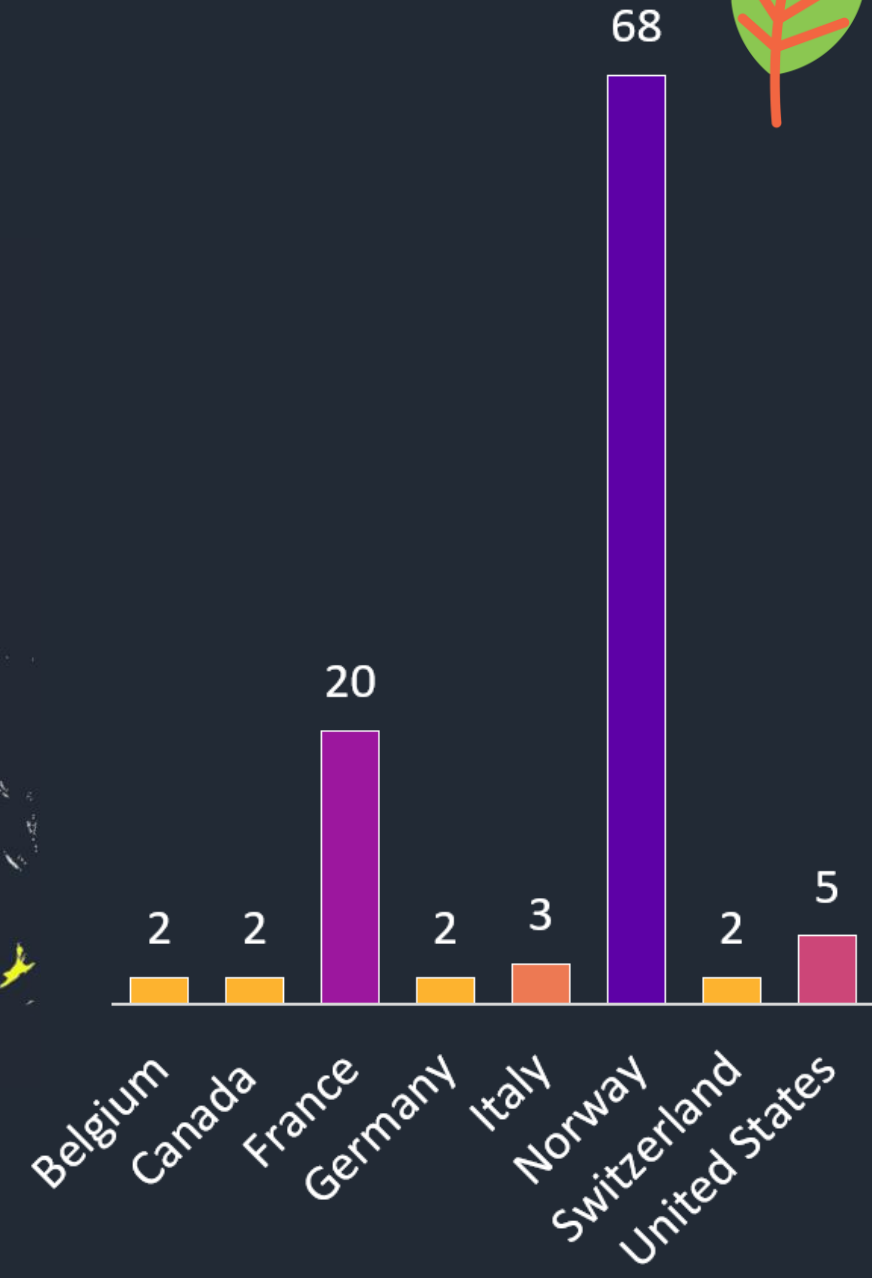
