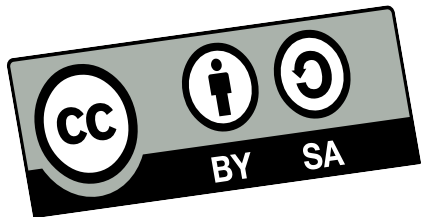


Publishing reproducible research

Fundamentals of reproducible research and free software

Miguel Colom

<http://mcolom.info>



école —————
normale —————
supérieure —————
paris — saclay —————

université
PARIS-SACLAY

Meet John Doe *the researcher*



- He **works** in his lab. He **sleeps** in his lab. He actually **lives** in his lab.
- He obtains **great results!**
- He likes to **work alone**
- He doesn't need to be **aware** of the **research** of others
- He **doesn't care** about **communicating** his findings

Meet John Doe *the researcher*



- Questions:
 - Is John Doe a **good researcher**?
 - Is John Doe making **good science**?

Scientific method

- **Science:** build and organize **knowledge** about **refutable facts**. Make **predictions**
- **Scientific method** (Aristotle, 384-322 BCE):
 - Observation/question
 - Hypothesis
 - Experiments. Obtaining data.
 - Analyzing data
 - Report conclusions
 - Support a reasoned claim which support the observations or answers the question



Scientific method

- **It requires:**
 - **Falsifiability** → Peers need to have access → **Communication**
 - **Repeatability**
 - **Reproducibility**

Meet John Doe *the researcher*



- John Doe doesn't share his knowledge. Nobody can refute his ideas.
- John Doe does research and has valuable results.
- **John Doe is not a good scientific researcher.**

Scientific publications

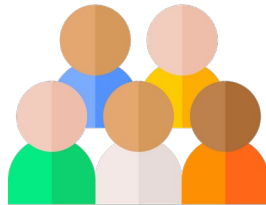


- The **best explanation** is accepted until other scientists find examples which **refuse** the current explanation
- Researchers need to be **aware** of the finding of **others**, to make science itself **advance**
- Typically, the findings are **communicated** as **scientific publications**
- It is important that the the scientific method is **performed without flaws** in order to have **reliable results** and **valid conclusions**
- Ensuring that the scientific works are **reproducible** is required.



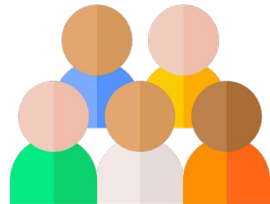
Scientific publication process. Authors, reviewers, editors.

1. The research produces **findings** which are worth **communicating**
2. The researchers write an **article** and **submit** it to a **peer-reviewed journal**
3. An editor of the journal studies the article and decides if it's a **good fit** for the journal (topic) and of enough **quality**. If not, it's **rejected**.
4. The editor assign anonymous **reviewers, experts** in the field
5. The reviewers will deliver a **recommendation**. Typically: **reject, minor or major revisions** needed, **accept**
6. In case **revisions needed**, the authors are requested to **improve** the article (*second round*). The reviewers emit a **second recommendation**.



Scientific publication process. Authors, reviewers, editors.

7. The **editor decides** according to the recommendation of the reviewers
8. The **editor in chief** of the journal makes a **final decision** (typically, they follow the decision of the editor)
9. The article is sent to **copyediting** to ensure it follows the **format of the journal**
10. The authors pay any **Article Processing Charges (APC)**, depending on the publication model, and the article is published. Nowadays, typically it appears on the website of the journal as a PDF.



Example of APC (MDPI publisher)

- From <https://www.mdpi.com/apc>:

MDPI publishes all its journals in full **open access**, meaning unlimited use and reuse of articles, in addition to giving credit to the authors. All of our articles are published under a Creative Commons (CC BY) license.

Authors pay a one-time Article Processing Charge (APC) to cover the costs of peer review administration and management, professional production of articles in PDF and other formats, and dissemination of published papers in various venues, in addition to other publishing functions. Please note that the option to process an advance payment remains but does not guarantee acceptance of manuscripts. There are no charges for rejected articles, no submission charges, and no surcharges based on the length of an article, figures or supplementary data. Some items (Editorials, Corrections, Addendums, Retractions, Comments, etc.) are published free of charge.

