# Open Life Science (OLS) response to UNESCO global call for best practices in open science

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## Context

UNESCO is aiming to collect best practices in open science at individual, institutional, national, regional and international levels with a particular focus on the seven priority areas of action highlighted in the Recommendation. The resulting compendium of best practices will be a useful tool to better understand the current landscape of open science, share lessons learned, identify and connect open science actors around the world, and further develop innovative solutions for open science in a collaborative, inclusive and transparent manner.

**Website with more information:**
https://www.unesco.org/en/articles/unesco-launches-global-call-best-practices-open-science

Further to the adoption of the UNESCO Recommendation on Open Science in November 2021, UNESCO launched a Global Call for Best Practices in Open Science.

*The Open Life Science team (email: team@openlifesci.org) led a workshop to facilitate discussion and put together a community solicited recommendations on the 2-3 (out of seven) selected priority areas.*

- Workshop date: 22 June 2022
- *Session facilitators: Malvika Sharan, Emmy Tsang*

# Draft for submission

- **Workshop Contributors:** Emmy Tsang, Yo Yehudi, Patricia Herterich, Mayya Sundukova, Hao Ye, Wai-Yin Kwan, Irene Ramos, Pradeep Eranti, Victoria Dominguez Del Angel
- **Summary of workshop notes:** Gracielle Higino
- **Editor:** Malvika Sharan

## Ensuring ethical considerations and mitigation of biases in research through open science training and mentoring, and participation of research and non-research stakeholders

Open science should promote ethical standards, scientific rigour and quality in research through targeted approaches for training and mentoring. To enable that, organisational processes and workflow should be established that reinforce open science practices in training and education, and periodically revise codes of ethics at various levels of decision-making. It is also important that stakeholders in research beyond STEM, and specifically from arts, humanities and social sciences are involved through opportunities for knowledge exchange, education and interdisciplinary discussions.

This submission has been collaboratively developed by the members of [Open Life Science (OLS)](). The OLS programme for training and mentoring supports people in various research domains as well as from outside research scope in open science and citizen space. OLS promotes computational skills and practices for diverse participation, co-creation and collaboration while maintaining rights to knowledge, such as in the case of marginalised and indigenous communities. Our definition of diversity in international platforms includes creating many types of research outputs, promoting bibliodiversity (cultural diversity applied to publication beyond peer-reviewed papers), representing different languages in which we communicate them and diverse stakeholders who are represented in the decision-making positions. To ensure that open science does not involve unfair or inequitable extraction of data and knowledge, we embed ethical considerations and mitigation of biases in our programme that are essential for promoting context-based practices and reciprocal benefits of open science among all stakeholders of research. The involvement of non-scientists, community practitioners and communicators in public engagement through open collaboration is supported to build public trust in science and research. Peer-led training (with emphasis on fact-checking and evidence-based solutions), and long-term support/rewards for mentorship, are integral to OLS' function.

## Investing in grassroots open science communities for effective capacity building

OLS is an internationally recognised training and mentoring platform to gather structured support in integrating open science practices in research and other projects. However, training and capacity building in open science is being enabled through different approaches as well. Other mission-aligned projects include (but not limited to) The Turing Way (community-led guide to best practices in data science), Code for Science and Society (supports open collaboration in public interest technology), The Carpentries (teaches foundational coding and data science skills), OpenScapes (empowers science teams with open data science tools and grows the community of practice), PREReview (a hub for peer-review community, resources and crowdsourcing for pre-print reviews), Open Hardware Makers (mentorship program for open hardware projects), Talarify (supports digital innovation and impactful capacity and community development interventions), Life Science Trainers (community of practice for short-format training in the life sciences), MetaDocencia (teaches evidence-based and student-centred educational methods to Spanish-speaking teachers), Galaxy (tools, computational environment, data and training platform for **FAIR data analysis**), Jupyter (free software, open standards, and web services for interactive computing) and 2i2c (provides interactive computing for communities in research & education). Collectively, they have made a significant impact on the global research and science communities, especially by ensuring open access to resources and open collaboration through community-led work. Many of these organisations are trying to shift the culture to provide targeted support and economical benefit for engaging with open science. For instance, OLS provides microgrants, honoraria and recompensation for volunteer work to especially ensure the participation of members from underrepresented and marginalised communities who can't afford to offer free labour or engage in a volunteer capacity. Code for Science and Society offers mid-range event funds to support training on data skills, as well as provides fiscal sponsorship to support the financial infrastructure of new organisations. CZI Grants and Essential Open Source Software provides large-scale and long-term grants to communities and research software groups to advance science, education, justice and opportunities through an equitable society (see details). Collectively, these communities have enabled training for thousands of individuals and supported the operational activities of hundreds of grassroots organisations all around the globe. Based on their successful implementation of targeted approaches for capacity building, we recommend that various citizen science, participatory and socially responsible grassroots and large-scale initiatives in open science are given the resources they need to continue providing training and building capacity at various levels. Their trusted position in the community will help build common knowledge, accountability and public trust in science and research-based solutions that embed ethical considerations amplified by open science practices.

