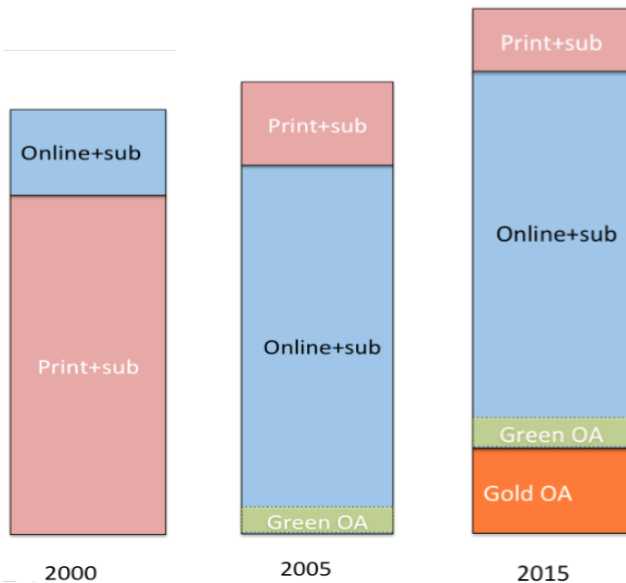
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## Flipping for the second time [▶ BACK](#)

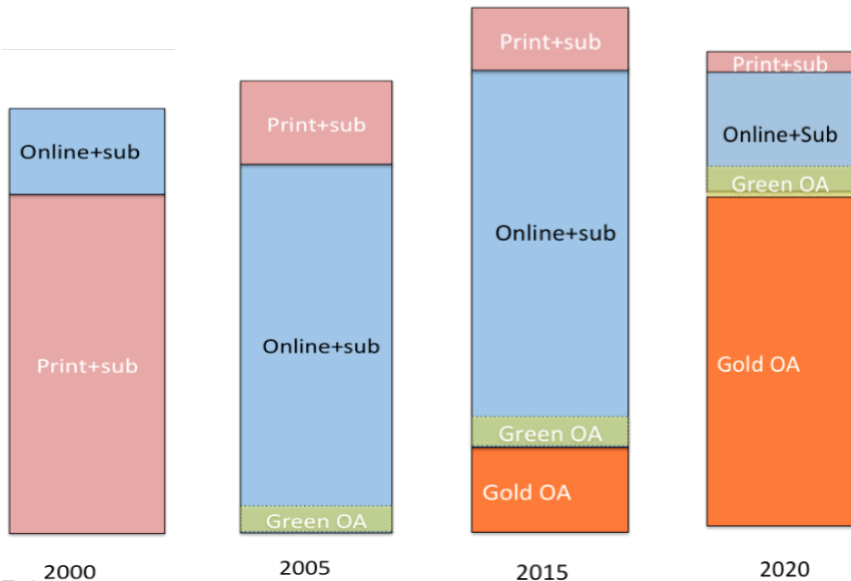




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## Flipping for the second time [▶ BACK](#)



# Will open science make citizens more educated and “scientific”?

- This is not new, or no need for “policies”
  - William Whewell’s tidal research 1833 – 1840, made possible by British Association for Advancement of Science (currently, British Science Association)
  - SETI@Home, SOHO, Galaxy Zoo, The Great Sunflower Project, FoldIt, Polymath etc. [▶ SETI](#)
    - ▶ Sunflower
    - ▶ Foldit
    - ▶ Galaxy Zoo
  - *Lorenzo’s Oil* (1992), *Extraordinary Measures* (2010), etc. [▶ Movies](#)
  - Archaeology, astronomy, botany, entomology etc in Japan
- Citizens are tools, not really beneficiaries
- If citizen science is confined to data collection and puzzle solving, which are both features of “normal science,” à la Kuhn, few if any innovations from citizen science



Donate to SETI@home

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## What is SETI@home?