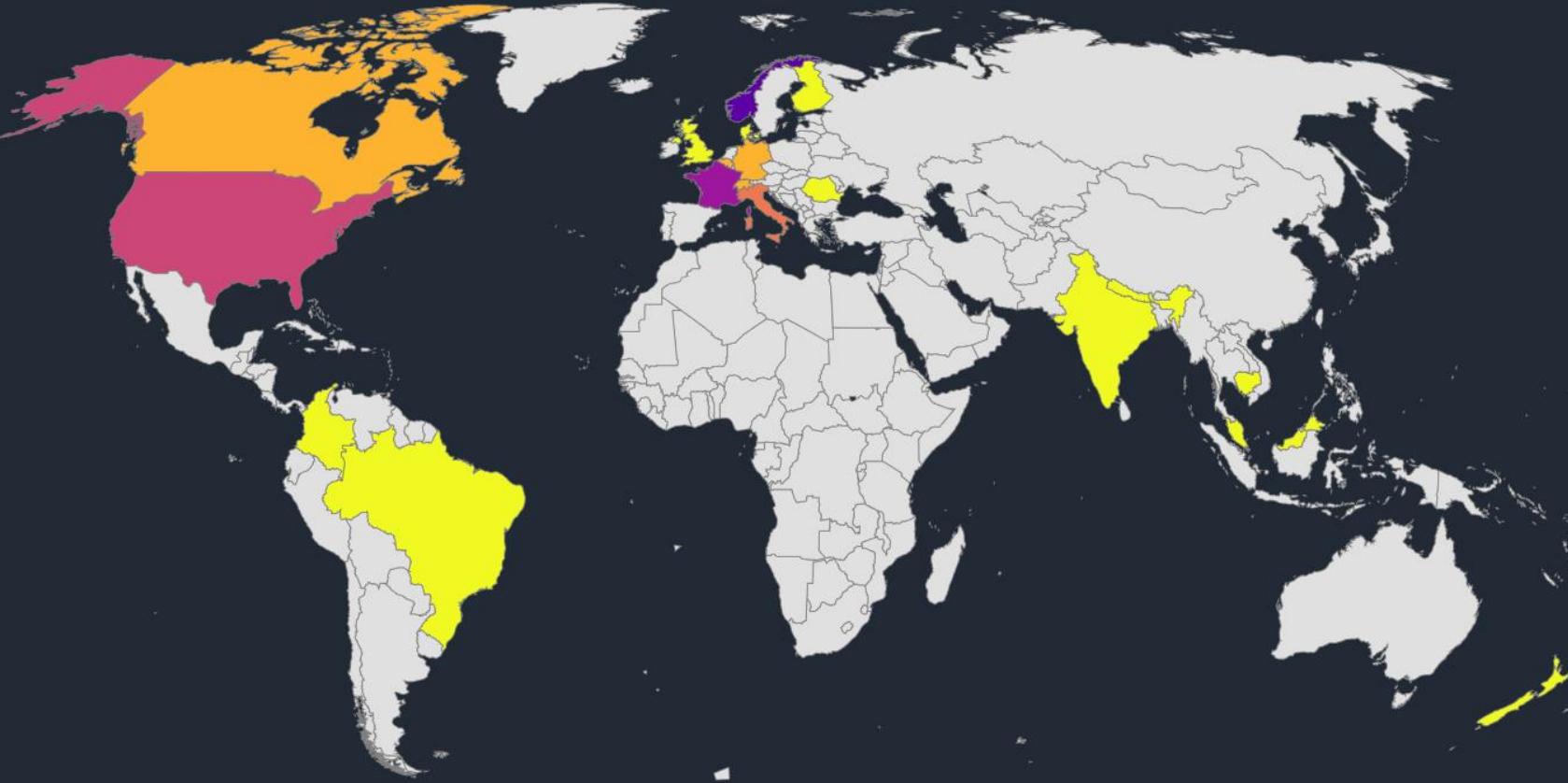
