How could the scientific publishing system be reformed?

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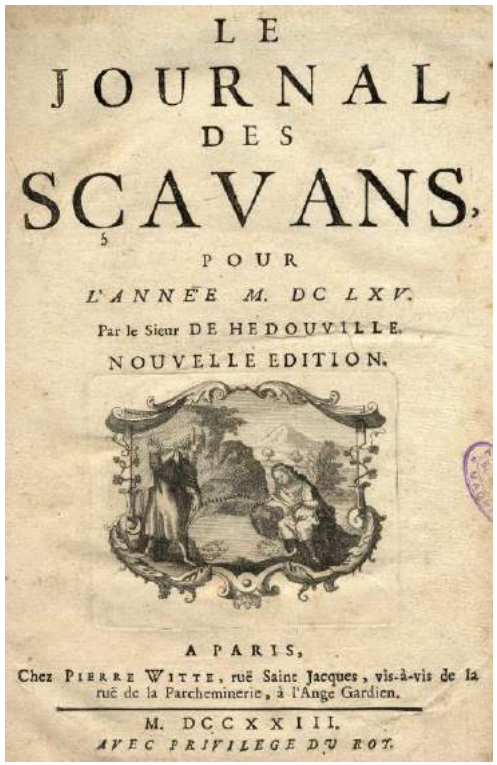
and ENS (Ecole Normale Supérieure) Paris

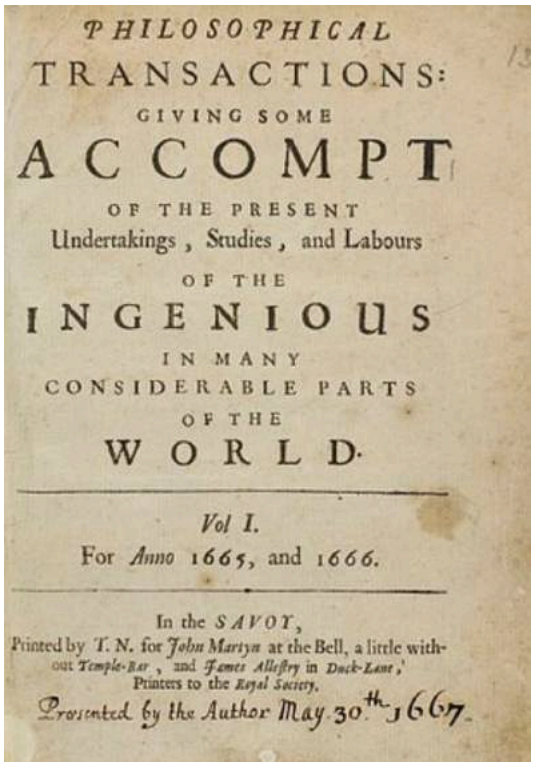
Open Science as a Common Good
European Parliament, Brussels
May 3rd 2017

Peer-reviewed scientific journals

The publication of research results in peer-reviewed journals
is the backbone of the present research system.
It was founded on *January 5th 1665* for sharing ideas and results.
It is also used today for evaluating researchers and projects.


LE
JOURNAL
DES
SCAVANS,
POUR
L'ANNÉE M. DC LXV.
Par le Sieur DE HEDOUVILLE.
NOUVELLE EDITION.
A PARIS,
Chez PIERRE WITTE, ruë Saint Jacques, vis-à-vis de la ruë de la Parcheminerie, à l'Ange Gardien.
M. DC C X X I I I.
AVEC PRIVILEGE DU ROY.

Paris, 5th January 1665


PHILOSOPHICAL
TRANSACTIONS:
GIVING SOME
ACCOMPT
OF THE PRESENT
Undertakings, Studies, and Labours
OF THE
INGENIOUS
IN MANY
CONSIDERABLE PARTS
OF THE
WORLD.
Vol I.
For *Anno* 1665, and 1666.
In the SAVOY,
Printed by T. N. for John Martyn at the Bell, a little without Temple-Bar, and James Allestry in Duck-Lane,
Printers to the Royal Society.
Presented by the Author May 30th 1667.

