

Ethos of Open Science 2

The Values of Open Science

What openness really means — and why it matters for science in Africa



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Hi, I'm Seun



- Open Science and Digital skills advocate
- Academic background in Biochemistry, & Public Health
- **BON Co-founder, Open Science Consultant, IGDORE Sweden, Program Administrator, IGDORE US, OLS Resident fellow, Community Leader, ReSA, PREReview Champion, ASAPbio fellow, Turing way contributor, and Certified Open Data Editor Instructor**
- Lives in Abuja, Nigeria



What does “OPEN” mean to you?

In pairs, take 2 minutes to discuss:

1. One word that comes to mind when you hear 'open science'
2. One barrier to openness you've personally experienced
3. Share back with the room — we'll capture on a shared board



5 minutes total

2 min pair discussion + 3 min sharing

No wrong answers!

This is your space to reflect and share honestly.

SECTION 1

What Is Open Science?

1

Defining Open Science

UNESCO Recommendation on Open Science (2021) — adopted by 194 member states

Open Science encompasses all scientific knowledge that is openly available, accessible, reusable, and reproducible. It includes open access to publications, open data, open source software, open hardware, open methods, open peer review, and broad participation in science.

1

**Knowledge
Availability**

Making knowledge accessible
and usable by all

2

**Increased
Collaboration**

Building bridges across
disciplines & borders

3

**Information
Sharing**

Transparent sharing at every
stage of research

4

**Science–Society
Engagement**

Connecting science with
communities & policy

The Open Science Ecosystem

Open Science is not one thing — it is a connected ecosystem of practices

Open Access Publishing

Free, immediate access to research articles

Open Data

Sharing datasets with FAIR principles

Open Source Software

Code openly shared, reusable, improvable

Open Peer Review

Transparent, accountable review processes

Open Education

Free learning materials & curricula

Citizen Science

Public participation in research

Why Open Science — Why Now?

20,773

Open access journals indexed (2024 vs
35 in 2002)

194

UNESCO member states committed to
OS implementation

10×

Increase in 'Open Science' mentions in
media (2005–2019)

The Global Shift

- US federal agencies now mandate open access for all publicly funded research
- COVID-19 demonstrated the power — and stakes — of open, rapid science
- Preprint servers like bioRxiv and medRxiv transformed scientific communication
- Funders (Wellcome, Gates, NIH) increasingly require open data plans

What This Means for Africa

- African researchers historically excluded from expensive journals
- Open access levels the playing field for knowledge creation
- BON was founded precisely to address this gap in Nigeria
- Open science principles underpin all of BON's work

SECTION 2

The Values of Openness

2

Why Openness Has Epistemic Value

Open science is good for how we know — not just how we share

01

Reproducibility

Open methods and data allow others to verify, replicate and build on findings. This is the bedrock of trustworthy science.

02

Error Correction

When data and code are open, the scientific community can catch and correct mistakes faster — reducing waste of resources.

03

Cumulative Knowledge

Open databases and shared datasets allow knowledge to accumulate across labs, institutions, and generations.

04

Diverse Perspectives

Openness allows researchers from under-resourced settings to contribute meaningfully to global science.

Why Openness Has Social Value

Science is a public good — openness ensures it serves everyone



Equity & Africa

Open access publishing reduces the traditional barrier where African institutions couldn't afford expensive journal subscriptions. Open data enables local researchers to contribute to, and benefit from, global datasets — addressing the historical extraction of data from African contexts without benefit to African communities. BON's work is built on this justice argument for open science.

BON in Practice: Open Science at Work

Bioinformatics Outreach Nigeria — a community built on open science values

Needs Assessment First

Open Data

Before building anything, BON ran a survey across institutions (212 responses) to understand barriers. 50% found bioinformatics resources 'somewhat difficult' to access. This data-driven approach is open science in action.

There is a large Digital Divide in Low Resource Settings

Scientific research in low-resource settings, particularly across Africa, faces significant hurdles. These include:

- Limited Infrastructure
- Training Shortage
- Accessibility Barriers
- Software Sustainability
- Resource Constraints

What are the main challenges you face when using bioinformatics tools or software?
224 responses