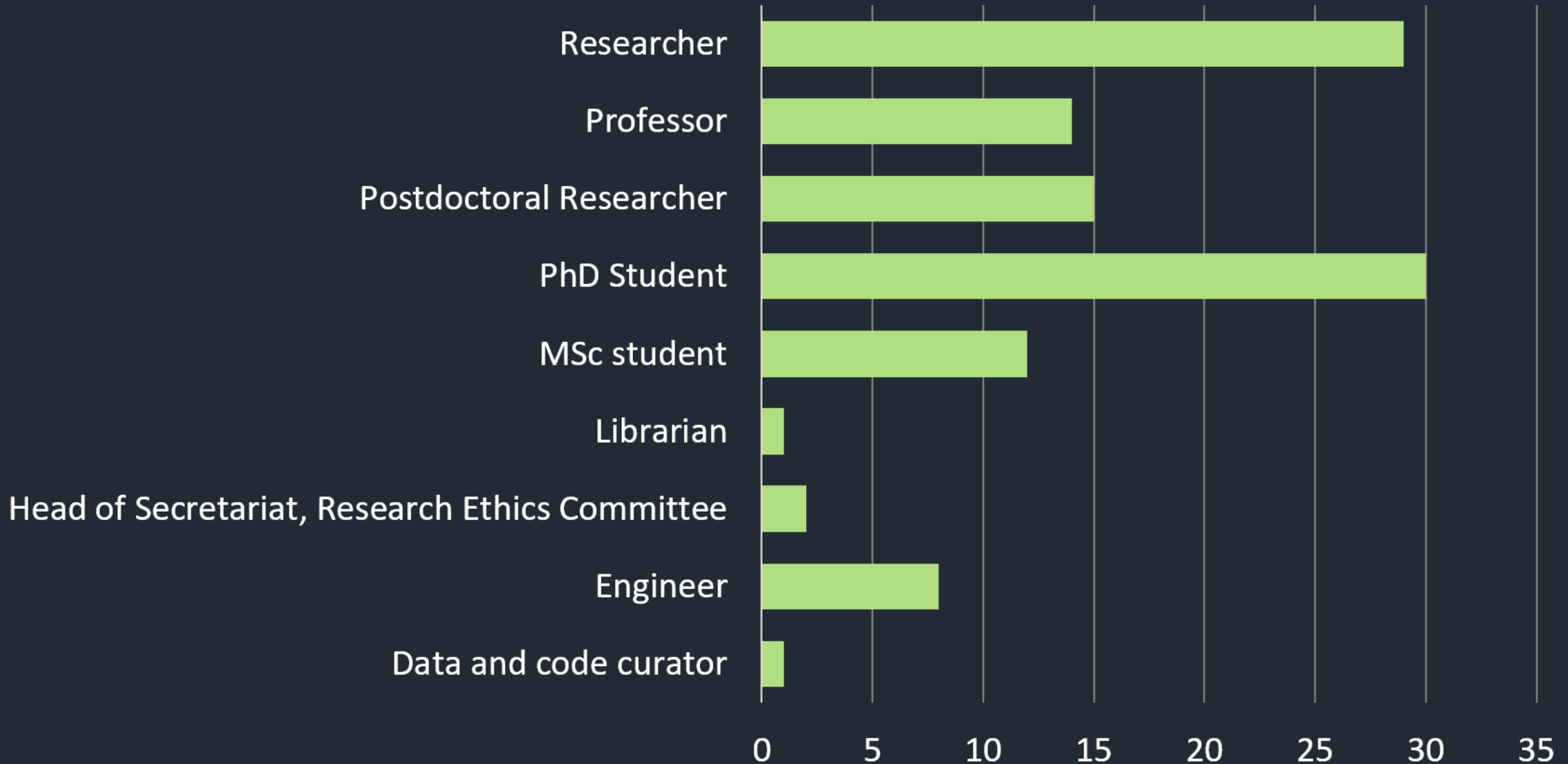