London, 6th March 1665

The scientific publishing system is based on the business model of printing: journals belong to publishers, researchers peer-review articles without being paid by publishers for this, then articles are printed and sold by publishers to academic libraries.

Who has access to peer-reviewed articles ?

Only researchers who work in institutions and countries rich enough to afford the very costly subscriptions to peer-reviewed journals.

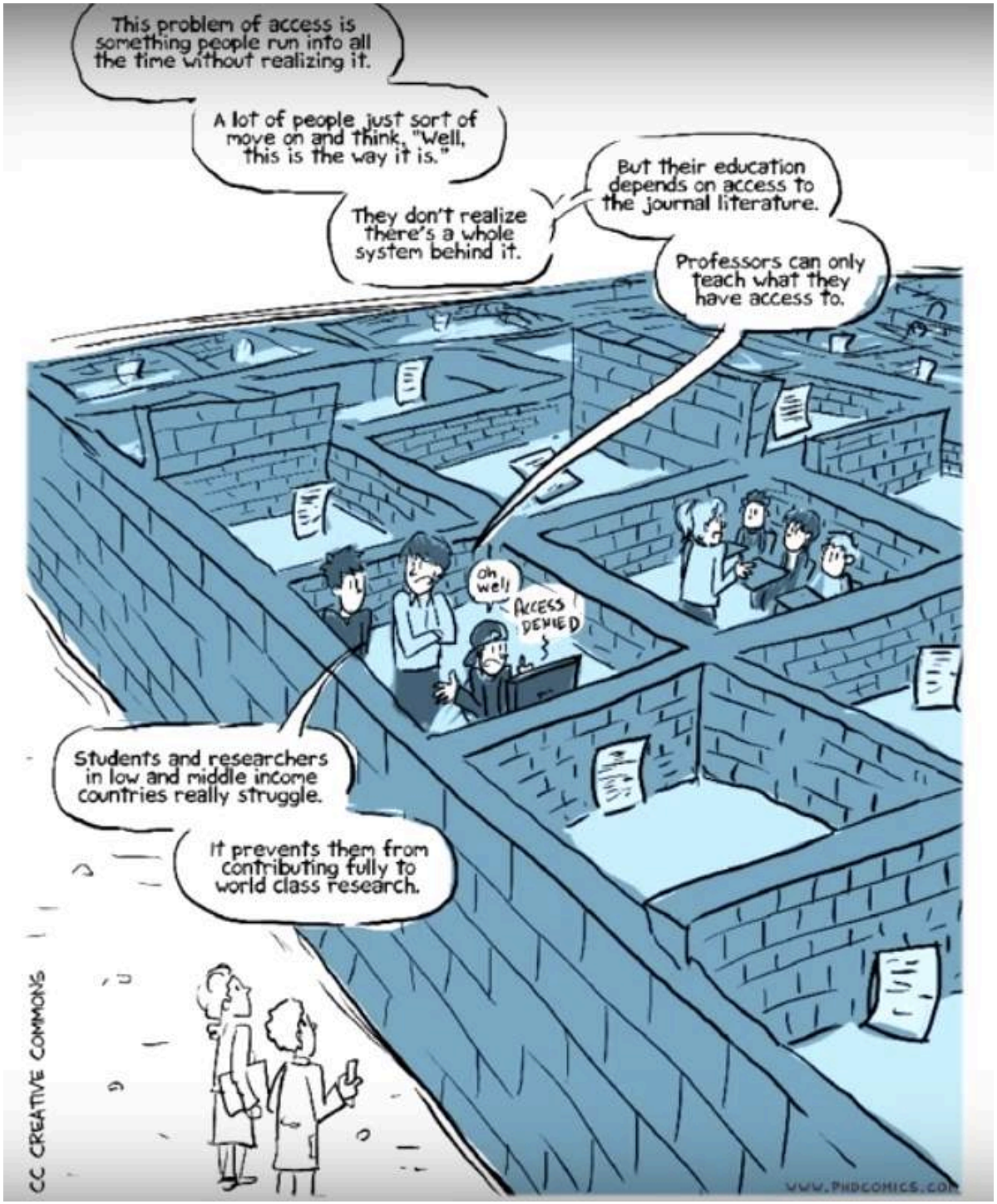
Researchers working for companies, or in poor institutions, teachers, students, retired researchers, and all citizens who finance public research do not have access to most of scientific articles.

