Beyond Open Access: leveraging technology in publishing

December 2016

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Editorial Director
Founded in 2007 by EPFL neuroscientists Henry Markram & Kamila Markram

ALPSP Gold Award for Innovation in Publishing 2014
Frontiers in numbers

- 54 Open access journals
- 430 Academic disciplines
- 54K Articles published
- 123K Authors
- 1M Article downloads per month
Frontiers journals are the most cited OA journals in 9 categories:

Psychology, Plant Sciences, Immunology, Neurosciences, Physiology, Neurology, Anatomy, Behavioral Sciences, Geriatrics

Frontiers journals are the largest OA journals in 7 categories:

Psychology, Plant Science, Immunology, Microbiology, Neuroscience, Behavioral Sciences, Geriatrics

The data is based on the 2015 Journal Citation Reports (Thomson Reuters, 2016). See Blog: Frontiers tops open-access journal ranking in several JCR categories
Frontiers journals (in red) are the top cited journals in the world
2015 Journal Citation Reports (Thomson Reuters, 2016)

The data is based on the 2015 Journal Citation Reports (Thomson Reuters, 2016). See Blog: Frontiers tops open-access journal ranking in several JCR categories
Frontiers is the 6th largest Open Access publisher (2015)
Changing traditions - Debunking myths
Flaw #1
Paywalls

Flaw #2
Rejection cascades

Flaw #3
Isolated disciplines

Flaw #4
Subjective evaluation of science

Flaw #5
Distorted public view of science
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Why Open Access?
Research & technology drive modern civilization

- Gutenberg Press
  Johannes Gutenberg, 1440

- Copernican System
  Nicholas Copernicus, 1543

- Gravity
  Isaac Newton, 1664

- Electricity
  Michael Faraday, 1821

- Steam-Powered Railway
  1825

- Telegraph
  Samuel Morse, 1844

- Evolution
  Charles Darwin, 1859

- Microbe-biology & prevention of infection
  Louis Pasteur, 1860’s

- Periodic Table
  Dimitry Mendeleev, 1869

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  Alexander Graham Bell, 1876

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Research & innovation drive economic growth

World GDP per capita

$ 19 Trillion

Internet of things by 2020

Scientific Revolution
1500

1st & 2nd Industrial Revolutions:
Steam & Electricity
1820

3rd Industrial Revolution: Digital
1940

4th Industrial Revolution:
Biology merges with Technology
Everything is connected
2010

Real GDP per capita world-wide (PPP adjusted), since 1000 – Max Roser
Data Source, Angus Maddison
Publishers interests are not aligned with neither governments & industry nor scientists.

Publishers

Growth $$$

Research & Innovation

Governments & Industry

Funding $$$
70-80% of research papers are still behind expensive subscription paywalls
Frontiers articles received 210 Million views and downloads
Everyone wants access

Open Access will overtake subscription publishing by 2018-2020

2000: 1.03 M
2001: 1.1 M
2002: 1.3 M
2003: 1.4 M
2004: 1.5 M
2005: 1.6 M
2006: 1.7 M
2007: 1.8 M
2008: 1.9 M
2009: 2 M
2010: 2.1 M
2011: 2.2 M
2012: 2.3 M
2013: 2.4 M
2014: 2.5 M
2015: 2.6 M
2016: 2.7 M
2017: 2.8 M
2018: 2.9 M
2019: 3 M
2020: 3.1 M
2021: 3.2 M

# research articles
0.3 M
0.6 M (US$ 300M)
1.4 M
2.1 M
2.8 M (US$ 15B)
3.2 M

Source all articles: Scopus, 2014-2020: estimate based on 5% compound growth rate
Source Open Access articles, Lacso and Bjork (2011): 2014-2020: estimate based on 20% compound growth rate

Total research articles
4-5% growth

Open access articles
18-20% growth

Subscription articles
Open Access mandates

http://roarmap.eprints.org/
All publicly funded scientific papers published in Europe are to be made free to access by 2020.

“Life-changing” reform ordered by EU Minsters and Carlos Moedas, European Commissioner for Research, Science and Innovation

May 27th, 2017

https://www.theguardian.com/science/2016/may/28/eu-ministers-2020-target-free-access-scientific-papers?CMP=twt_a-science_b-gdnscience
Transition from subscription to Open Access can free up funds for research

Subscription publishing

14B USD subscription revenue for approx. 2M articles

7’000 USD/subscription article

Open access publishing

4B USD open-access revenue for the same 2M articles in OA model

2’000 USD/Open Access article

A transition to open access will:
1. Save universities $10 Billion per year
2. Accelerate global research and innovation
3. Unlock unlimited potential for data mining and innovation
4. Stimulate growth and jobs

* Data from The STM Report (The STM Report: An overview of scientific and scholarly journal publishing, 2015) and SIMBA Report (Global Social Science and Humanities Publishing 2013 – 2014, 2013); **Data calculated from APC range assuming the same number of articles published in 2014
Open Access drives innovation

Peer-review
new models, impact-neutral mandate, publish what is scientifically correct