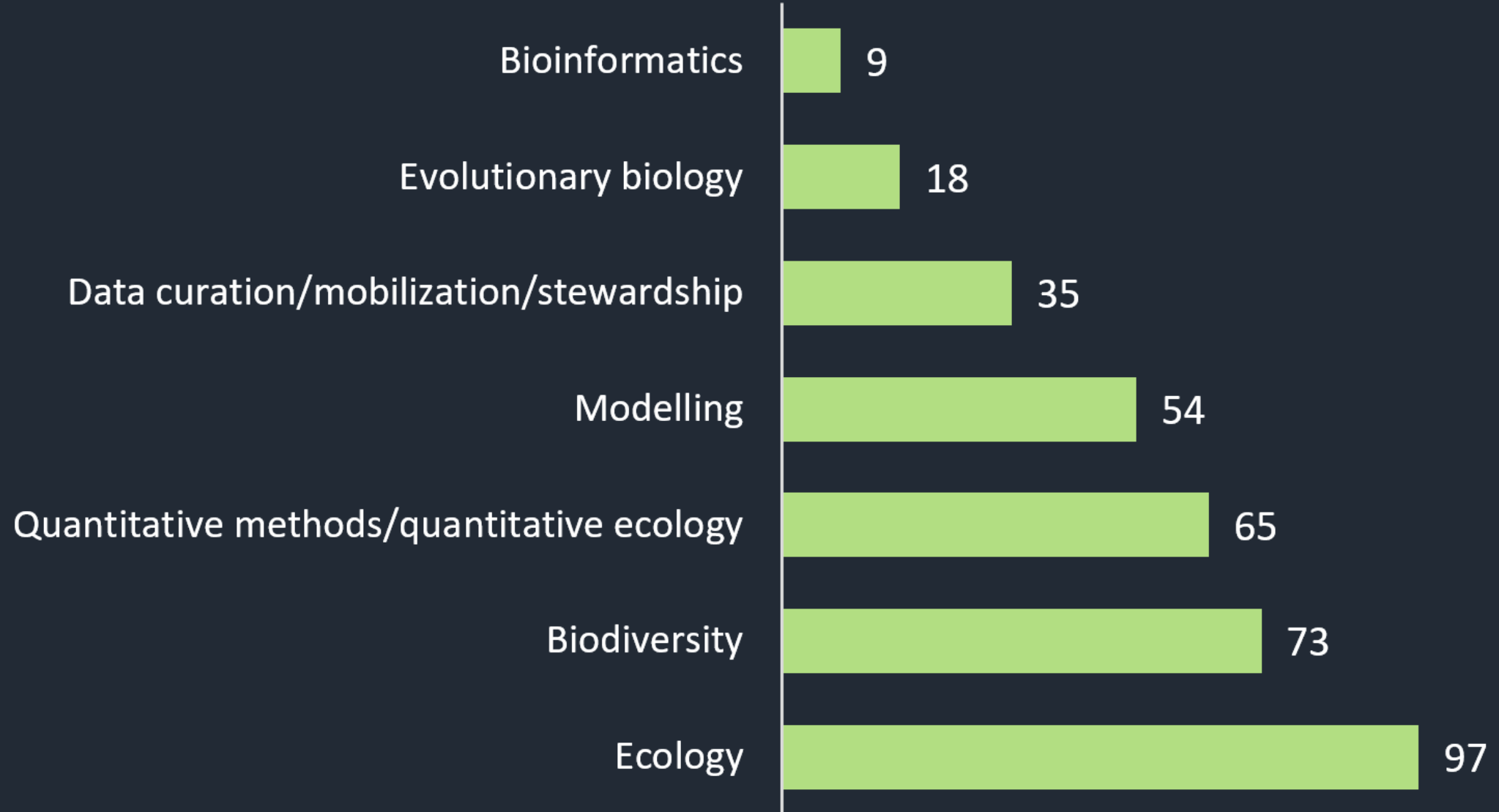
Who are «we»?