Example of APC (MDPI publisher)

- From <https://www.mdpi.com/apc>:

Service functions	% of total		Amount (Swiss Francs, CHF)	
	2000 CHF	1000 CHF	2000 CHF	1000 CHF
1. Publishing Operations & Projects	17%	34%	336	336
2. Journal publication	40%	79%	790	790
3. Editorial Fees	1%	2%	22	22
4. Marketing and Communication	4%	4%	80	40
5. General	6%	12%	118	118
6. Discounts & waivers	19%	19%	370	185
7. Surplus	13%	-50%	284	-491
Total publication fee per article (CHF)			2000	1000

(2000 CHF = 2.016,42 €)

Publication modalities

- **Traditional model:** the journal gets revenues from **subscription fees** from readers
- **Free access** ("bronze model"): content is **free to the reader**. **Restrictions on reproduction, selling, or modification.**
- **Open access:** content is **free to the reader**. The **author is granted some rights**, typically on a **Creative Commons** or similar license. **APC** are assumed **by authors**.

Open access modalities

- Gold
- Green
- Hybrid
- Bronze
- Platinum

→ Diamond type



www.THECOLOR.COM

Open access gold

- **Free to read**
- **Authors pay APC**

Example: MDPI's Remote Sensing,
<https://www.mdpi.com/journal/remotesensing>



Open access green

- *"Self archiving"*. Pre-prints
- **Authors don't pay** any fees
- Typically, the **publisher** imposes an **embargo** from 6 to 24 months
 - Only readers who have **paid** will get access to the article. **Not available** otherwise



Example: PubMed Central, <https://www.ncbi.nlm.nih.gov/pmc/>



Open access hybrid

- Only **some** articles are **open access**
- **Subscription** model. **Pay** to publish.

Example: The Florida Entomologist, <https://journals.flvc.org/flaent>

Open access bronze

- **Free** for the **readers** on the **publisher's website**
- **Copyright** controlled by the **publisher**

Example: Palaeohistoria journal, <https://ugp.rug.nl/Palaeohistoria>



Open access platinum

- **Free** for the **authors**
- **Free** for the **readers**

Example: Journal of the Electrochemical Society,
<https://iopscience.iop.org/journal/1945-7111>



Open access modalities

Take into account: copyright retained for the authors, embargos, payment by the authors (APC) and readers (subscription), peer reviewed.

Diamond:

- **Authors retain the copyright**
- **Peer-reviewed**
- **Free for readers**
- **Free for authors**