SETI@home is a scientific experiment that uses Internet-connected computers in the Search for Extraterrestrial Intelligence (SETI). You can participate by running a free program that downloads and analyzes radio telescope

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					<a href="#">Web</a> <a href="#">Site</a> <a href="#">Shops</a>
					<a href="#">Languages</a>

## Get started

- [Read our rules and policies](#)
- Download, install and run** the BOINC software used by SETI@home. When prompted, select SETI@home from the list of projects.

Have questions or need help? Contact a volunteer using [BOINC online help](#).

Special instructions:

- [For SETI@home Classic participants](#)
- [For users of command-line and pre-5.0 clients](#)

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## News

### Behind the scenes at Berkeley SETI Research Center

New video! BSRC engineer Dave MacMahon talks GPUs, FPGAs, and the search <https://youtu.be/1OJ6-glyP0> 27 Jun

### SETI.German announces fifth Wow! event

To celebrate the 39th anniversary of the Wow! signal, SETI.Germany is hosting a [crunching competition](#) from Aug 15th to Aug 29th. Everyone is welcome to participate. 24 Jun

### Vice Magazine article about Arecibo Closure

Vice Magazine has posted an [article](#) about the potential closure of Arecibo. 10 Jun

# The Great Sunflower Project



## Welcome to the Great Sunflower Project!

*IDENTIFYING WHERE POLLINATORS NEED HELP.  
AND HELPING!*

We are the largest citizen science project focused on pollinators with over 100,000 members. To say thank you to our members for all you have done for pollinators, we have a present for you, **Bee Identification Cards!** You can download them by logging in and then clicking [here](#). We hope you will use them in your garden this year!

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**foldit** BETA  
Solve Puzzles  
for Science

23:24:05 GMT

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Click to learn how you contribute to science by playing FoldIt.

**NANOCRAFTER** Try our new scientific discovery game!  
Be creative and build extraordinary tiny machines!

What's New 

New Release!

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Win Beta  
Windows (Vista/7/8)

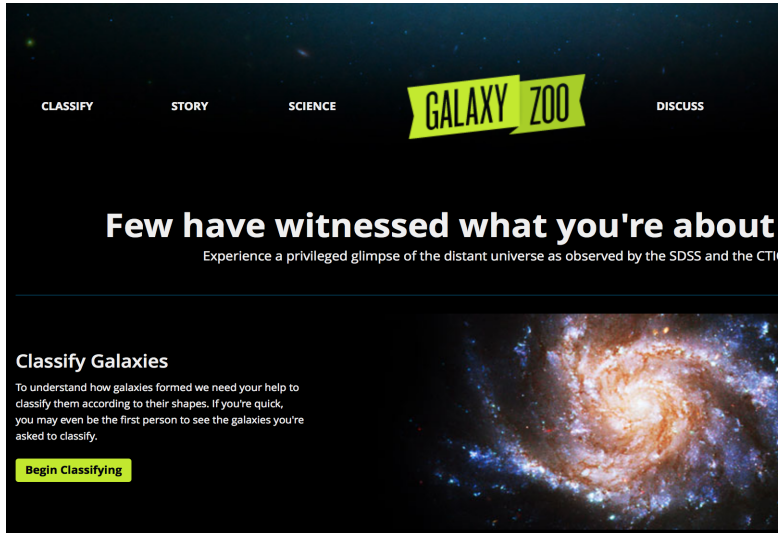
Are you new?  
Are you a pro?  
Are you a scientist?

