Knowledge as a commons:
How to improve the peer review and dissemination of research outputs

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March 2nd 2017
Barcelona Knowledge Hub of the Academia Europaea
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 governance, 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 the only woman who has ever received the Nobel prize in economic sciences.
What research is about?

Research is a collaborative endeavour, in both space and time, that advances through discussions, seminars, conferences and peer-reviewed articles.

Publishing means making the research outputs publicly available for their evaluation and use.

Peer reviewing means checking the content of articles by peers, i.e., researchers in activity (not employees of the publishers), able to find errors and to assess originality of the results.

This guarantees the validation, reproduction, transmission and conservation of the research outputs for the advancement of knowledge.
Peer-reviewed scholarly journals

The publication of research outputs 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.

Paris, 5th January 1665
London, 6th March 1665
How is the scholarly publishing system today?
Business model of peer-reviewed journals

Researchers write articles, typeset them in final format, review those of their peers, are editors of scholarly journals.

After papers are accepted by reviewers and editors, publishers put them online, insure their visibility, occasionally print them, and sell them.

Librarians negotiate subscription contracts, pay them, control access to the journals and curate collections of articles.

Taxpayers

Their salaries are paid by taxpayers

Researchers acting as editors

Publishers
Publishers own articles, journals and more…

Before publishing the accepted papers, publishers require that researchers transfer them their copyrights for free!

Publishers own intellectual property of the text, figures and data contained in articles for more than 100 years. They can thus sell articles at the prices and conditions they set, with non-disclosable contracts.

Publishers also own the scholarly journals, plus all derivatives (e.g., databases), plus the peer-reviewing and publishing platforms, and the bibliometric data used to evaluate research projects and researchers’ career.

*Profit margin up to 40%*!
Example of the copyright transfer form we signed on January 24th 2017 to publish an article online in Journal of Turbulence

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| Article (the "Article") entitled: | Coherent structure extraction in turbulent channel flow using boundary adapted wavelets |
| Article DOI:                     | 10.1080/14685248.2017.1284326                   |
| Author(s):                       | Teluo Sakurai, Katsunori Yoshimatsu, Kai Schneider, Marie Farge, Koji Morishita, Takashi Ishihara |
| To publish in the Journal:       | Journal of Turbulence                            |
| Journal ISSN:                    | 1468-5248                                       |

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Who has access to peer-reviewed articles?

Only researchers working in institutions and countries rich enough to afford the very costly subscriptions to scholarly 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 the scholarly articles.

By 2000 most of the famous scholarly 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.

Publishers want to benefit from the digital revolution and the Web to develop online publishing and reduce their production costs, while preserving their business model designed for printing.

Today few major publishers have acquired an oligopolistic position.

Vincent Larivière et al., The Oligopoly of Academic Publishers, PLOS one, 10th June 2015
Operating profits and profit margin of the publisher Reed-Elsevier for its Scientific, Technical and Medical (STM) division from 1990 to 2015

Vincent Larivière et al., The Oligopoly of Academic Publishers, PLOS one, 10th June 2015
Density of peer-reviewed articles per country

Today publishers impose their *Gold Open Access model*, which flips subscription costs into article processing charges that researchers have to pay to publish, so researchers might get bankrupted or stop publishing.

http://www.worldmapper.org

http://www.scimagoir.com

Number of articles divided by the number of inhabitants
How could be the scholarly publishing system tomorrow?
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
The marginal cost of online publishing is 0

‘While, in economic terms, printed journals can be considered as rival goods— goods that cannot be owned simultaneously by two individuals— online journals are non-rival goods: a single journal issue that has been uploaded by the publisher on the journal’s website can be accessed by many researchers from many universities at the same time. The publisher does not have to upload or produce an additional copy each time a paper is accessed on the server as it can be duplicated ad infinitum, which in turn reduces the marginal cost of additional subscriptions to 0. In a system where the marginal cost of goods reaches 0, their cost becomes arbitrary and depends merely on how badly they are needed, as well as by the purchasing power of those who need them. [...] In such a system, any price is good for the seller, as the additional unit sold is pure profit.’

Vincent Lrivière et al., The Oligopoly of Academic Publishers, PLOS one, 10th June 2015a
Tim Gowers and 33 mathematician colleagues called to boycott Elsevier and thus stopped the Research Works Act, a bill to the US Congress Elsevier was lobbying for.

16,556 Researchers Taking a Stand. See the list

Academics have protested against Elsevier's business practices for years with little effect. These are some of their objections:

1. They charge exorbitantly high prices for subscriptions to individual journals.

2. In the light of these high prices, the only realistic option for many libraries is to agree to buy very large "bundles", which will include many journals that those libraries do not actually want. Elsevier thus makes huge profits by exploiting the fact that some of their journals are essential.

3. They support measures such as SOPA, PIPA and the Research Works Act, that aim to restrict the free exchange of information.

http://www.thecostofknowledge.com/
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://opencourse.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 before since this is part as their academic duty.

3
The publisher is no more the journal’s owner but becomes a service provider, that the editorial board selects and hires by contract.
Two Diamond Open Access journals

1. IPOL Journal · Image Processing On Line

   //www.ipol.im   ISSN : 2105-1232   DOI : 10.5201/ipol

   Founded in 2010 by Jean-Michel Morel, IPOL has 41 editors. It is financed by CNES, ERC and 13 public institutions from 5 countries. Each article contains the text, the algorithm and the source code, which all are peer reviewed. The journal platform also provides online demonstration facility and an archive of experiments. IPOL thus ensures open science and reproducible research.