## Replicability/scaling up of the best practice:

Open science interventions and methods can be impossible to practise without the infrastructure and resources they require. Lack of funding, technology and professional expertise are often huge barriers to building an accessible, equitable and participatory research environment. Funders, government and decision-making bodies should help scale these efforts through collaboration and promoting open science opportunities by integrating their approaches into the education and training systems at the local, state or national, as well as international levels. Integration of open science in traditional subjects in STEM and humanities, as well as more modern skills (such as data analysis, machine learning, artificial intelligence, ethics and business), will enable the emergence of open practices that can address context-specific problems and challenges. Researchers, educators, and community builders should be supported to work systematically towards social benefit through public engagement and skill-building in open science concepts and practices.

Collaboration beyond the institutional as well as national level should be encouraged and incentivised, or else a culture of working in silos will continue to prevail and prove to be extremely detrimental to the overarching goals of open science. Open practices and research assessment frameworks should be designed by a diverse pool of experts drawn from different geographical, professional and economic backgrounds, who are rewarded for connecting distributed research infrastructures and initiatives in open science.

Through policy interventions, researchers should take the individual as well as organisation-level responsibility to ensure that publicly funded research integrates open principles, embodies ethical considerations and creates open educational resources for the public. In the scientific publication and review processes, guidance should be provided following the written policy for open, ethical and inclusive implementation of the open science framework. Empowering leaders at local levels, as well as supporting their participation at the global levels, will help build a shared understanding of open science and its adoption in different contexts. Funders, institutions and policymakers should consider research assessment processes that incentivise practising open science. Participation of diverse members and the different nature of their contributions to the publication of different research outputs should also be normalised in the open research culture. Some examples include authorship recognition through CRediT taxonomy that moves past the 'first author', HiddenREF framework that celebrates all kinds of contributions and leadership positions for research engineers, data stewards, community managers, librarians and other open science specialists. Individuals, institutions and organisations should work together to create resources where the intellectual property of research output is not transferred to its publishers but belongs to the community and benefits all stakeholders of research.

Without an effective alignment of open science goals both at the individual and systems level, the responsibility for ensuring open and ethical research practices may not be fairly shared among different stakeholders. Failing to build a system that

upholds and rewards the roles related to open science will end up disproportionately affecting the marginalised communities who are generally expected to carry out hidden and unrecognised tasks in research.

## Cost of the best practice

Sustainable investments and support for unfunded research and grassroots communities already leading open science efforts and contributing to capacity building in research is crucial. With an emphasis on developing and teaching standardised curricula, the curation and maintenance of open education resources from existing communities should be funded by institutions.

