THE FUTURE OF OPEN SCIENCE

HOW WE GET THERE FROM HERE
OSI (the Open Scholarship Initiative) is a diverse, inclusive, global network of high-level experts and stakeholder representatives, working together and in partnership with UNESCO to develop broadly accepted, comprehensive, sustainable solutions to the future of open scholarship that work for everyone everywhere.

- About 450 participants, representing 250 institutions (including SciELO), 27 countries, and 18 stakeholder groups (see chart, left)
Science and society will benefit from open done right. Successful solutions will require broad collaboration. Connected issues need to be addressed. Open isn’t a single outcome, but a spectrum.

The 4 pillars of OSI’s approach.

The future of research.
CONNECTED ISSUES

- Impact factors
- Global equity
- HSS vs STM
- Predatory publishers
- Culture of communication
- Many others (transparency, peer review, repositories, sustainability, more)
THE DARTS OPEN SPECTRUM

INFORMATION EXISTS ALONG A SPECTRUM OF OPEN OUTCOMES, defined by its discoverability (is this information indexed and does it contain adequate identifiers?); accessibility (is this info downloadable, timely and machine-readable?); reusability (what technical and licensing conditions prevent this information from being repurposed at will?); transparency (what do we know about the accuracy and provenance of this information?); and sustainability (is the open solution for this information artifact sustainable?).

Most open knowledge outputs are in this range
Where we’d like to be
OPEN IS GROWING

Archambault, E. 2018. Universalisation of OA scientific dissemination
AND THE OPEN CONVERSATION IS INCREASINGLY FOCUSING ON ALL OPEN APPROACHES, NOT ANY SINGLE APPROACH IN ISOLATION

- OPEN ACCESS +
- OPEN DATA +
- OPEN SOURCE/CODE +
- OPEN GOVERNMENT
- OPEN EDUCATIONAL RESOURCES
- OPEN SOCIETY
IN CONTEXT: WE ARE HERE

• GREAT MANY ENTHUSIASTIC AND COMMITTED ORGANIZATIONS AND PEOPLE WORKING HARD TO CREATE A BETTER FUTURE FOR THE WORLD THROUGH SCIENCE

• ROBUST GLOBAL ENVIRONMENT OF DISCOVERY AND INVENTION

• ENDLESS PROMISE AND NEED FOR SCIENCE SOLUTIONS (ESPECIALLY NOW)

• No global leadership of science (who speaks for science?)

• No long-term improvement in public’s faith in science

• Public misunderstanding of the scientific process

• Active ridicule of science by political leaders

• Difficulty communicating science effectively to the public

• Rampant disinformation

• INCOHERENCE IN THE OPEN REFORM SPACE
### HOW CAN WE DO BETTER?

<table>
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<tr>
<th>Improve</th>
<th>Science communication and education</th>
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<tr>
<td>Improve</td>
<td>Science “awareness” among opinion leaders</td>
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<td>Improve</td>
<td>Research reliability and replicability</td>
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<td>Improve</td>
<td>Gatekeeping and peer review (especially preprints)</td>
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<td>Improve</td>
<td>Evaluation and metrics methods</td>
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<td>Improve</td>
<td>Access and equity</td>
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<td>Improve</td>
<td>Culture of communication in academia</td>
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<td>IMPROVE</td>
<td>All open solutions (open access, open data, open source, open government, OER) and coordination</td>
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BUT OPEN SOLUTIONS ONLY PARTLY ADDRESS SOME OF THESE CHALLENGES

Integrity
Reliability
Peer review
Funding
Policy
Equity
Predatory
Access
Tenure evaluation
Impact factors
Embargoes
OPEN SOLUTIONS
PLUS THESE OPEN SOLUTIONS ARE DIVERSE COMBINATIONS OF INPUTS