Publishers do benefit from the digital revolution and use online publishing to reduce their costs (marginal cost is about 0), while preserving their business model designed for printing.

$\Longrightarrow$

Today few major publishers have acquired an oligopolistic position.

Vincent Larivière et al.,
The Oligopoly of Academic Publishers,
PLOS one, 10th June 2015

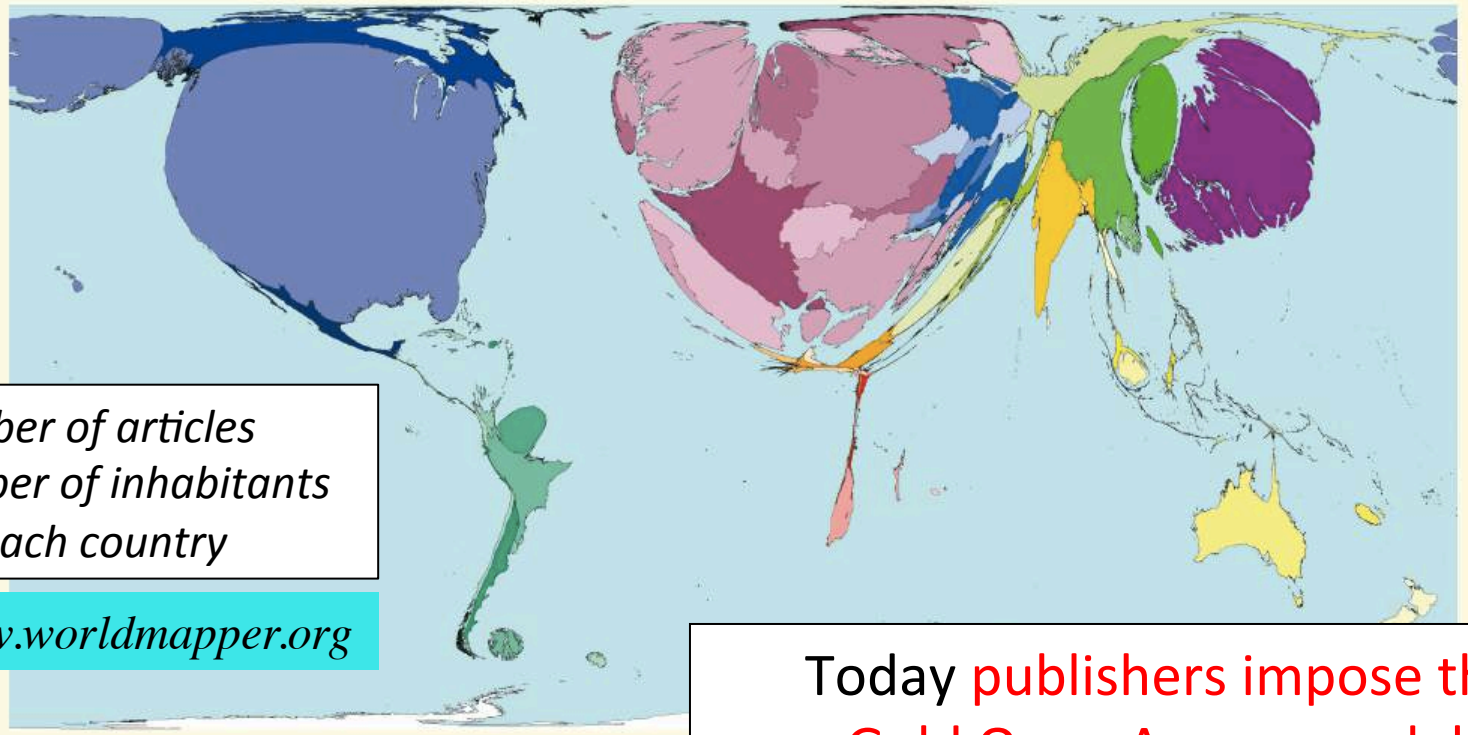


Articles are still locked behind paywalls

Since 2000
most renown journals
have been bought by
few major publishers,
whose exceptional profits
rely on the work
that researchers and
their funding agencies
offer them for free.