## Impact

Publicly funded initiatives will help break the cycle where funding, training and advocacy interrelate to building an equitable and beneficial open science culture. In this regard, access to small to large-scale funding will help sustain and positively escalate open science's impact by allowing timely action where needed. Considering the diversity of disciplines as well as career stages that will be impacted by open science, we recommend that a general framework for open science competencies should be developed. However, specific considerations for individual, local and discipline-specific approaches should be integrated to ensure alignment of competencies and meaningful adoption of open frameworks by accounting for different social, geographic, and political contexts of both the private and public sectors. Member States should encourage institutions to recognise and promote adherence to the general open science framework, as well as incentivise open science competencies in terms of career progression. At an individual level, mentoring framework as applied by Open Life Science, allows people to reflect on, critically analyse and contextualise open science practices and tools in their professional careers as well as geographical locations considering the resources available to them. To foster a research culture that values open and reproducible practices in research, we need to create, fund and support dedicated professions filled by specialised roles beyond the general academic track that ensure engagement, skill-building, maintenance and sustainability beyond the project's lifecycle.

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## Submission Detail

1. Title of the best practice: **Ensuring ethical considerations and mitigation of biases in research through open science training and mentoring, and participation of research and non-research stakeholders**

2. Language(s) of the best practice: **English**

3. Scope of the best practice:

- Individual
- Institutional
- National
- Regional
- International
- Other ← Shared through collaborative system

4. Responsible institution:

- Other ← Shared responsibility

5. Area(s) of action covered by the best practice as per the UNESCO Recommendation on Open Science:

**(Multiple choices are possible. to guide your answer, please refer to section IV of the UNESCO Recommendation on Open Science (p. 20) available here)**

- Promoting a common understanding of open science, associated benefits and challenges, as well as diverse paths to open science
- Investing in human resources, training, education, digital literacy and capacity building for open science
- Fostering a culture of open science and aligning incentives for open science

6. Which element (s) of open science does the best practice include:

**Scientific Knowledge** - (multiple choices are possible)

- Open Scientific Knowledge
- Open Educational Resources

**Open Science Infrastructures** - (multiple choices are possible)

- Virtual Open Science Infrastructures

**Open Engagement of Societal Actors** - (multiple choices are possible)

- Scientific Volunteering
- Citizen and Participatory Science

**Open dialogue with other knowledge system** - (multiple choices are possible)

- Marginalized Scholars
- Local Communities

7. Open science actor(s) implementing the best practice:

8. Open science actor(s) benefiting from the best practice:

- Researchers
- Scientists and Scholars
- Leaders at Research Institutions
- Educators
- Academia
- Students and Young Researchers Organizations
- Information Specialists
- Librarians
- Communities
- Indigenous Knowledge Holders
- Civil Society Organizations
- Computer Scientists
- Software Developers
- Coders
- Creatives
- Innovators
- Engineers
- Citizen Scientists
- Publishers
- Editors
- Technical Staff
- Research Funders
- Philanthropists
- Policymakers
- Learned Societies
- Practitioners from Professional Fields
- Representative of the Science, Technology and Innovation-related Private Sector

9. Types of collaboration(s) promoted by the best practice:

- Multidisciplinary
- Multistakeholder
- Inter-institutional
- National
- Regional
- International
- Other ← All

10. Description of the best practice

Submitted a summary of the text above

11. Replicability/scaling up of the best practice: (100 words)

Submitted a summary of the text above

 12. Cost of the best practice: (50 words)

Submitted a summary of the text above

**13. Evaluation/Assessment/Measure of the impact of the best practice:** (200 words)

What is the preliminary impact of this open science best practice? How was the practice evaluated? What indicators were used to evaluate the impact of the practice?

Submitted a summary of the text above

**14. Website/Link to more information about the practice:**

https://openlifesci.org/, Full submission with all contributors: https://zenodo.org/record/6841873 (DOI: 10.5281/zenodo.6841873)

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# Details and notes from the workshop

***Thanks goes to Gracielle Higino for summarising the notes***

*In the workshop, the OLS team focused on best practices in **Investing in human resources, training, education, digital literacy and capacity building for open science** and **Fostering a culture of open science and aligning incentives for open science**. We look forward to listening to your thoughts, questions and ideas in this area. Please see details here:* https://bit.ly/unesco-open-2022-workshop-ols. Other sessions hosted on different priority areas are listed here: https://bit.ly/unesco-open-2022-workshop.