Who are «we»?



Who are «we»?

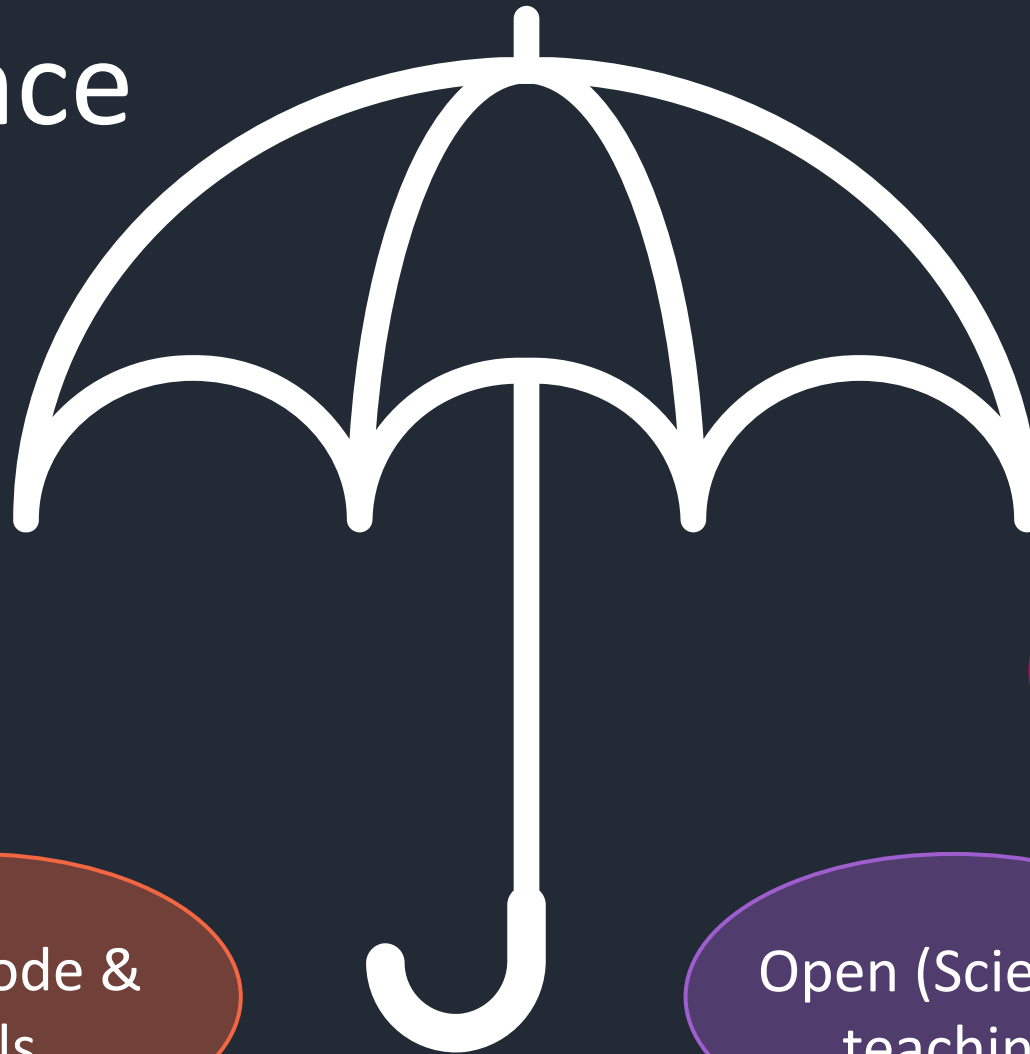


Webinar content



- Lightning introductions to Open Science facets
- Your experience & interests – survey results
- Organization of the Open Science Lab
 - ❖ Aim and vision
 - ❖ Upcoming webinars & envisioned formats
 - ❖ Using Slack for communicating and networking
 - ❖ Other activities
- Open floor for input

The «big umbrella» of Open Science



Erlend Nilsen

Open & FAIR data

Dag Endersen

Open code &
tools

Matt Grainger

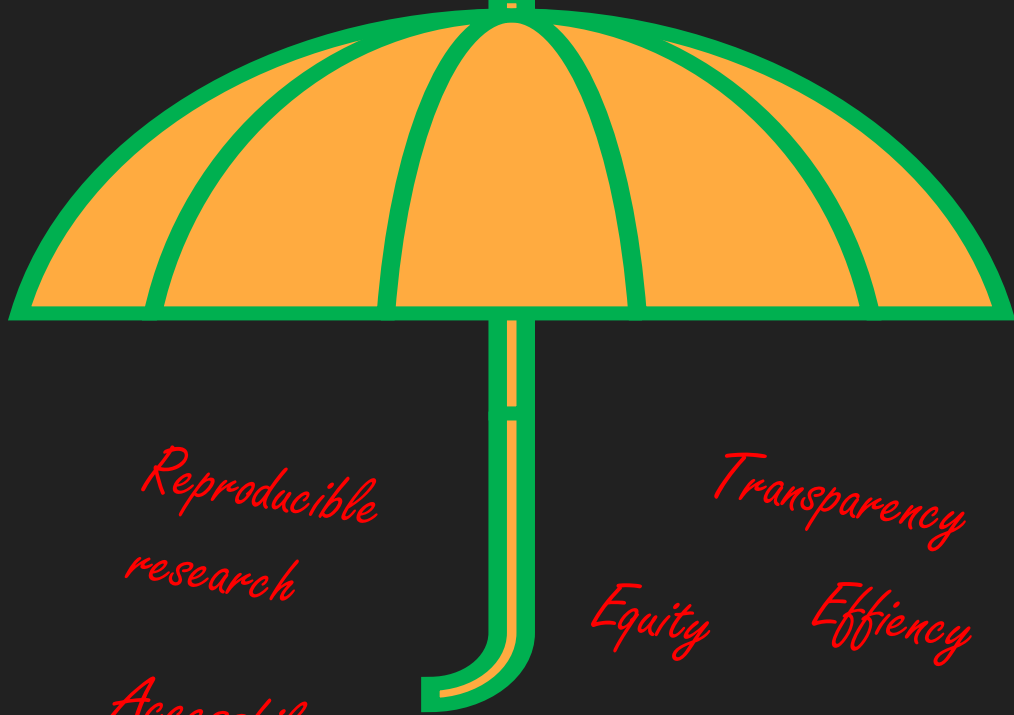
Workflow
reproducibility &
accessibility