What is Open Access?
www.phdcomics.com/TV

Density of peer-reviewed articles per country



Number of articles per number of inhabitants of each country

http://www.worldmapper.org

1	➡	Centre National de la Recherche Scientifique
2	➡	Chinese Academy of Sciences*
3	➡	Russian Academy of Sciences*
4	➡	Harvard University
5	➡	Helmholtz Gemeinschaft*
6	➡	Max Planck Gesellschaft*
7	➡	University of Tokyo

http://www.scimagoir.com

Today publishers impose the Gold Open Access model, which flips subscription costs into article processing charges that researchers have to pay to publish

$\Longrightarrow$

researchers might get bankrupted or stop publishing!

How could the
scientific publishing system
be reformed?

Researchers want to recover control !

`Neither author nor reader should have to pay to publish and a journal should not belong to its publisher but to its editorial board. The dissemination of the peer-reviewed articles should be done using public infrastructures, from where articles should be accessible for free.'

Marie Farge, Note for the French Minister of Research, June 29th 2012
http://openscience.ens.fr/MARIE_FARGE/

Researchers proposed an alternative model : *Diamond Open Access*

Diamond Sutra,
the earliest complete survival of a dated printed book,
China, 11th May 868
British Library, London

The Diamond Open Access model

1

Authors keep their copyright and make their articles available in open access with a Creative Commons license CC-BY.

https://creativecommons.org/licenses/

2

The editorial board owns the journal (title and assets), while the editors and referees peer-review the articles for free, as they have ever done since it is part of their academic duty.

3

The publisher is no more the journal's owner but becomes a service provider, that the editorial board selects the best ones and hires them by contract.

Researchers need publishing platforms

Public funding agencies should provide for free to researchers
publicly-owned platforms, developed in open source software,
for peer-reviewing, publishing and archiving peer-reviewed articles,
with the help of librarians and of publishers (as subcontractors).

Anyone from anywhere should have free access (*i.e.*, gratis and libre)
to any peer-reviewed publication (*e.g.*, articles, data, codes, videos)
without researchers having to pay to publish their results.

Funding agencies could thus control the quality of peer-reviewing,
by selecting journals having good practices and reputable editors,
that will then be published for free using publishing platforms.

Such publishing platforms could give the chance to researchers
to experiment new ways of publishing (*e.g.*, open peer-reviewing).

How to insure a smooth transition from printed publishing to online publishing?

Green Open Access is the wisest model !

Today, publishers own peer-reviewed journals and bibliometric tools,
which insures their control of the scientific publishing system.

Today, publishers try to impose to researchers and funding agencies
the Gold Open Access model where one has to pay to publish,
but this leads to the rise of predatory journals of very poor quality.

To insure a smooth transition to Open Acces
the wisest solution is the Green Open Access model

$\Longrightarrow$

researchers keep the academic freedom to publish
their articles in the journals they prefer, and at the same time
deposit a version of each article in a public open repository.

http://openscience.ens.fr/MARIE_FARGE

Platform to boost Green Open Access

http://dissem.in

'Spot your own paywalled papers. Liberate them in one click!'

The platform was created in 2014 by Antonin Delpeuch,
when he was computer science student at ENS Paris,
and is collectively developed in open source by CAPSH (Committee for the Accessibility of Publications in Sciences and Humanities)

Dissem.in lists the articles of any researcher

Welcome to dissemin

Dissemin detects papers behind pay-walls and invites their authors to upload them in one click to an open repository.