**Code of Conduct that applies to this workshop:** https://openlifesci.org/code-of-conduct - any issues, email team@openlifesci.org which reaches Bérénice Batut, Malvika Sharan, Emmy Tsang, and Yo Yehudi. If you prefer to email an individual, please email yo@openlifesci.org, berenice@openlifesci.org, malvika@openlifesci.org, or emmy@openlifesci.org

👋 **Roll call (contributors + co-authors)**
Name / affiliation below / Social media (*please note that it is a public document. Although we need your contact details, you can send it to Open Life Science by emailing team@openlifesci.org*)

- Yo Yehudi / OLS
- Patricia Herterich / OLS mentor & DCC, University of Edinburgh / @pherterich
- Emmy Tsang / OLS
- Mayya Sundukova / OLS, IGDORE, MCAA / github msundukova
- Hao Ye (he, him) / University of Florida / @Hao_and_Y (twitter)
- Wai-Yin Kwan
- Malvika / OLS
- Irene Ramos / CONABIO / @iramosp (github)
- Pradeep Eranti /  OLS
- Gracielle Higino / UBC / @graciellehigino
- Victoria Dominguez Del Angel / vdda (github)

🎯 Goals

- Open Life Science's submission to UNESCO global call for best practices in Open Science - the key areas of the inquiry we are making a recommendation on:
    - 1. Promoting a common understanding of open science, associated benefits and challenges, as well as diverse paths to open science
    - **4. Investing in human resources, training, education, digital literacy and capacity building for open science**
    - **5. Fostering a culture of open science and aligning incentives for open science**
- Collect evidence of best practices in Open Life Science, or how we address the adoption of open science in our work and across the selected priority areas.
- Read more about the listed action areas: https://unesdoc.unesco.org/ark:/48223/pf0000379949/PDF/379949eng.pdf.multi.page=20

- During the call you can use chat or directly edit this document to share your thoughts, notes and references.
- We will create a final report at the end for circulation to the contributors and final sign off.
- The intention is to publish this report on Zenodo after the submission has been received by the UNESCO team.

## ⏳ Structure of Workshop

*For this workshop, we are using 1-2-4-all format by Liberating Structure, which was successfully applied by Arielle Bennett and Malvika Sharan for the "Turing Response to Reproducibility of Research Government Inquiry" in 2021 (see the report).*

| Time | Activity | Duration |
|------|----------|----------|
| 00:00 | Icebreaker | 10 mins |
| 00:10 | Welcome & Scope | 15 mins |
| 00:25 | Individual reflection | 10 mins |
| 00:35 | Small group feedback | 15 mins |
| 00:50 | Comfort break | 10 mins |
| 00:00 | Larger group discussion | 25 min |
| 00:25 | Whole group discussion | 20 min |
| 00:45 | Wrap up & next steps | 15 mins |
| 00:00 | Close | - |

Introduction and Icebreaker (breakout rooms of 4, 5 mins)

- Who are you? What do you work on?
- What has been your experience with open science?
- What do you consider open science most crucial for?

Scope of this meeting (all together, 15 mins)

- 5 minutes pitch by the facilitators
- 5 minutes on tech & structure of the workshop by the facilitators
- Notetakers: *please add your name if you would like to help take notes*

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# Summary paragraphs

*How can we **enhance diversity** in terms of communities, research outputs, and languages, and practice respectful co-creation and inclusion while maintaining rights to knowledge (such as in the case of indigenous communities)? **How can open science have reciprocal benefits**: not involving unfair and/or inequitable extraction of data and knowledge?*

We believe that it is important to be mindful, at all stages of research, of biases and ethics to enhance diversity and promote reciprocal benefits in open science. Ethical standards should be included in open science training, and the importance of the implementation of methods to develop and periodically revise codes of ethics within and across organizations should be reinforced. To achieve this goal, it is imperative that professionals from the humanities are invited to these discussions.