Chloé Nater

Open (Science)
teaching

Aud Halbritter





*Reproducible
research*

Transparency

Equity *Efficiency*

*Accessible to
everyone*

Accountability

Verification

Value for money

Trust





Global Biodiversity Information Facility

Free and open access to biodiversity data

Dag Endresen - GBIF Norway

University of Oslo, Natural History Museum



GBIF

Global Biodiversity
Information Facility

Illustration: GBIF data portal

Living Norway Open Science Lab | 3rd March 2022

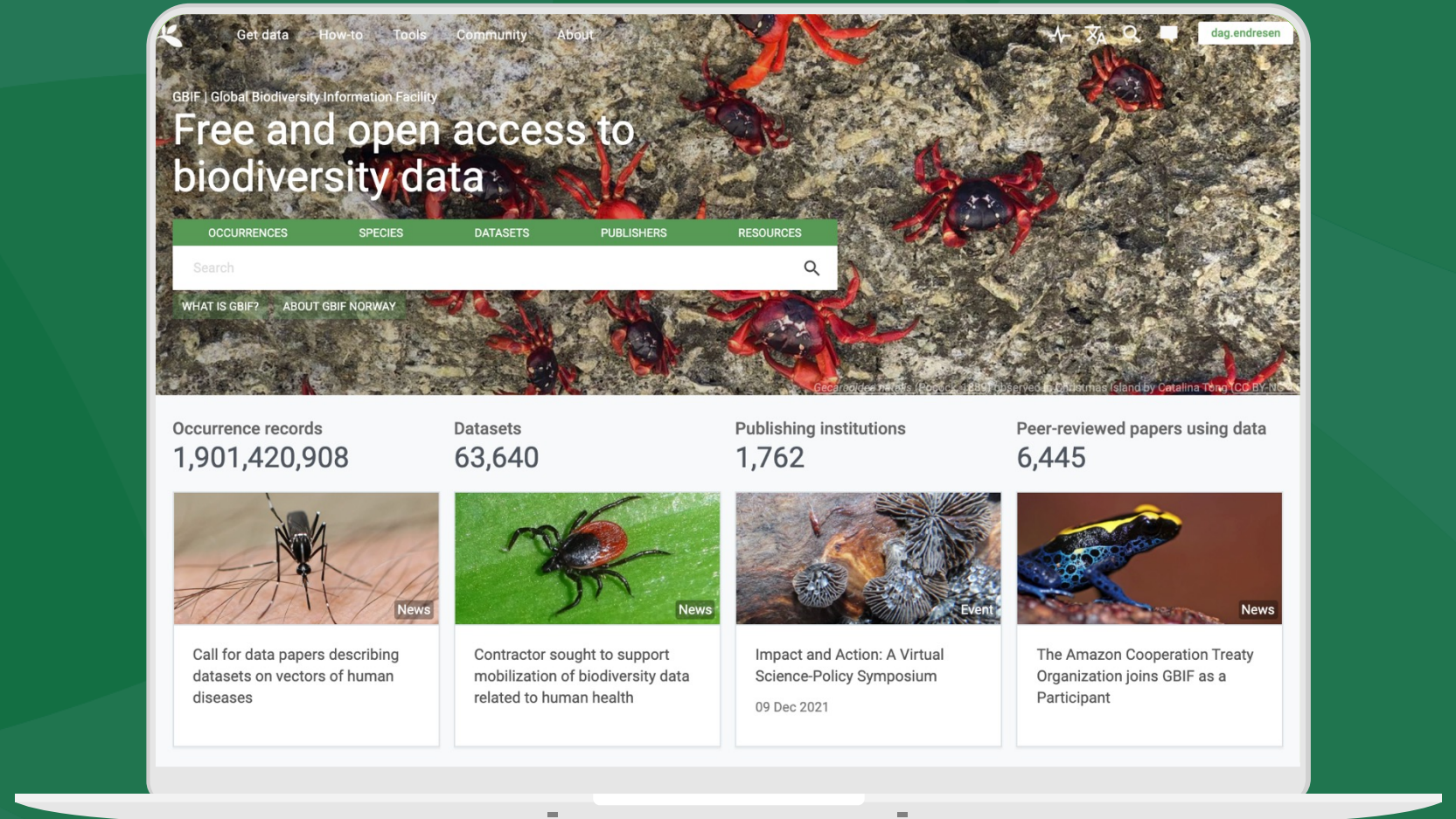
WHAT IS GBIF?