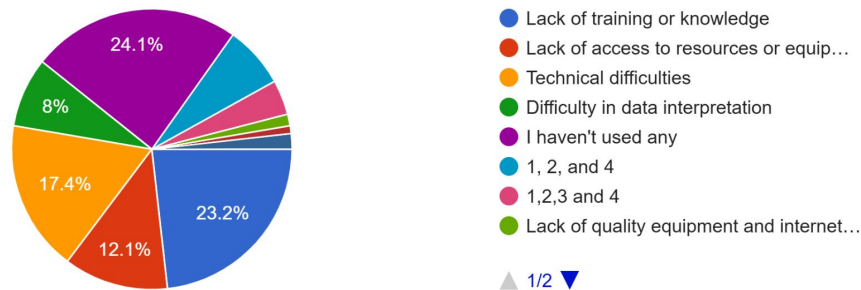


Fig 1: Data from a nationwide survey carried out by Bioinformatics Outreach Nigeria (BON) on the Impact of bioinformatics and research software use in Nigeria

These barriers create a significant impact on research communities in low-resource regions which includes the impediment on the growth on scientific competitiveness, international collaboration, career advancement, Research reproducibility, open science participation

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Open Science for Bioinformaticians Workshop

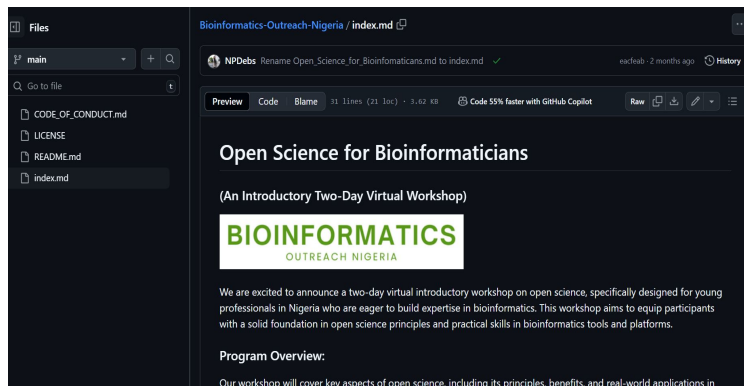
Open Education

232 applied, 48 trained, all materials openly archived on Zenodo under CC BY 4.0. The workshop itself followed open curriculum design — anyone can reuse and adapt.

Open Science for Bioinformaticians Workshop

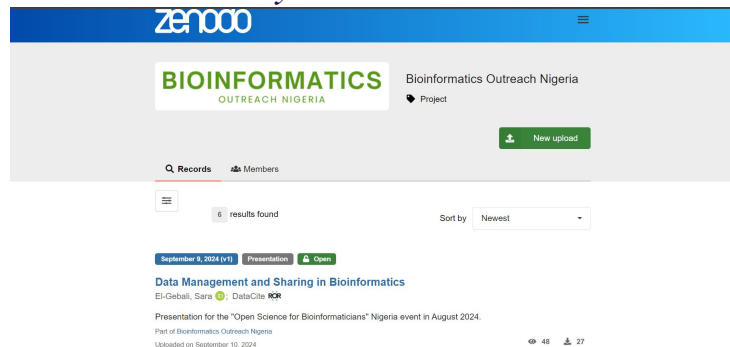
We organized an Open Science for Bioinformatics training in 2024 for bioinformatician and Digital data skills enthusiast in Nigeria

- 232 people applied
- 48 people where trained
- 7 Speakers/Instructors
- 184 people are **yet to be trained**

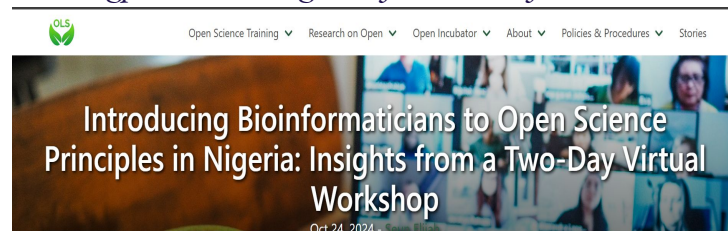


GitHub documentation of the events

Zenodo community resources



Blogpost describing the aftermaths of the events



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Catalyst Project Partnership

Open Infrastructure

Selected as 1 of 19 global community partners. BON received cloud infrastructure support and Carpentries 'Train the Trainers' certification to build local capacity.

Community partner on the Catalyst Project



CATALYST
PROJECT



We were selected as **1 of the 19** communities partners on the Catalyst project which aims to adopt open science principles in under-served biomedical research communities through the provision of reliable and sustainable cloud computing infrastructure.

1. We have received trainings:
 - Hub Champion Training from **2i2c**
 - Train the Trainers from **Carpentries**
 - Open Science and Training and Mentoring from **OLS** - Ongoing
2. Participated in Interviews and Community calls

BON in Practice: Open Science at Work

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ODE Training & Blog Documentation

Open Communication

The 'Quality & Consistent Data with Open Data Editor' training was documented in a public blog post on Open Knowledge Foundation — transparent outputs for the community.