*What are the ways to ensure that **publicly funded research work integrates** open principles? How can we (researchers, trainers, community builders) contribute to **systematic and continuous capacity building on open science** concepts and practices?*

Member States should encourage transfer of funds - also through public funded research - to unfunded communities to break the cycle where funding, training and advocacy interrelates to build an open science culture. By empowering leaders in their local communities, funding (even when small) can escalate the impact of open science.

*How can open science competencies be aligned with specific disciplines for researchers at different career stages, as well as for actors active in the private and public sectors or in civil society? **Is there a need to develop a framework for each profession, or a better collaborative pathway** (such as applied by OLS) should be used to allow people to contextualise open science practices and tools in their professional careers?*

Considering the diversity of disciplines and career stages impacted by the open science recommendations, we propose that a general framework for open science competencies should be developed, but local and/or discipline-specific communities should be able to adapt it, considering their different social, geographic, and political contexts. Member States should encourage institutions to recognize these competencies in terms of career progression, as it can promote adherence to this framework.

*What approaches can funders, government and decision-making bodies take to **promote open science opportunities** (via research projects, research institutions and civil society initiatives) **by integrating them with digital and data science skills** (such as in higher education and funding calls by promoting data analysis, statistics, machine learning, artificial intelligence, visualization, understanding of writing code and using algorithms with scientific and ethical responsibilities)?*

Funders, government and decision-making bodies should promote open science opportunities by integrating them with digital and data science skills through practical training for researchers and students, designed to discuss and reflect about their problems and needs and how open practices can help solve them. This will help to develop a workforce for research supporting roles and contribute to research's sustainability.

*How can we **support educators and education related bodies to open up their teaching resources** (Open Education Resources) to allow more teachers to reuse them, build better teaching practices through exchange and improve the overall impact of training capacity at regional and national levels?*

Member States should implement policies which encourage gradual adoption of open educational resources. The curation and maintenance of such resources should be funded by institutions, with emphasis on teaching training and the development of a standardized curriculum. These incentives should go to new initiatives, but also to the maintenance and leadership of existing resources (e.g. NASA, Carpentries and CERN)

*What are some ways to **support science communication** accompanying open science practices with a view to the dissemination of scientific knowledge to scholars in other research fields, decision-makers and the public at large? This is to help improve public engagement in science and reduce misinformation.*

Member States should invest in science communication through institutions, encouraging the involvement of non-scientists communicators (artists, journalists, reporters, social media creators) in long term collaborative processes with scientists and researchers. Basic training (with emphasis on fact checking), support and rewards should be offered to scientists who want to engage in SciComm initiatives. Researchers should be recognized by their research outputs in different formats (not only for peer reviewed papers).

*How can different stakeholders in research including funders, research institutions, journal editorial boards, learned societies and publishers **combine efforts to promote open science culture and adopt policies that require and reward/incentivise open science practices?***

In order to implement incentives towards open science practices, Member States should invest in infrastructure first. Some open science practices are not possible without money and other resources, so rewards should consider these barriers too. The assessment of open science practices should be designed by a diverse pool of reviewers, the different geographical/economic levels, and connecting infrastructure and open science culture. Guidance should be provided for reviewers that is consistent with written policy, and they should be able to understand and implement these policies. In the transition phase towards open science culture, researchers should be incentivised to use the flaws of the current system to implement open science practices (e.g. write a statement to say the authors contributed equally to a paper and all of them are considered "first authors"). Finally, institutions and organizations should work towards a publication system where the intellectual property of a research output is not transferred to its publisher.

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# Live notes and contributions from the workshop participants