Example of a diamond journal: IPOL

<https://www.ipol.im>

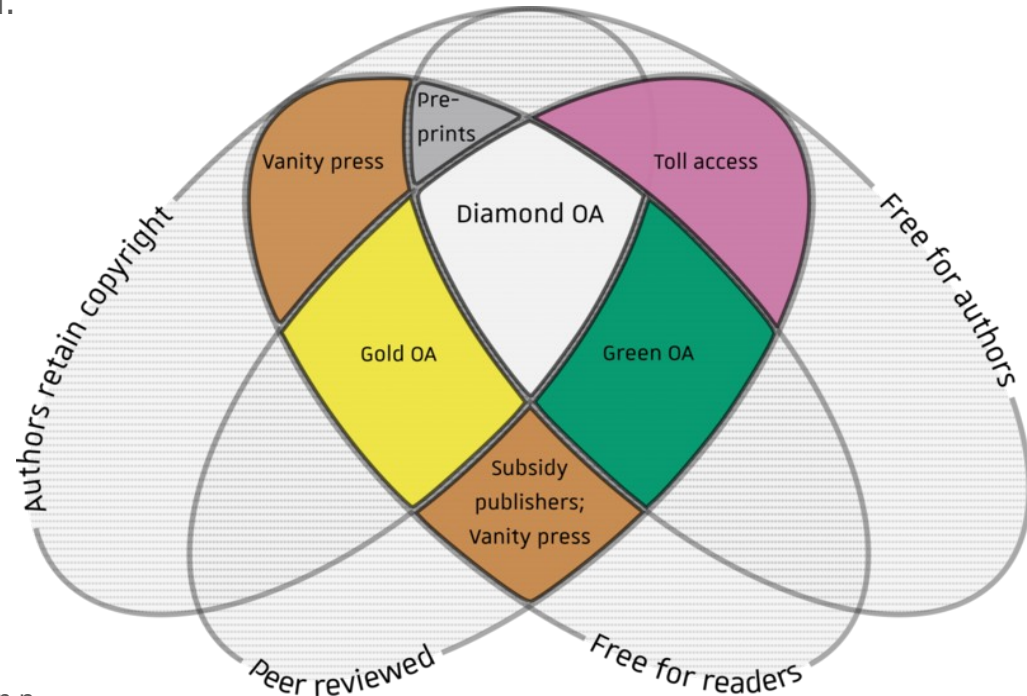


Image from
https://en.wikipedia.org/wiki/File:Open_Access_colours_Venn.png

Open access modalities: statistics

Statistics from <https://www.nature.com/nature-index/news-blog/bronze-open-access-supersedes-green-and-gold>

Open access rates reach 60% among a sample of articles that researchers sought out via Unpaywall. The share of accessible articles is higher among these searched articles, compared to those archived in CrossRef.

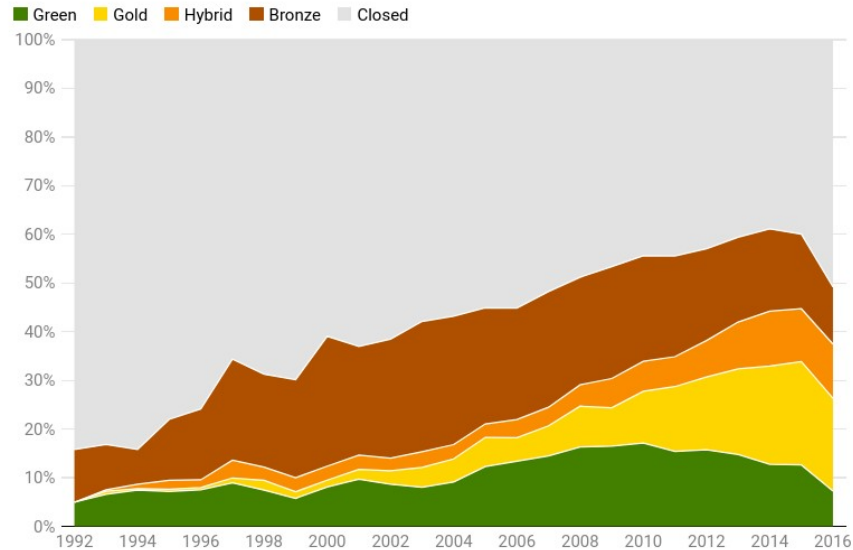


Chart: Jon Brock • Source: [Piwowar et al 2018, PeerJ](#) • [Get the data](#) • Created with [Datawrapper](#)

Open access modalities: some references

- Directory of Open-Access journals (DOAJ):
https://en.wikipedia.org/wiki/List_of_open-access_journals



- *Publication of a study on “Diamond” Journals*
<https://www.ouvri.lascience.fr/publication-of-a-study-on-diamond-journals/>

Warning: predatory journals!

- Exploit the fact that traditionally **researchers** are **scored** according to the number of (high impact factor) **publications**
- Very **large APC**, typically to publish or presenting
- **Lack** of proper **peer-review**
- **Lack** of a specialized **editorial board**
- **Aggressive** email spam techniques
- **Unethical**
- **Fraud**



Warning: predatory journals!

Asunto: Expecting a response

De: "Trends in
ai.org>

Fecha: 13/10/21 17:02

Para:

Dear Professor,

Hope you are doing good!

We are very pleased to inform that Our
ISSN has almost completed 4 volumes with novel articles.

Now, with the same spirit we are planning for prestigious launch of next issue with your eminent contributions.

Receiving your eminent work is the virtuous symbol of our success. So, we are expecting this from your end.

Hope you will be backbone to this successful issue.

Note: On occasion of open access week, we are providing 30% waiver for every article received on or before 22nd October.

This work is under the Attribution-ShareAlike 4.0 International (CC BY-SA 4.0) license.

For more details: <https://creativecommons.org/licenses/by-sa/4.0/>

The images used in these slides are under the *Fair Use* provision, given that they're used only for this particular scholarly purpose.

Please contact me if any of the images should be removed.