2. Discrete Analysis

   http://discreteanalysisjournal.com   ISSN : 2397-3129

   Founded in 2015 by Tim Gowers, DA has 12 editors. It is an overlay journal on the open repository arXiv. It is financed by Cambridge University (10$/submission).
We need public 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 would have free (gratis and libre) access to any peer-reviewed publication (e.g., articles, data, codes, videos) without researchers having to pay to publish their results.

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

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

SciELO
Scientific Electronic Library Online

revues.org
Centre pour l’Édition Électronique Ouverte
Centre for Open Electronic Publishing

Created in 1999, it publishes 451 journals in open access, financed by public agencies from France (CNRS, EHESS, BSN, Aix-Marseille and Avignon universities).

Created in 1999, it publishes 1249 journals in open access, financed by public agencies from Brazil (FAPESP, CNPq, BIREME) and from 15 other countries.

Brasil
+ África do Sul
Argentina
Brasil
Chile
Colômbia
Costa Rica
Cuba
Espanha
México
Peru
Portugal
Venezuela
+ Bolívia
Paraguai
Uruguai
How to insure a smooth transition from printing on paper towards online publishing?
Green Open Access is the wisest model!

Today publishers own scientific journals and control bibliometry, that they use as a marketing tool to insure their control.

The Gold Open Access model leads to the creation of predatory journals of very poor quality, even fake journals. To avoid this and to guarantee a smooth transition towards open access, researchers would like to preserve the main traditional journals which are useful, having a good reputation and good practices.

The wisest solution is the Green Open Access model, i.e., researchers should keep the academic freedom to publish their articles in the journals they prefer, and at the same time deposit a version in a public open repository.

http://openscience.ens.fr/MARIE_FARGE
Dissemin to boost Green Open Access

Antonin Delpeuch, a student in computer sciences from ENS Paris, created in September 2014 the plateform http://dissem.in, that is collectively developed in open source.

‘Spot your own paywalled papers. Liberate them in one click!’
The team CAPSH / Dissemin

http://dissem.in is supported by the not-for-profit association CAPSH (Committee for the Accessibility of Publications in Sciences and Humanities) created on September 5th 2015 by:

Antonin Delpeuch
Graduate student, Computer Science
École Normale Supérieure
France

Creator and main developer of the platform Dissemin

“We need to take a stand against more traditional publishers”

Europe's Open Access Champion 2016

Antoine Amarilli
Pablo Rauzy
Marie Farge
Thomas Bourgeat
Dissemin lists the articles of any researcher
Papers authored by Marie Farge

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

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 2.96% 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 97.14% wavelet modes correspond to an 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.
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Coherent vortex extraction in three-dimensional homogeneous turbulence: Comparison between CVS-wavelet and POD-Fourier decompositions

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(Received 22 November 2002; accepted 21 May 2003; published 2 September 2003)

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 an 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
The source of *Dissemin* is open on *GitHub*.
You can follow the development of Dissemin

Antonin

Ryan

You are also welcome to participate to its development in Python!
How to list the articles of an institution

With Dissemin you can generate the list of the scholarly articles published by the researchers of an institution and get some statistics. Here is the example of Ecole Normale Supérieure Paris:

http://dissem.in/institution/1/
The administration has provided us with this list. Please report any problem to contact@dissem.in.

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<table>
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| A | Guillaume Lapeyre (26 papers)  
Ara Arakelian (2 papers)  
Soumaya Latour (5 papers)  
Bernard Legras (53 papers)  
Francois Lott (47 papers) |
| B | Patrick Meunier (20 papers)  
Pierre Barré (49 papers)  
Claude Basdevant (34 papers)  
Pierre Briole (69 papers) |
| C | Yves Pinquier (2 papers)  
Éric Calais (125 papers)  
Vincent Casse (2 papers)  
Nicolas Chamot-Rooke (63 papers)  
Christian Chopin (63 papers)  
David Cugnet (13 papers) |
| D | Alexis Rigo (27 papers)  
Fabio D'Andrea (20 papers)  
Damien Deldique (5 papers)  
Matthias Delecluse (15 papers)  
Pierpaolo Dubernet (1 paper)  
Jean-Philippe Duvel (38 papers) |
| F | Hector Teitelbaum (6 papers)  
Marie Farge (106 papers)  
Luce Fleitout (45 papers)  
Jérôme Fortin (59 papers) |
| G | Bruce Velde (78 papers)  
Christophe Vigny (40 papers)  
Claudia Zanetel (0 papers)  
Vladimir Zeitlin (27 papers)  
François Gay-Balmaz (51 papers)  
Yves Gueguen (52 papers)  
Lionel Guez (9 papers) |
| L | Patrick Meunier (20 papers)  
Pierre Barré (49 papers)  
Claude Basdevant (34 papers)  
Pierre Briole (69 papers) |

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It harvests more than 33 M articles and offers the choice to deposit in HAL. Interfaces for DSPACE (open source package to create open repositories) and OSF Preprints (open repository for any discipline) are now developed.
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, bibliometry and related data.

Public funding agencies should provide public platforms for peer-reviewing, publishing and archiving the outputs of public research. Intellectual property laws (copyright/copyleft) should be improved to guarantee that research outputs remain public and open. We need those tools to develop knowledge as a commons.
'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, April 2017

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