## 1-2-4-all structure: Instructions

**1: quiet reflection (all together, 10 mins)**

*Please submit written reflections in either via Zoom chat or this Google doc*

Prompts to guide your reflections

- How can we **enhance diversity** in terms of communities, research outputs, and languages, and practise respectful co-creation and inclusion while maintaining rights to knowledge (such as in the case of indigenous communities)? **How can open science have reciprocal benefits**: not involving unfair and/or inequitable extraction of data and knowledge?
- What are the ways to ensure that **publicly funded research work integrates** open principles? How can we (researchers, trainers, community builders) contribute to **systematic and continuous capacity building on open science** concepts and practices?
- How can open science competencies be aligned with specific disciplines for researchers at different career stages, as well as for actors active in the private and public sectors or in civil society? **Is there a need to develop a framework for each profession, or a better collaborative pathway** (such as applied by OLS) should be used to allow people to contextualise open science practices and tools in their professional careers?
- What approaches can funders, government and decision-making bodies take to **promote open science opportunities** (via research projects, research institutions and civil society initiatives) **by integrating them with digital and data science skills** (such as in higher education and funding calls by promoting data analysis, statistics, machine learning, artificial intelligence, visualization, understanding of writing code and using algorithms with scientific and ethical responsibilities)?
- How can we **support educators and education related bodies to open up their teaching resources** (Open Education Resources) to allow more teachers to reuse them, build better teaching practices through exchange and improve the overall impact of training capacity at regional and national levels?
- What are some ways to **support science communication** accompanying open science practices with a view to the dissemination of scientific knowledge to scholars in other research fields, decision-makers and the public at large? This is to help improve public engagement in science and reduce misinformation.
- How can different stakeholders in research including funders, research institutions, journal editorial boards, learned societies and publishers **combine efforts to promote open science culture and adopt policies that require and reward/incentivise open science practices?**

✅ **Notes:** *insights from reflections and discussions*

- Each breakout group will discuss and add notes for prompts they they would like to respond to
- please use the number, such as [1] to indicate the prompt you are responding to
- You can add your name if you like to be identified and specifically attributed for your comments

**Contributes notes**

- [3] Patricia: Frameworks are nice, not sure if one per profession is useful or actually too restrictive; something collaborative and fluent seems to make more sense to me but I also understand that some people might want to get official certification for certain skills as hiring and promotion might still require it
  - +1 Mayya - certification is an interesting point, or even accreditation to promote adherence to the framework.
- [6] Support and reward researchers who want to engage in public engagement instead of discouraging them from doing so. Offer science communication courses in the curriculum.
- [6] Engage non-scientists communicators in long term collaborative processes with scientists and researchers (maybe experienced journalists/reporters/communicators who act as "influencers" and have a direct link to the general public - active on social media for example) (paz).
  - +1 and more funding for it, more recognition to the efforts
- [1] about diversity: have more public discourse about it, wait for change to happen with generation change, bring in more philosophy and social scientists, more interdisciplinarity into the discussions about research, meta-research etc
  - there could be broader understanding and awareness about collections/knowledge (in GLAM: galleries, libraries, archives, museums) not being truly objective or neutral - even for content that is 100% factual (e.g. mathematical proofs), there is human bias involved in selection and communication; for everything else there is much more room for interpretation that affects what is there and how it reflects society - this seems like an important first step towards motivating changes in inclusion in knowledge work
- [5] educate educators in types of licenses and IP, make sure that the correct usage is respected. Recognise the contributions of those active in opening the resources (via what?), request/give (generous) funding (!) to create and maintain the resources and communities around open educational resources. Organise networking events and promote dissemination events, fund short term missions and exchange
  - Patricia +1
- [3] really curious about framework, probably yes, it would be helpful to have them for various career type and stage - but should be contextualised to national context and even regional context +1
  - Malvika +1, Maybe thinking about what a general frame of these framework will look like, what aspects to consider (which can be same for all career but the topic, tools and practices can change)
- [5] Patricia: highlight case studies of people using OER and how they adapt them, highlight ways to find good resources (and have funders pay for the curation of databases in addition to the maintenance of the content highlighted in the point above); examples could be Carpentries and some of the Creative Commons initiatives that I forgot about…+1 +1
  - Malvika +1, showing OER as success stories rather than someone stealing my notes. Putting emphasis on teaching skills, building standardised curriculum - probably easier to do in public schools than private.+1+1
- [1] some sort of code of ethics for research and researchers - there are some parallels to draw from clinical research, for example, but existing informed consent and review isn't always set up when humans are the direct subjects of research practices.