Publishing platforms
Service oriented, scalable, adaptable with customer feedback, efficient

Impact metrics
At the article-level, objective

Author discoverability & reputation
Make authors & editor profiles to raise impact for them and readership for their articles

BioMed Central frontiers frontiers

2006 2013 2009 2010
PLOS PeerJ PLOS

2007 2016 2012 2015
frontiers PLOS
NPG, BMC, Copernicus, Wiley Blackwell, SageOpen
ResearchGate Academia.edu RESEARCHERID

2008 2010 frontiers loop

2012 ORCID Google

2015 Mendeley Elsevier

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Traditional Journal: Nature

100K article submissions per year
97% of these articles are rejected because they are not sufficiently „revolutionary“
2 million published articles in 2014
1 million of these articles were rejected at least 1x by a journal prior to their publication
6 months
time it takes to go through 1 rejection cycle
100 million hours wasted by researchers on rewriting their articles for another journal
$ 10 Billion wasted
Selecting for impact does not guarantee quality

Sample: 570 journals represented, Where rejection rates are publicly stated

Analysis
1. There is no significant correlation between rejection rates and Impact factors (IF)
2. The lowest IF seems to be obtained in journals that reject 60-70% of articles
3. The few journals that do achieve IF factors (top right) with very high rejection rates (>95%) may achieve this by selecting authors rather than papers and publishing within the main stream where most of the citations are generated.
Collaborative Peer Review

• Authors, reviewers and handling Associate Editor interact directly with each other in the online review forum.

• Names of editors and reviewers published on final version of paper.
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Journals

Fields
Article collections across disciplines

Research Topic

The Pathway to Solutions: New Frontiers in Climate Change Adaptation & Mitigation

Participating Journals

Manuscripts can be submitted to this Research Topic via the following journals:

Frontiers in Bioengineering and Biotechnology
Plant Biotechnology

Frontiers in Plant Science
Plant Biotechnology

Frontiers in Earth Science
Soil Processes
Interdisciplinary Climate Studies

Frontiers in Environmental Science
Soil Processes
Interdisciplinary Climate Studies
Air Pollution
Marine Pollution

Recent Articles

Climate risk assessment under uncertainty: an application to main European coastal cities
Luis María Abadie, Elisa Sainz de Muneta and Ibon Galarraga

Overview 4 Articles 65 Authors 6 Impact 2 Comments 11,329 VIEWS

About this Research Topic

The 2015 Paris Climate Conference (COP21), has led to a shift in focus in climate change research from an emphasis on the scientific test of the role of human activity, already consolidated into strong evidence, to a focus on solutions to prepare society to adapt and mitigate the consequences of a warming...
<table>
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Innovative Impact Metrics

MT-MMP as Regulators of Vessel Stability Associated with Angiogenesis

Since beginning
9,035 views and downloads, 7,836 views, 1,199 downloads

Top countries
- United States: 2,025
- China: 1,322
- India: 907

Top referring sites
- www.sciencedirect.com: 637

People also looked at
Hierarchical traits distances explain quantized Ebola spike spikes.
Flaw #1 Paywalls
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Empower communities: take responsibility for publishing, peer review and evaluation.

Everybody should understand cutting-edge research.

Everybody should have easy access to research knowledge.
Empower communities: take responsibility for publishing, peer review, and evaluation.

Everybody should understand cutting-edge research.

Jennifer Doudna

Emmanuelle Charpentier
The people behind the work

Jan Baptist Vermorken
University of Antwerp
Antwerp, Belgium

Overview Bio 10 Network 73 Publications 2 Editorial Contributions Impact

893 Total Views 172 Profile Views 73 Total Publications 721 Publication Views 147 Publications Downloads

Editorial Roles
Specialty Chief Editor for Head and Neck Cancer
Frontiers in Oncology

Brief Bio
Functions related to the 6 Co-Authors
Pol M Specenier
Popularizing content

Your next nurse could be a robot
The nursing assistant for your next trip to the hospital might be a robot. This is the implication of research recently published by Dr. Elena De Momi and colleagues in the open access journal Frontiers in Robotics and AI (Artificial Intelligence). [...] 

Life Sciences

Designing buildings to be safer and more sustainable - Science Hero
from Frontiers

Izuru Takewaki, Kyoto University, Japan
Field Chief Editor, Built Environment

Researching one of the most disruptive volcanoes to predict future eruptions
December 1, 2016

Researchers turn to specific volcanoes such as Etna in Sicily to gain insight into volcanic and non-volcanic activities of the Earth. By Fiona Boni, Science Writer A professor at the University of Roma Tre, Valerio Acocella focuses his research on understanding what triggers eruptions and what causes the propagation of the magma to the earth’s [...] 

frontiers
Our mission is to team with kids to bring science to the world

Our Mission

Our Network of Excellence

Validated articles on current research
Facing today’s challenges – how to achieve quality at scale
Scientific output is growing exponentially

- **Researchers**
  - 2014: 7M
  - 2021: 9M

- **R&D Budget**
  - 2014: $1.9 trillion
  - 2021: $3 trillion

- **Research Data**
  - 2014: 7 Exabytes
  - 2021: 50 Exabytes

- **Research Articles**
  - 2014: 2M
  - 2021: 2.8M
Allow more airplanes in the same airspace while reducing risks and delays.