- **DIFFERENT APPROACHES EVOLVING FOR MANY YEARS**, such as open data, open source, OER, open government, open society, etc.
- **MANY DIFFERENT STAKEHOLDER GROUPS** (universities, libraries, publishers, funders, etc.)
- **MANY DIFFERENT AGENCIES AND FOCUS POINTS** (repositories, peer review, editing, etc.)
- **WIDE VARIETY OF PERSPECTIVES** by field, career stage, institution and region
- **WIDE VARIETY OF IDEAS** about which approach is best
- **NO UNIVERSALLY ACCEPTED DEFINITIONS** of “open” (broad, narrow, practical, catchphrase)
- **MANY DIFFERENT MOTIVES** (replication, collaboration, social justice, transparency, access)
- **MANY DIFFERENT MANIFESTOS** (FAIR, Leiden, DORA, BOAI, etc.)
- **MANY DIFFERENT SOLUTIONS** (Plan S for most of EU, public access for US, SciELO for South America, AmeliICA for LatAm, nationwide subscription for India)
- **NO COORDINATION** between open efforts (except at the margins between like-minded groups); no common long-term goals.
Open Science Diversity

Open Science Taxonomy

- Open Access
  - Open Access Definition
  - Open Access Initiatives
  - Open Access Use and Reuse
  - Open Big Data
  - Open Data Definition
  - Open Data Journals
  - Open Data Standards
  - Open Data Use and Reuse
  - Open Government Data
  - Definition of Open Reproducible Research
  - Reproducibility Studies
  - Open Lab/Notebooks
  - Open Science Workflows
  - Open Source in Open Science

- Open Data
  - Open Metrics and Impact
  - Reproducibility Guidelines
  - Reproducibility Testing
  - Open Peer Review

- Open Reproducible Research
  - Open Science Guidelines
  - Organisational mandates
  - Subject policies

- Open Science Project
  - Open Repositories
  - Open Services
  - Open Workflow Tools

- Open Science Policy
  - Altmetrics
  - Bibliometrics
  - Semantometrics
  - Webometrics
  - Funders policies
  - Governmental policies
  - Institutional policies
  - Open Access policies
  - Open Data Policies
THIS IS WHY IT’S VITAL TO UNDERSTAND ALL THE PERSPECTIVES RELATED TO OPEN. IMPROVING RESEARCH REQUIRES LOOKING AT THE WHOLE PUZZLE, NOT JUST PART

OPEN IS ONLY A MEANS TO AN END, NOT OUR END GOAL. Our common end goal is to improve not only science but all kinds of research; not only for the world’s most privileged researchers but for all researchers everywhere; not only to help western nations but all nations of the world. If we work on this challenge together and with truly open hearts and minds---and we must work together to reach workable solutions---then and only then can we unlock the vast potential of open to improve science and society.
AND WHAT ABOUT RESEARCHER VOICES?

• **RESEARCHERS HAVEN’T BEEN HEARD** (in any large-scale meaningful sense). All efforts have found researcher engagement difficult---they are a busy group, focused (rightly) on their research.

• **PROXIES ARE NOT REPRESENTATIVE**. Individual researchers and research groups active in open debates are not representative of the whole---each has different needs and perspectives.

• **SCHOLARLY SOCIETIES ARE FRUSTRATED**. In general, scholarly societies are opposed to wholesale bans on subscription and hybrid publishing because their revenue streams depend on these.

• **NO ONE-SIZE-FITS ALL SOLUTIONS**. For some fields, open is easy. For others, it’s massively complex. Some groups have developed their own “open” sharing protocols and platforms that don’t “count” in the open debate because material isn’t open enough.

• **RESEARCHERS WANT MORE IMPACT AND VISIBILITY** for their work.

• **RESEARCHERS REMAIN CONCERNED** about misuse and usurpation (an age-old concern in science).
RESEARCHER CONCERNS

TOP 3 CONCERNS ABOUT DATA SHARING

- Concerns about misuse of data: 31%
- Unsure about copyright and licensing: 25%
- Not receiving appropriate credit or acknowledgment: 37%

TOP 3 CONCERNS ABOUT PUBLISHING

- Good reputation: 60%
- Widely-read: 50%
- High impact factor: 45%


COMMON GROUND?