- - Yo - +100. The linux kernel debacle was very important as an example here, where researchers inserted malicious code into a codebase for "research" and it was passed by an IRB who deemed it not to be human research since it wasn't a medical experiment.
  - Mayya +1 should not be these topics in research integrity, research ethics training for scientists (and other stakeholders) and in documents as Charter and Code and others guidelines (maybe it is already there somehow)?
- [2] more dedication to things like POSI - https://openscholarlyinfrastructure.org/ - strong need for sustainable infrastructure that supports research, esp. in publishing
- [4] emphasis on workforce development (i hate that phrase, but it's what some governments like to think about from an economic perspective) for research supporting roles like data, software, communications (rather than expecting research-focused individuals to do all of the tasks) +1
- [5] this is hard, textbooks are such a big business, and such a traditional part of instruction. Maybe there can be an intentionally phased transition to increasing the percentage of materials that are OER? +1
- [6] enforcement of communication principles - stop letting individuals approach research communications like political punditry. better PR and comms teams (or maybe support for those positions at all)
  - support individuals and teams to check claims rigorously - it's really distressing that so much covid policy about masking in schools (in the US) was driven by 1 study that had a number of data and analysis flaws, which other groups have now published, but probably too late to influence things and with much less recognition e.g. https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciac187/6542972
- [7] Yo - One flaw I've seen in scenarios where research is incentivised and assessed - such as funding journals - is that even though the journal/funder may advocate for specific open practices, they aren't then effectively assessed or rewarded, and instead "traditional" metrics may be used instead (such as lead author publications). To combat this, I think it's important to ensure that guidance for reviewers is consistent with written policy, and that reviewers are chosen from pools that understand and implement these policies, rather than merely being selected from so-called "elite" institutions and positions.
- 
- [4] Irene: A common trap is the circular problem that it's difficult to advocate for open science practices if researchers and decision-makers do not have a basic understanding of what it is, but at the same time, it's difficult to provide that basic training without (a lot) of advocacy work. This relates to the prompt in that a somewhat effective strategy for us has been to start with very practical incentives for researchers and students (ie, gain data literacy skills), and we design the training to talk and reflect about their problems and needs and how open practices can help solve them. At the same time, it has been necessary to convince decision-makers that this training ensures that the project is more sustainable in the long term because we are creating the "demand for our services" (maintaining an information system).
  - Yo: I like this! I think it links nicely with my comments on [7] above.
- [6, 2] provide incentives to researchers and students for  working on science communication. There should not be any discouragement for doing #SciComm

because after all we are working on taxpayers money. They should know what is going on by using their money. Science communication should be part of the curriculum or duties of the researcher and include relevant training programs or modules. If it is not part of their agreed curriculum or duties, then it will result in stress (e.g: I am doing something which is not in my expected task list and this will not help me in my work-related expected goals). OLS kind of training program should be part of the doctoral programs and encourage the students to diversify their research outputs: paper, code, presentations (oral and posters).

- [6] Gracielle - It will be quite impossible to invest in science communication without (serious) money and connection to professionals of many different areas; it will be needed to highlight the A in STEAM areas and include artists in this conversation. The Open Update podcast did this this week! [=
  - Yo - +100, so important
- [6] One thing that is really harmful is to ask researchers and students to engage in SciComm. They can end up doing things that don't meet the goal or being super frustrated. SciComm is a collective and primarily institutional effort, and it requires that individuals actually like to do it.
- [7] Structure must come first! Some open science practices are not possible without money and other resources, so we should be mindful of these barriers when implementing rewards.

2: small group discussion (breakout rooms of 2-3 people, 10 mins+5mins for documenting feedback)

- Go back to your written reflections, share your ideas with each other & build on them
- What are the main points of similarity or differences in your views?
- Discussion points should be captured in the Google doc

✅ Notes: *insights from reflections and discussions*

- Each breakout group will discuss and add notes for prompts they they would like to respond to
- please use the number, such as [1] to indicate the prompt you are responding to
- You can add your name if you like to be identified and specifically attributed for your comments

