open access TO open science

j. k. vijayakumar Ph.D
today Open Access Open Science role of libraries discussion
Open Access

“Open access (OA) can be defined as the practice of providing on-line access to scientific information that is free of charge to the user and that is re-usable. In the context of R&D, open access to 'scientific information' refers to two main categories:

• **Peer-reviewed scientific publications** (primarily research articles published in academic journals)

• **Scientific research data**: data underlying publications and/or other data (such as curated but unpublished datasets or raw data)”

[European Commission Website]
Open Access

• Most publishers own the rights to the articles—not the authors.
• Anyone who wants to read the articles pays a fee to access them.
• No part of the article can be reused by researchers, students, or taxpayers without permission from the publisher, often at the cost of an additional fee.
• Through OA, providing immediate and unrestricted access to the latest research, we can accelerate discovery and create a more equitable system of knowledge that is open to all.

© PLOS why open access matters
Impacts of Open Access

- More exposure for your work
- Practitioners can apply your findings
- Higher citation rates
- The public can access your findings
- Your research can influence policy
- Compliance with grant rules
- Taxpayers get value for money

**Versions**

1. Submitted version
   - Author's original
   - Pre-print
2. Peer review
3. Edit
4. Accepted by publisher
5. Copy-editing and typesetting
6. Published version
   - Version of record

**Embargo archive** (e.g., repository)
**Self-archive** (e.g., pre-print server)

**Pay to publish** (APC)
Open Access Article share

Table 10: Open access article shares reported by selected studies (see text for details and qualifications)

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<tbody>
<tr>
<td></td>
<td>Scopus</td>
<td>DOAJ, ROAD, CrossRef, PubMed Central, OpenAIRE</td>
<td>Web of Science + Unpaywall</td>
<td>Scopus Google + Web of Science Unpaywall + Web of Science 1Finder</td>
<td>Web of Science + Google Scholar</td>
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<tbody>
<tr>
<td>Gold (total)</td>
<td>14.4%</td>
<td>-</td>
<td>19%</td>
<td>16.7%</td>
<td>23%</td>
<td>11.6%</td>
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<tr>
<td>Gold OA</td>
<td>14.4%</td>
<td>-</td>
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<td>11.2%</td>
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<td>-</td>
<td>4%</td>
<td>5.5%</td>
<td>-</td>
<td>1.5%</td>
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<tr>
<td>Delayed OA</td>
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<td>-</td>
<td>3%</td>
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<tr>
<td>Bronze OA</td>
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<td>-</td>
<td>10.8%</td>
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<td>12.6%</td>
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<tr>
<td>Green OA</td>
<td>13.9%</td>
<td>-</td>
<td>-</td>
<td>10.4%</td>
<td>31%</td>
<td>10.5%</td>
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<tr>
<td>‘Other’ OA (total)</td>
<td>-</td>
<td>-</td>
<td>11%</td>
<td>-</td>
<td>-</td>
<td>20%</td>
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<tr>
<td>All OA</td>
<td>28.3%</td>
<td>29%</td>
<td>33%</td>
<td>37.8%</td>
<td>55%</td>
<td>55.8%</td>
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</table>

Lack of significant progress in the OA movement

Open Access is (exceptionally) strong as a principle
- cf. the many resolutions, policies, guidelines etc.

...but still fairly weak as a practice
- very low deposit rate in IRs
- 85% of research is still behind paywalls
- subscription system as prosperous as ever

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Transformative Models (recent OA trend)

- **MEMBERSHIP AGREEMENTS**
  - authors from the member institution(s) receive discounted open access charges.

- **DEPOSIT ACCOUNTS/PREPAID ACCOUNTS**
  - prepay or deposit an agreed upon amount to the publisher to cover all anticipated APCs for a given time period, usually a year

- **READ AND PUBLISH and PUBLISH AND READ**
  - pay an agreed upon amount for “read” access to subscription-based journals (the subscription fee portion of the agreement) and receive “publish” benefits which means all eligible and accepted manuscripts from the respective institution’s researchers are published open access immediately

- **Subscribe to Open S2O**
  - Existing subscription investment will convert valuable journals to OA, with no extra funds needed. if all subscribing libraries participate, publishes can make all previous volumes of the Subscribe to Open journals freely available (Annual Reviews).