Intergovernmental network and research infrastructure

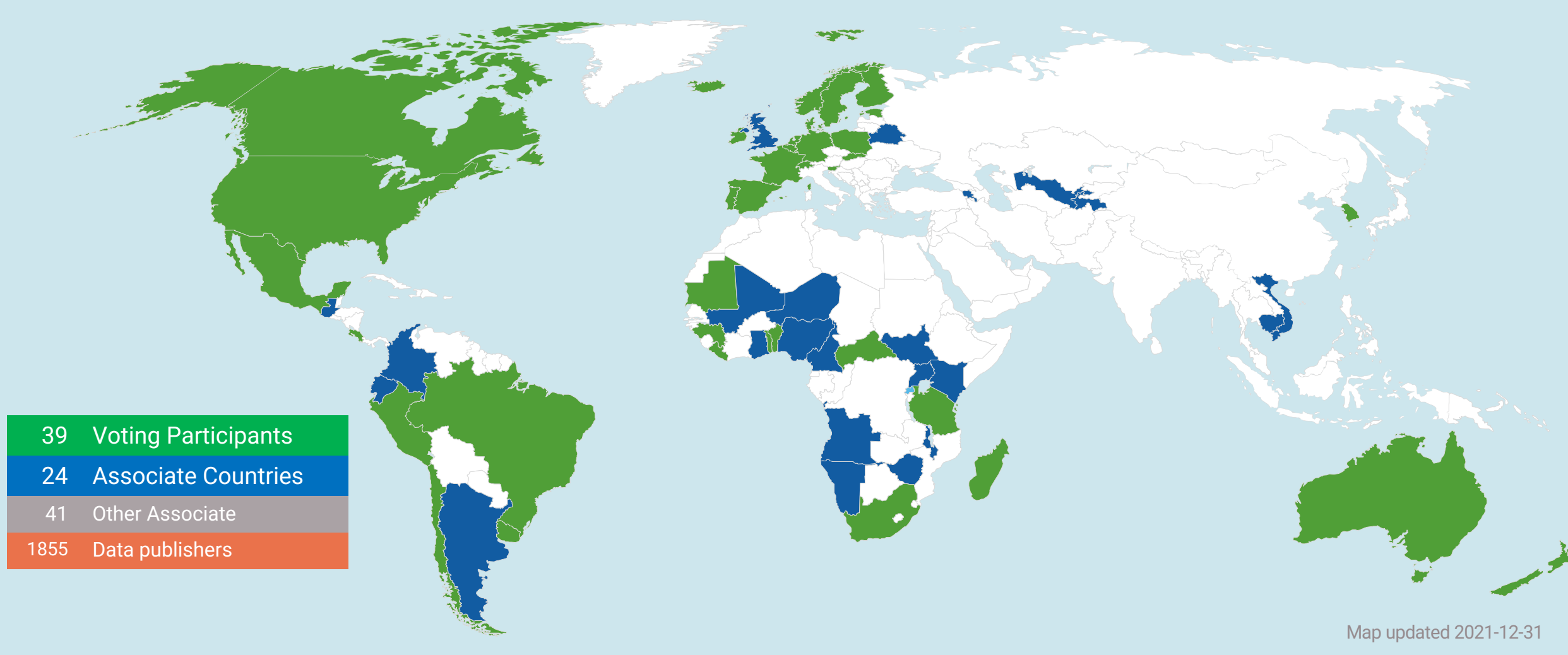
Provides anyone, anywhere, **free and open access to data** about all types of life on Earth

Voluntary collaboration through Memorandum of Understanding (MoU)