SEARCH

Google Search

RECOMMEND FOLDIT

USER LOGIN



The image shows a screenshot of the Galaxy Zoo website. At the top, there is a navigation bar with the words "CLASSIFY", "STORY", "SCIENCE", and "DISCUSS" in white capital letters. In the center of the navigation bar is the "GALAXY ZOO" logo, which consists of the words "GALAXY" and "ZOO" in white capital letters on two overlapping yellow banners. Below the navigation bar, the main heading "Few have witnessed what you're about" is displayed in large white font. Underneath this heading is a sub-heading "Experience a privileged glimpse of the distant universe as observed by the SDSS and the CTIO". Below the sub-heading is a horizontal line. Underneath the line, on the left side, is the section "Classify Galaxies" in white font. Below this section is a paragraph of text: "To understand how galaxies formed we need your help to classify them according to their shapes. If you're quick, you may even be the first person to see the galaxies you're asked to classify." Below the paragraph is a yellow button with the text "Begin Classifying" in black. On the right side of the main content area is a large image of a spiral galaxy with a bright orange and yellow core and blue and white outer arms.

[CLASSIFY](#)   [STORY](#)   [SCIENCE](#)   **GALAXY ZOO**   [DISCUSS](#)

## Few have witnessed what you're about

Experience a privileged glimpse of the distant universe as observed by the SDSS and the CTIO

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### Classify Galaxies

To understand how galaxies formed we need your help to classify them according to their shapes. If you're quick, you may even be the first person to see the galaxies you're asked to classify.

[Begin Classifying](#)

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# Movies

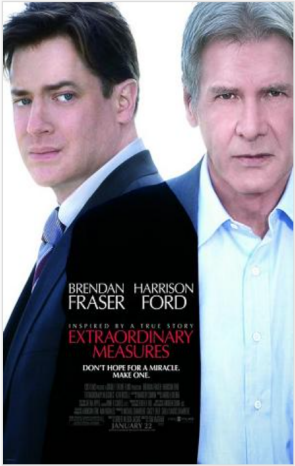
## Lorenzo's Oil



Theatrical release poster

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## Extraordinary Measures



Theatrical poster



## Data is tough to make open

- Data sharing is necessary for sure
  - ▶ Explosion of data creation/generation
  - ▶ Size
  - ▶ Reproducibility
  - ▶ Constraints on resources. Budget.
- However,
  - ▶ Are seemingly “all-purpose,” though actually article-oriented, “institutional” repositories tough enough?
  - ▶ Cybersecurity on campus generally tends to be miserable world wide
  - ▶ What is the “given” (=datum) anyway? Isn't it that all observation is theory-laden?
  - ▶ “Open” means “Unwarranted,” a forgotten principle, *i.e.* who curates?
  - ▶ Whoever cares will curate and share, but that's what we do now

## Changes apparently, but nothing is new except for “digital”

- “Big science” funding since the mid-20th century, and “science for progress and prosperity” since the 19th century
- Scientists since the early 19th century
- Modern university à la Humboldt with higher education and research for “the country”
- Scholarly society/associations since the early 19th century
- International collaboration by scientists across borders since a long time ago
- employment and promotion based on research performance in research institutions since nobody knows when

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Is “digital” ominous for an overall restructuring?

Or will the changes be assimilated into the scientific establishment?

## Conclusions for now

- Open access to articles is the only “serious” openness  
⇒ When open access is the rule, libraries will be publishers of locally generated knowledge, where do “conventional publishers” go, or nowhere?
- Data sharing is necessary and vital, and has to be supported by the communities, just because science has long since been a community activity, which simply means that data was not, is not and will not have to be open, though “digital” has made it easier
- Open source will be the norm in various ways
- Open reproducible research will be more appreciated than before in the sense that research will be more “ethical.” But ironically data sharing is more important in UNreproducible research, like geosensing, ecology, *etc.*
- Higher education as a place for research, why? ⇒ The question will still remain.

## Possible impacts on research journals and scholarly societies, though in the form of questions

- **Definition issue** Will the idea of journals as collections of “articles” as research results survive?
- **Quality issues, descriptive and normative** Will only those research results worth publishing be published?  
ORCID as a exemplary practice of good “closed” science, due to “membership”
- **Sustainability and Financing issue** Will membership still pay?
- **Why open now?**

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