- **SCOAP³**
  - Partnership of over three thousand libraries, key funding agencies and research centers in 44 countries and 3 intergovernmental organisations. Working with leading publishers, SCOAP³ has converted key journals in the field of High-Energy Physics to Open Access at no cost for authors
# Combination of 3 routes to reach 100% Open Access

<table>
<thead>
<tr>
<th>What</th>
<th>Route 1</th>
<th>Route 2</th>
<th>Route 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What</strong></td>
<td>Open Access publishing venues (Gold journals or platforms) Immediate Open Access</td>
<td>University repository route Delayed (up to 24 months) Open Access</td>
<td>Transition from subscription to publishing model (Hybrid journals) Immediate Open Access</td>
</tr>
<tr>
<td><strong>How</strong></td>
<td>Institutional Membership/OA Agreement. CC By License</td>
<td>Authors deposit Author’s Accepted Manuscript (AAM) openly available in a repository. Copy right and reuse restrictions</td>
<td>Change from Subscription agreement to Read and Publish OR offset agreements with selected Publishers. CC By License</td>
</tr>
<tr>
<td><strong>What Libraries can do</strong></td>
<td>APCs can be negotiated down. Centralized invoice management etc.</td>
<td>Establish Open Access policy and repository. Integrate with other platforms, add value.</td>
<td>Negotiate transformative agreements, avoid double dipping.</td>
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Preprint Servers

Growing Number of Preprint Platforms

<table>
<thead>
<tr>
<th>Year range</th>
<th>Number of platforms started</th>
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<tbody>
<tr>
<td>1990 - 1995</td>
<td>5</td>
</tr>
<tr>
<td>1996 - 2000</td>
<td>10</td>
</tr>
<tr>
<td>2001 - 2005</td>
<td>15</td>
</tr>
<tr>
<td>2006 - 2010</td>
<td>20</td>
</tr>
<tr>
<td>2011 - 2015</td>
<td>25</td>
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<tr>
<td>2016 - to date</td>
<td>30</td>
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Posting to arXiv Increasingly Common in More Fields

arXiv submission rate statistics


Emergence of bioRxiv as Main Site for Life Sciences Preprints

Information revolution

Scientists are sharing more information using preprints than they did during any previous outbreak. The number of published papers is exploding as well.

Open Science represents a **new approach to the scientific process** based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools

- Digitisation in Science & Research
- (almost) all actions along the research life cycle create data points
- value creation chain becomes visible (and therefore also threats / barriers to it)

[European Commission, 2016b:33]
Scholarly Record

Scholarly record: Content & perspective

Faculty: what establishes credentials

Researchers: what is necessary to validate & build on current literature

Publishers: what is “published”

Library: what is selected and preserved

Libraries services always connected to the collections: (scholarly records/published literature)
Evolving Scholarly Record

Open Research

Research Literature
- Increasing Volume of Content
- Increasing Diversity and Complexity of Content
- Increasing Distribution of Custodial Responsibility
- Broader Awareness of System-wide Context
- Many more

"The content of the scholarly record" by OCLC Research, from The Evolving Scholarly Record (doi:10.25333/C3763V), CC BY 4.0
**Open Science in Research Cycle**

- **Hypothesis**
  - Consider financiers' requirements
  - Clarify usage rights
  - Ensure that you give credit through citations

- **Data collection**
  - Make use of open-source software and open interfaces

- **Processing**
  - Make use of service infrastructure
  - Attach a persistent identifier to your results
  - Attach descriptive metadata to your results
  - Publish metadata with an open licence

- **Publication and distribution**
  - Use services that safeguard the preservation and integrity of materials
  - Produce standard metadata

- **Long-term preservation**
  - Publish metadata with an open licence

- **Reuse**
  - Clear citations
  - Ensure the accumulation of credits
  - Publish metadata with an open licence
  - Use open evaluation
  - Ensure links between publications, data and methods
  - Make use of institutional repositories

*Figure 1. Promoting openness at different stages of the research process (Open Science and Research Initiative, 2014)*
Library Support in Research Cycle

Preparation
- Access to Resources
- Literature Search Skills
- Reference Management
- Embedded Librarians

Gathering
- Funding Proposals
- Citation Profiling
- Research Data Management plans

Research
- IPR & Copyright advices
- Research Data Management tools
- Open Science framework
- Data Analysis & Visualization
- Digital Scholarship Centers

Measuring

Preservation
- Archiving & Preservation
- Institutional Repository
- Open Knowledge
- Registration of records

Publishing
- Research Writing
- Open Access Publishing
- Research Data Publishing
- Scholarly Communication
Research Lifecycle through "Open Science by Default" Workflow

Grigorov et al. (2016)
Components of Open Science

FOSTER Open Science Training Courses
https://www.fosteropenscience.eu/toolkit

FOSTER Handbook
Open Data: research data Management

Research data management (RDM) is assuming an increasingly prominent place in scholarly communication, funder requirements, codes of academic practice, university research strategy, and even national policy.