**Contributes notes**

- [1] topic of unbiased, objective and ethics was resurfacing often in the discussion
- [3] Wai-Yin & Patricia: frameworks can be good but also introduce inequalities, using frameworks requires time to be able to think about it and then go on courses spend time on getting additional skills; explicit certification would cost money which might be an additional barrier
- [5] & [6] Wai-Yin & Patricia: Some of this could be already started earlier, e.g. in high school where Open Educational Resources could be used and SciComm can be introduced; might need national approaches on how to highlight this as part of teacher training and connect teachers up with initiatives that provide this already (e.g. NASA or CERN)
  - NASA education resources https://www.nasa.gov/stem

- ○ CERN teacher programme: https://teacher-programmes.web.cern.ch/ (includes sessions on using resources from the CERN Open Data Portal)
- [6] Why don't we see SciComm about open science out there?
- [6] Semi-formal training in SciComm +1 (Victoria)
- [6] We can't expect people to play so many different roles at once or to excel in Science Communication when they are trained to do science. +1(paz)
- [7] We need different assessments in different geographical/economic levels, connecting infrastructure and open science culture
- [2, 7] Transfer of funds can help break the cycle advocacy-training-advocacy-funding; empower/invest in people in their local communities to change the culture; take advantage of the global/online/no-borders connections between people that have the training/funds with people that don't have them. +1 (a small amount can make a big difference, often what it's needed is to fund a kind of proof-of-concept to show that training for open science is possible and valuable)
- Data literacy through lived experience in society
  - ○ Example of COVID related communication

🍵 BREAK: 5 mins

4: larger group discussions
(10 + 5 mins for documenting feedback)

- Larger groups refine ideas, expand them, challenge them, and agree on a set to share with the whole workshop
- Points should be captured in the document under the 'notes' section

Notes: *insights from reflections and discussions*

[Each breakout group (combination for 2 groups from previous session) will discuss and add notes for each prompt]

- In the transition phase, maybe we need some "hack the system" training; How can we use the gaps in the current rewards system to implement open science rewards? Can we educate scientists to declare different credits and authorship in their papers/data?
  - ○ Write a statement to say the authors contributed equally/these are the contributions
- Introduce explicit training in the curriculum based on Open Science principles and advocate SciComm?
  - ○ Open SciComm training!
- Transfer of intellectual property: some OA journals give the intellectual property to authors and this should be the norm! +1
- How do we provide incentives for people to open up their various research artefacts?
  - ○ Taking advantage of the global network of open science, to transfer resources from the community that has more to those that has less resources
  - ○ Use different language: instead of incentivizing open science practices; talk about building digital skills capacity, as researchers are more likely to know that they would like to build digital skills, and incorporate open practices in that training
    - ■ That's also easier for some funders

- - - Example: funding call for data for biodiversity and food security- in the proposal, they included costs for building data literacy skills and training
    - [please add further examples here!]
    - Can Open science message be passed through via message of saving resources and reducing costs by avoiding reinventing the wheel or starting from scratch and endlessly replicating?
    - Increase data literacy skills transferred to better understanding of COVID
  - "Normalize open in what exists
- More funding and incentives for open research promoters at the local levels adjusting to national and regional contexts - not being the only one advocate with limited resources +1

**ALL: everyone joins together**

For the final discussion and shares the points discussed in their groups (20 mins)

- Points should be captured in the reflections document
- May want to identify a dedicated notetaker from each group for this part

✅ Notes: *insights from reflections and discussions*

- [Each breakout group (combination for 2 groups from previou session) will discuss and add notes for each prompt]

📅 Wrap up (all together, 5 mins)

*Thank you!* 🙏

- Volunteers to clean up the notes by combining bullet points and organising them under the selected priority areas: **Deadline 25 June 2022**: [Add names]
- Volunteers to create paragraphs from the bullet points: **Deadline 30 June 2022**: [Add names]
  - Gracielle
  - Paz
- Community feedback and Request for comments: **Deadline 10 July 2022**
- **Finalisation and submission by facilitators before 15 July**

**Next steps:**

- Notes from this discussion will be recorded in a document for submission by 15 July.
- Attendees listed in the notes document will be acknowledged and thanked for their input as contributors and authors.