Try any author name | Search

Green open access

Many researchers do not use their right to make their papers freely available online, in addition to the paywalled version offered by traditional publishers.

This forces libraries to buy overpriced electronic subscriptions to journals, when they can afford them at all.

Open repositories

Uploading your papers on your own webpage is not enough. Such copies are less stable and harder to find than documents uploaded to well-indexed repositories.

Dissemin searches for copies of your papers in a large collection of open repositories and tells you which ones cannot be accessed.

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2016

Seung-Bu Park, Pierre Gentine, Kai Schneider, **Marie Farge**

Coherent Structures in the Boundary and Cloud Layers: Role of Updrafts, Subsiding Shells, and Environmental Subsidence

Download | American Meteorological Society, Journal of the Atmospheric Sciences, 2016.

Frank G. Jacobitz, Kai Schneider, Wouter J. T. Bos, **Marie Farge**

Structure of sheared and rotating turbulence: Multiscale statistics of Lagrangian and Eulerian accelerations and passive scalar dynamics

Download | American Physical Society, Physical Review E, 1(93), 2016.

2015

Marie Farge, Kai Schneider

Wavelet transforms and their applications to MHD and plasma turbulence: a review

Download | Cambridge University Press (CUP), Journal of Plasma Physics, 06(81), 2015.

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2003

Marie Farge, Kai Schneider, Giulio Pellegrino, Alan A. Wray, Robert S. Rogallo

Coherent vortex extraction in three-dimensional homogeneous turbulence: Comparison between CVS-wavelet and POD-Fourier decompositions

Upload | American Institute of Physics, Physics of Fluids, **10**(15), 2003.

Kai Schneider, **Marie Farge**

Coherent Vortex Simulation (CVS) of 2D bluff body flows using an adaptive wavelet method with penalisation

Upload | Springer Verlag, Notes on Numerical Fluid Mechanics and Multidisciplinary Design, 2003.

2002

Bartosz Protas, Kai Schneider, **Marie Farge**

Geometrical alignment properties in Fourier- and wavelet-filtered statistically stationary two-dimensional turbulence

Upload | Physical Review E, **4**(66), 2002.

Kai Schneider, **Marie Farge**

Adaptive Wavelet Simulation of a Flow around an Impulsively Started Cylinder Using Penalisation

Download | Elsevier, Applied and Computational Harmonic Analysis, **3**(12), 2002.

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Coherent vortex extraction in three-dimensional homogeneous turbulence: Comparison between CVS-wavelet and POD-Fourier decompositions

Journal article by Marie Farge, Kai Schneider, Giulio Pellegrino, Alan A. Wray, Robert S. Rogallo

Full text: Unavailable

Publisher: American Institute of Physics (AIP)

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Policy details (opens in a new window). *Data provided by* SHERPA/RoMEO

Published in

American Institute of Physics, Physics of Fluids, **10**(15), 2003

DOI: 10.1063/1.1599857

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Abstract

The coherent vortex simulation (CVS) decomposes each realization of a turbulent flow into two orthogonal components: An organized coherent flow and a random incoherent flow. They both contribute to all scales in the inertial range, but exhibit different statistical behaviors. The CVS decomposition is based on the nonlinear filtering of the vorticity field, projected onto an orthonormal wavelet basis made of compactly supported functions, and the computation of the induced velocity field using Biot–Savart's relation. We apply it to a three-dimensional homogeneous isotropic turbulent flow with a Taylor microscale Reynolds number $R_\lambda = 168$, computed by direct numerical simulation at resolution $N=256^3$. Only 2.9%N wavelet modes correspond to the coherent flow made of vortex tubes, which contribute 99% of energy and 79% of enstrophy, and exhibit the same $k^{-5/3}$ energy spectrum as the total flow. The remaining 97.1%N wavelet modes correspond to a incoherent random flow which is structureless, has an equipartition energy spectrum, and a Gaussian velocity probability distribution function (PDF). For the same flow and the same compression rate, the proper orthogonal decomposition (POD), which in this statistically homogeneous case degenerates into the Fourier basis, decomposes each flow realization into large scale and small scale flows, in a way similar to large eddy simulation(LES) filtering. It is shown that the large scale flow thus obtained does not extract the vortex tubes equally well as the coherent flow resulting from the CVS decomposition. Moreover, the small scale flow still contains coherent structures, and its velocity PDF is stretched exponential, while the incoherent flow is structureless, decorrelated, and its velocity PDF is Gaussian. Thus, modeling the effect of the incoherent flow discarded by CVS-wavelet shall be easier than modeling the effect of the small scale flow discarded by POD-Fourier or LES.