Quality and Consistent Data with Open Data Editor

← → ↺ blog.okfn.org/2025/07/30/empowering-life-scientists-in-africa-through-open-data-highlights-from-the-ode-training/ ☆ | 📄 | 📥 0 | ⋮



Open Knowledge

Content for a fair, sustainable and open future



About ▾

English ▾



by Seun Olufemi
July 30, 2025

Empowering Life Scientists in Africa through Open Data: Highlights from the ODE Training

3 Min Read

 SCHOOL OF DATA
→ x

This text reports on the impact of a training course offered by a [multiplier trainer](#) from the [School of Data](#) network.



Open Knowledge
FOR A FAIR, SUSTAINABLE AND OPEN FUTURE

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Advocating for Openness in Science

Championing Preprints: A Call for Recognition in African Research Settings

In this special guest blog piece, PREreview Champion, Seun Olufemi, reflects on his own experiences and advocates for greater inclusion and recognition of preprint articles and preprint peer reviews as legitimate academic contributions within A



Advocating for Openness in Science

Preparing Manuscript for Journal Submission

 Summarize

 You replied on Wed 3/25/2026 9:24 AM

Hello [REDACTED]

As we have earlier discussed, I will be preparing the manuscript ready for submission, So while reviewing them I noted the following:

1. [REDACTED] there is no reference list.
2. [REDACTED]
3. [REDACTED] s, which implies that the in-text

While I review the possibilities of submitting our work to journal for consideration. I feel it is of the essence, that I promote the use of preprint in this case. Preprint is version of a scientific or scholarly paper shared publicly before formal peer review and journal publication. Preprints majorly, offers quick visibility, faster collaboration, ease of sharing, and security over ones work, but is devoid of extensive review and waiting for journals approval. Especially in cases where there are few journals accepting work in this space.

Mind you the Preprints are free, and articles published in preprints, can still be eventually published in Journals. I would list some examples here for your review:

1. <https://arxiv.org>
2. <https://www.medrxiv.org>
3. <https://www.biorxiv.org>

I would look forward to your response, and just in case you need further clarifications are preprints, I will be happy to share more.

Best regards,
Seun.

ACTIVITY 1

Case Study Pairs

Work in groups of 3–4. Each group gets a scenario card.

Scenario A

A researcher in Lagos collects genomic data from 500 patients but stores it on a local hard drive and never shares it. Three years later, the hard drive fails.

Scenario B

A bioinformatics pipeline developed at a Nigerian university is uploaded to GitHub with a CC BY license. Six months later, a team in Kenya uses it to accelerate a malaria study.

Scenario C

A training program shares all slides, code, and recordings on Zenodo. Three subsequent workshops in 4 countries are built directly on those materials.

Discuss (8 min): What open science value is illustrated — or missing? What was the impact? What could have been done differently? Share one key takeaway with the room.



SECTION 3

Nuances & Trade-offs

3

Openness Is a Value — Not a Rule

"Openness is a saguaro cactus: a beautiful ecological keystone that we should love, celebrate, and occasionally water — but should not embrace in a full-on bearhug." — Santana (2024), Canadian Journal of Philosophy

Standards Can Standardise Too Much

FAIR data principles are powerful — but standardising metadata can freeze scientific vocabulary, disadvantage qualitative methods, and exclude Indigenous knowledge systems.

Openness Can Spread Errors

If flawed code or data is openly shared and uncritically reused across fields, openness amplifies — not corrects — the mistake.

Transparency Can Constrain Expertise

When experts must justify every decision to non-expert audiences, they may self-censor findings, simplify conclusions, or avoid publication of legitimate but misunderstood results.

Open Data Can Be Weaponised

Special interest groups (polluters, tobacco industry) have used open data to fund counter-analyses and create doubt. Not all contexts call for fully open datasets.

Balancing Openness Against Other Values

Science operates by value schemes — openness must coexist with other scientific goods

Value in Tension	Competing Value	Example Context
Openness	Privacy / Confidentiality	Patient data in clinical trials
Openness	Accuracy	Premature sharing before peer review
Openness	Equity	Open access APCs that cost thousands of dollars
Openness	Epistemic Diversity	Standardisation that excludes qualitative research
Openness	Context	Data decontextualised for machine-readability

Key Principle: The goal is not maximum openness — it is optimal openness within your community's value scheme.

ACTIVITY 2

Debate Cards

Two groups argue opposing sides — then swap.