> Quality can’t be compromised
Air Traffic - Solution

- **Decisions** are made by **people**, supported by IT systems
- **Quality** is ensured by standards, procedures and transparency
- **Delays and risks** are reduced by standards, assistance and prediction
How?

Foundation
- Visibility
- Control

Scale
- Standards
- Assistance
- Prediction
Digital Editorial Office

30 Tasks require your attention
- 20 Invite an Associate Editor
- 3 Invite additional Reviewers
- 3 Remind Associate Editor to take decision
- 2 Take a final decision
- 1 Remind Reviewer to submit report
- 1 Remind Associate Editor to activate forum

290 Manuscripts in review
- Submitted: 131
- In Independent Review: 80
- In Interactive Review: 149
- Review Finalized: 11
- Final Validation: 4

MANUSCRIPTS

SUBMISSIONS
471 last 6 months
- 8% compared to previous year

RESEARCH TOPICS
12 posted last 6 months
- 50% compared to previous year
Artificial Intelligence

Use for
- Editor & Reviewer Suggestion
- Paper
- Reading List
- Publication Suggestion
- Journal Advisor

Consolidate by
- Paper
- Authors Editors Reviewers
- Research Topic
- Journal
- Organisation

Extract
- keywords
- vector space model
- semantic vectors
- semantic topics
- concepts
- social graph
- impact vector
- citation graph

Text & Data Mine with artificial Intelligence trained models & machine learning algorithms

Papers

Authors
Editors
Reviewers

Extract

Consolidate by

Use for

Artificial Intelligence
Editorial board – international and top institutions

**International Distribution of Frontiers’ Editors**

- **41%** North America
- **40%** Europe
- **10%** Asia
- **3%** South America
- **2%** Middle East
- **2%** Oceania

**Editor’s Affiliations: Top 20**

1. National Institutes of Health
2. Harvard University
3. The Max Planck Society
4. University College London
5. Stanford University
6. University of Michigan
7. University of California, Los Angeles
8. Consiglio Nazionale delle Ricerche
9. University of California, Davis
10. University of Oxford
11. University of Florida
12. INSERM
13. King’s College London
14. University of Minnesota
15. Yale University
16. University of Southern California
17. University of Cambridge
18. University of California, San Diego
19. McGill University
20. University of Pennsylvania
Transparency of who is involved

Mission Statement
Frontiers in Psychology is an open access journal that aims at publishing the best research across the entire field of psychology. The journal welcomes contributions in any domain of psychological science.

Research Topics

Multisensory Human-Food Interaction
Topic Editors
Anton Nijholt, Carlos Velasco, Kasun Karunawardena and Oisín Hultman
Relative Age Effects in Mathematics and Reading: Investigating the Generalizability across Students, Time and Classes

Katharina Thoren1, Elissa Heinig1, and Martin Brunner1,3

1Division of Evaluation and Quality Management in Education, Department of Education and Psychology, Free University Berlin, Berlin, Germany
2Division of Early Childhood Education, Department of Education and Psychology, Free University Berlin, Berlin, Germany
3Berlin Brandenburg Institute for School Quality Improvement, Berlin, Germany

A child’s age in comparison to the age of her or his classmates (relative age) has been found to be an influential factor on academic achievement, particularly but not exclusively at the beginning of formal schooling. However, few studies have focused on the generalizability of relative age effects. To close this gap, the present study analyzes the generalizability across students with and
Quality checks

Author Contributions

NS designed research and performed data analysis. NS, GA, YP, WK, PD, HM, IA, AL, LK, and FP equally wrote the article.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.
“Science is all about knowing more… If you know more, you have more solutions, more possibilities.”
“The more people who have access to reliable knowledge… and can access it easily the more quickly we can understand how to do business… the business of living on earth to a sustainable path.”
“Quick advancements in research and in knowledge this is the only way we can overcome all our problems we have because time is a very important factor.”
Britain has had enough of experts, says Gove
Brexit campaigner offers to have disputed EU contribution figure audited

TRUMP AND THE TRUTH: CLIMATE-CHANGE DENIAL
By Carolyn Kormann, October 13, 2016

This essay is part of a series The New Yorker will be running through the election titled “Trump and the Truth.”

Over the past four years, Donald Trump has, at different times, declared global warming a “canard,” “nonexistent,” a “make-believe problem,” a “big scam,” and “a very, very expensive form of tax.” During the first Presidential debate, late last
Thank you
Frontiers has competitive Article Processing Charges

Publication fees paid in the UK to the top 10 publishers (by volume). Data from “Monitoring the transition to open access” (Figure 14, adapted) for the Universities UK Coordination Group.

http://eprints.whiterose.ac.uk/90213/1/Report-FINAL-AS-PUBLISHED%2020150918.pdf