WHAT KIND OF COMMON GROUND EXISTS for creating global open policies that are workable and sustainable for everyone everywhere? Some of this common ground includes actions like:

• **LEARN** more about the open space and the needs of individual researchers (what works, what doesn’t, and why)

• **BUILD** open infrastructure that works for everyone everywhere

• **TEACH** easy, turnkey approaches to open, not ill-fitting one-size-fits-all approaches and motivations

• **SOLVE** critical science problems now using open.
DREAM BIG AND WORK TOGETHER SMARTLY

**PICK THE LOW HANGING FRUIT:** Work together on common ground solutions to the easiest and most pressing issues. Build confidence.

**TACKLE THE TOUGH ISSUES:**
Replace the impact factor, improve promotion & tenure systems, and raise the bar (significantly) for data inclusion and interoperability and repository function.

**IF WE CAN WORK TOGETHER ON OUR COMMON GROUND,** then we can create a pathway for really getting to a brilliant and robust future for open that isn’t driven by ideology, but by addressing real science needs in flexible, resilient and practical ways.

**AND THEN…**
Open science is clearly defined and supported
Open is the standard science output format
Open solutions are robust, inclusive, broad, scalable and sustainable
Almost all science information is discoverable The global access gap is nonexistent
Solutions for the humanities are built-in
Connected issues are resolved
Incentives are aligned so scholars embrace open because they want to
Open is simple and clear so scholars know what it means and why they should do it
Predatory publishing is defeated so it no longer threatens science
Standards and global guidelines are clear for all journals, which helps the marketplace
The marketplace remains competitive so open products remain cutting edge
Repositories are integrated, not just connected
Data standardization is widespread and robust

Many kinds of improvement happen to science, including less bias and better transparency
The research ecosystem grows exponentially more powerful (with more data, more connections, and more apps), which further catalyzes innovation and improvements in science. New fields and directions emerge based on “connecting the dots” (thanks to data and repositories), funding efficiency improves, and discovery accelerates.
The social impacts of science surpass today (including science literacy, public engagement with science, and science input into public policy)
Most science knowledge becomes a global public good, and society reaps the benefits

WE REACH AN OPEN RENAISSANCE
SO, HOW DO WE GET THERE FROM HERE?

1. **STOP INSISTING** on “one true path” to open and instead embrace the diversity of open solutions and approaches.

2. **START INTEGRATING** our different approaches and policies

3. **START WORKING TOGETHER NOW** on big, urgent science needs like climate change
WHAT DOES THIS MEAN FOR EDITORS AND PUBLISHERS?

1. **PUSH BACK** (on funders in particular) on the narrative that open comes in only one flavor. The market needs and has created a wide spectrum of open approaches and outcomes.

2. **FIND YOUR OWN REASONS** for doing open in a way that makes sense for your customers. Fundamentally, find out what they want and need and go from there.

3. **SERVE RESEARCHER NEEDS BY ADDING MORE VALUE TO OPEN.** Help build the next generation of data repositories, pilot data standards efforts, make connections between studies, improve the robustness and speed of peer review, and more.

4. **BUILD ALLIANCES** with researchers and universities who want open options. There is strength in diversity and numbers.
IN SHORT, FLIP THE INCENTIVES

In summary, in the words of the co-inventor of the Internet, Vint Cerf, who keynoted the OSI2017 conference, we need to **FLIP THE INCENTIVES** in the open space and make open something that researchers do because it helps their work, not because they are told to do so. If we can start thinking along these lines, we will be well on our way to building an exciting, robust, durable open space that will be able to deliver on the full promises of open and truly unleash the full potential of science.
THANK YOU

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