© OCLC RDM report

• Raw/initially processed data produced at a research facility such as an observatory
• ‘Research ready’ processed data which has been fully calibrated, combined and cleaned/annotated
• Published output dataset – following detailed analysis of research ready datasets
• Published catalogue type representation of published output dataset
Open research software, or open-source research software, refers to the use and development of software for analysis, simulation, visualization, etc. where the full source code is available. In addition, according to the Open Source Definition, open-source software must be distributed in source and/or compiled form (with the source code available in the latter case), and must be shared under a license that allows modification, derivation, and redistribution.

© The Open Science Training Handbook
Open Peer Review OPR

Open peer review is an umbrella term for a number of overlapping ways that peer review models can be adapted in line with the aims of Open Science.

- Open identities
- Open reports
- Open participation
- Open interaction
- Open pre-review manuscripts
- Open final-version commenting
- Open platforms

+ Transparency
+ Speed
+ Reliability
+ Consistency
+ Context
+ Motivation

Publishers provide peer-reviewers training
Peer review part of research profiles
Include in our awareness sessions
Preprint servers: example
Open Peer Review Example
Open Notebook Science

Open-notebook science is the practice of making the entire primary record of a research project publicly available online as it is recorded. This involves placing the personal, or laboratory, notebook of the researcher online along with all raw and processed data, and any associated material, as this material is generated.

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https://doi.org/10.1371/journal.pbio.3000120
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000120
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https://guides.lib.vt.edu/oer/opentextbooks

https://guides.library.illinois.edu/oer
"Academic social media" sites are targeted toward researchers and academics, but the same cautions exist here as on Twitter, Facebook, and other more social sites. Be aware of your audience, privacy settings, and your digital reach.
Citizen Science: Special collections

10 YEARS OF KAUST BIRDS

These two learning events are designed to bring together existing Wikipedia/Wikidata users and contributors within the KAUST community with those interested in exploring these tools, with the intention of participating in the improvement of these essential, global resources.
Increase visibility and impact of research activity
And their role is that of **enablers**: “Libraries have adapted their role and are now active in the preservation, curation, publication and dissemination of digital scientific materials, in the form of publications, data and other research-related content. Libraries and repositories constitute the physical infrastructure that allows scientists to share use and reuse the outcome of their work, and they have been essential in the creation of the Open Science movement” © OECD, 2015.

- **Advocating and raising awareness**: promotion of the benefits of Open Science should take place in parallel with the development of tools and services, the incentives and recognition mechanisms that support excellence in Open Science. Libraries can advocate within institutions to develop open access policies and roadmaps. This will benefit not only researchers, but also other stakeholders at institutional level and international level, and even the whole society, promoting Open Science and engaging with citizens.
- **Giving support to the infrastructures** to share articles or data, including repositories; keeping with their involvement and responsibilities in the development and governance of repositories of publications and data, in regards to appraisal, selection, description and metadata application, curation and preservation; information retrieval; monitoring data reuse, citation and impact, etc.
- Contributing to the development of **research data management (RDM)** policies and strategies at their home institutions and carrying RDM themselves;
- **Training and supporting researchers** to open their research workflows, sharing and reusing the research outputs produced by others. Besides the necessary research infrastructure, researchers need support at a practical level throughout the whole research cycle. Librarians can offer guidance, training and services in: the provision of information during the exploratory stage of research; funding opportunities and requirements; bibliography and data management; applying metadata; identification of open research methods and tools for analysis; outputs sharing and publication; data citation, licensing and other intellectual property issues; preparing data for deposit and long-term preservation of data, among others. For these purposes, librarians need to know their community research practices in regards to information use, production, and sharing, and the platforms, tools and services that they use.

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One example

No Evidence for Temperature-Dependence of the COVID-19 Epidemic

“the majority of scientists support open science, a minority actually fully participate in it. Although the trends toward open science are increasing, strategies need to be found to stimulate the necessary negotiation within the scientific community and a new willingness to experiment with scientific communication to shape the future criteria of science”
thank you

Open access

Open Science

role of libraries
discussion

@jkvijayakumar