For each article *Dissem.in* checks which version the publisher allows to deposit in open access and provides a very simple way to deposit it in an open repository (*e.g.*, Zenodo, HAL).

Conclusion

Today investments for producing and peer-reviewing articles are public but ownership of journals, peer-reviewing reports and publishing platforms and profits from subscriptions, article processing charges and bibliometric data are private.

Publishers should become service providers to publicly funded and publicly owned publishing platforms, without having anymore the property of articles and journals, plus platforms for peer-reviewing, publishing and computing bibliometry.

$\Longrightarrow$

Public funding agencies should provide public platforms for peer-reviewing, publishing and archiving the results of public research. Intellectual property laws (copyright/authoright) should be improved to guarantee that results of public research remain public and open. We need those tools to develop knowlegde as a commons.

What do we need publishers for ?

'Since the creation of scientific journals 350 years ago, large commercial publishing houses have increased their control of the science system. While one could argue that their role of typesetting, printing, and diffusion were central in the print world, the ease with which these functions can be fulfilled in the electronic world makes one wonder: what do we need publishers for? […] It is up to the scientific community to change the system in a similar fashion and in parallel to the open access and open science movements. Unfortunately, researchers are still dependent on one essentially symbolic function of publishers, which is to allocate academic capital, thereby explaining why the scientific community is so dependent on *The Most Profitable Obsolete Technology in History*'

Vincent Larivière et al., The Oligopoly of Academic Publishers, PLOS one, 10th June 2015

Need to change present practices

‘Scientists, despite being great explorers, are very conservative in changing how they do things.’

‘That sort of reliance on prestige allows some journals to not respond to pressure towards openess.’

What is Open Access?
www.phdcomics.com/TV

'Scholarly publishing and peer-reviewing in open access', Marie Farge, 2017
in 'Europe's Future: Open Science, Open Innovation, and Open to the World',
European Commission, DG Research, Science and Innovation, May 2017

'Consequently to Brexit, the European Commission could reconsider the present negotiation about European copyright law. Indeed, besides United Kingdom, other Commonwealth members and United States of America that are ruled by copyright, most of United Nations members are ruled by author's law. Europe could then play a leading role to promote author's law, to give a better protection to authors and a legal status to *knowledge commons*.'

Charlotte Hess and Elinor Ostrom,
Understanding knowledge as a Commons,
MIT Press, 2006

Knowledge as a Commons

Ideas are not of the same nature as material products
since when you give an idea, you do not lose it.
Therefore knowledge is not a product to be traded,
but a commons to be shared since
its exchange is a positive-sum game.

Charlotte Hess and Elinor Ostrom,
Understanding knowledge as a Commons,
MIT Press, 2006

Elinor Ostrom received in 2009 the Nobel prize
in economic sciences, together with Oliver Williamson, for :
'her analysis of economic gouvernance, especially the commons
showing how common resources can be managed successfully
by the people who use them rather than
by governments or private companies'.

Elinor Ostrom (1933-2012)

She was professor of political science
at Indiana University (USA)
and is the only woman
who has ever received the
Nobel prize in economic sciences.

http://openscience.ens.fr/
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http://wavelets.ens.fr

'Scholarly publishing and peer-reviewing in open access', Marie Farge, 2017
in 'Europe's Future: Open Science, Open Innovation, and Open to the World',
European Commission, DG Research, Science and Innovation, May 2017

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