Motion 1: "All publicly funded research data in Africa should be open by default"

A large, empty rectangular box with a dark purple background, intended for writing an argument.A large, empty rectangular box with a dark purple background, intended for writing an argument.

Motion 2: "Preprint servers do more harm than good in global health"

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10 minutes · 4 min argument per side, 2 min synthesis

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Debate Cards

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Motion 1: "All publicly funded research data in Africa should be open by default"

FOR: Enables collaboration, prevents data hoarding, accelerates health research

AGAINST: Communities may be exploited; contextual knowledge is decontextualised; privacy risks

Motion 2: "Preprint servers do more harm than good in global health"

FOR: COVID showed dangerous misinformation from unreviewed preprints circulating in policy

AGAINST: Preprints democratise access and speed — the answer is better science literacy, not gatekeeping



SECTION 4

Applying Open Science in Your Work



Your Open Science Toolkit

Practical tools you can start using today — most are free

Publishing

Zenodo

Free data & code repository
(CERN-backed)

bioRxiv / medRxiv

Preprint servers for rapid sharing

PLoS ONE / F1000

Open access journals with low/no APCs

Data & Code

GitHub / GitLab

Version control & code sharing

Open Data Editor (ODE)

Quality data management tool

OSF

Open Science Framework for project
management

Community

OLS Mentorship

Open Life Science — apply for a funded
cohort

The Carpentries

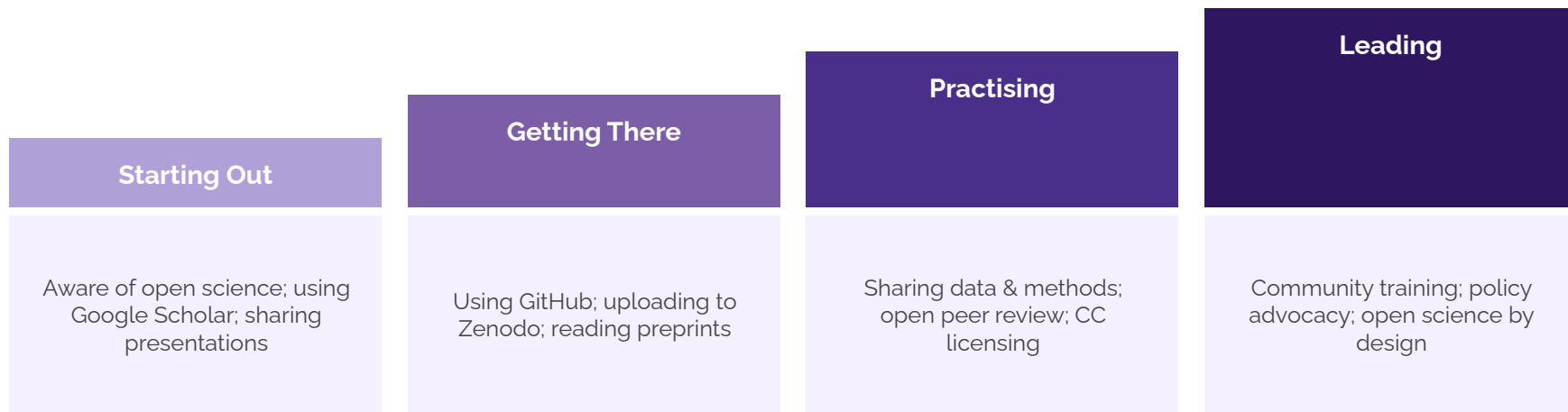
Data & coding skills training globally

BON

Our own community — get involved!

Where Are You on the Open Science Spectrum?

Open science is a journey — every step forward counts



Reflection: Where are you right now — and what is one step you could take to move forward?

FINAL REFLECTION

Your Open Science Commitment

Take 3 minutes to write — then share with a partner.

01

One thing I learned today about open science that I didn't know before

02

One open science practice I will adopt or improve in my own work within the next month

03

One person or community I will share today's learnings with

Key Resources & Next Steps

UNESCO Recommendation on Open Science (2021)

<https://unesdoc.unesco.org/ark:/48223/pf0000379949>

The global framework — free PDF

Santana (2024) — The Value of Openness in OS

Cambridge Journal of Philosophy (Open Access)

Nuanced academic perspective on OS values

BON Community

bioinformatics-outreach-nigeria.github.io

Join, contribute, or reach out to collaborate

Open Life Science (OLS)

we-are-ols.org

Be an active community member

The Carpentries

carpentries.org

Free data & software skills training globally

Zenodo

zenodo.org

Archive datasets, code, slides openly — for free

Thank You

Open science is not a destination — it is a practice, a culture, and a commitment.

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