Participant nodes, Secretariat in Copenhagen, Denmark

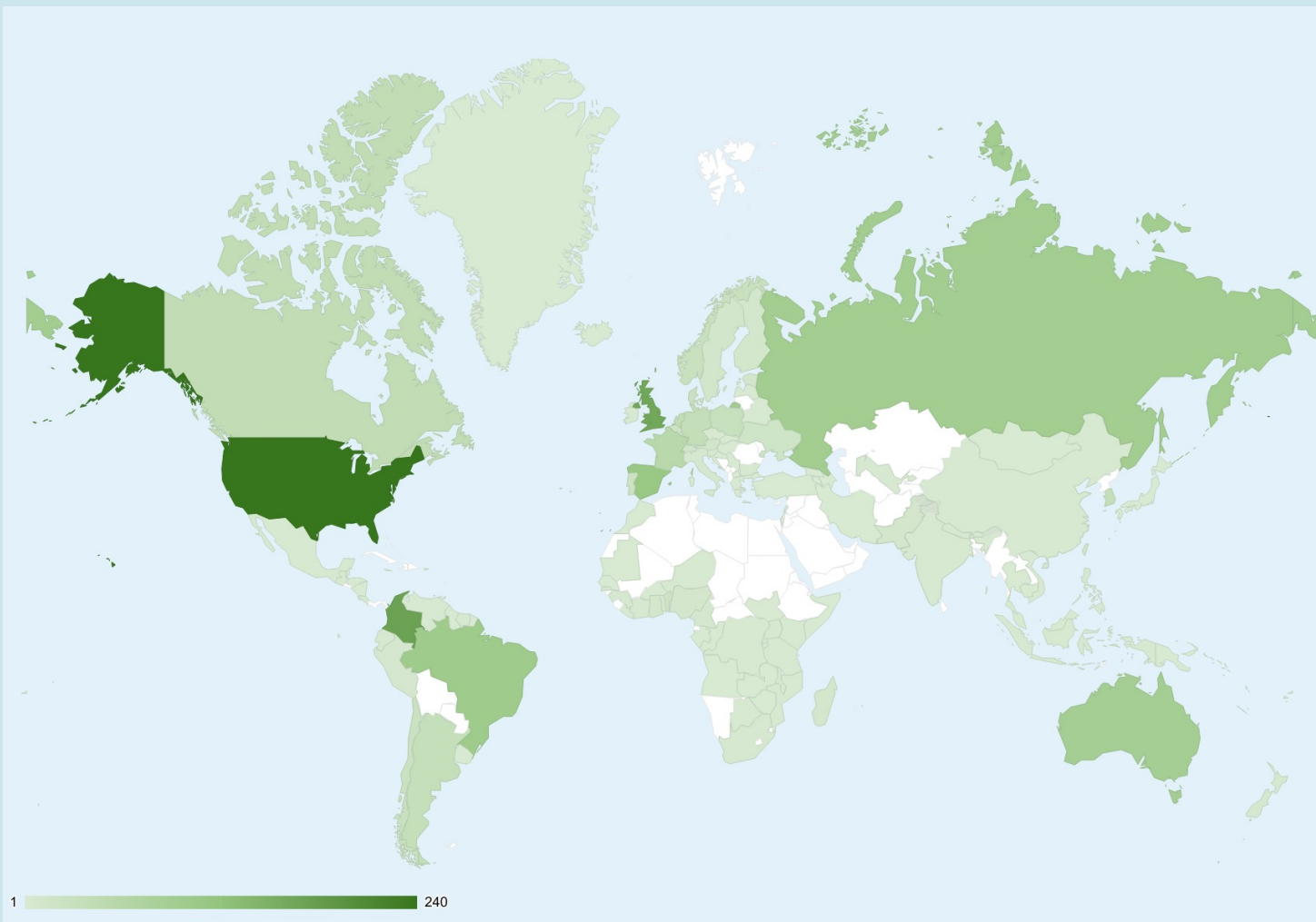


GBIF PARTICIPANT COUNTRIES



Map updated 2021-12-31

GBIF NETWORK OF DATA PUBLISHING INSTITUTIONS



126 countries with institutions sharing data through GBIF

Top 10 countries: number of data publishers		
1	United States	288
2	Colombia	175
3	United Kingdom	174
4	Spain	120
5	Australia	109
6	Brazil	102
7	Russian Federation	92
8	France	66
9	Finland	53
10	Argentina	52
16	Norway	38

Species occurrence records

1,944,706,149

Published from Norway: 45,436,027 occurrences



Country
Participants

63

Organizational
Participants

41

Avg records downloaded per month (2021)

88.1 billion



Datasets

67,819

From Norway: 331 datasets



Data-publishing
institutions

1,797

Norway: 35 institutions

Peer-review papers
using data

6,837

Norway: 165 papers



SPECIES OCCURRENCE RECORDS WITH MULTIMEDIA EVIDENCE

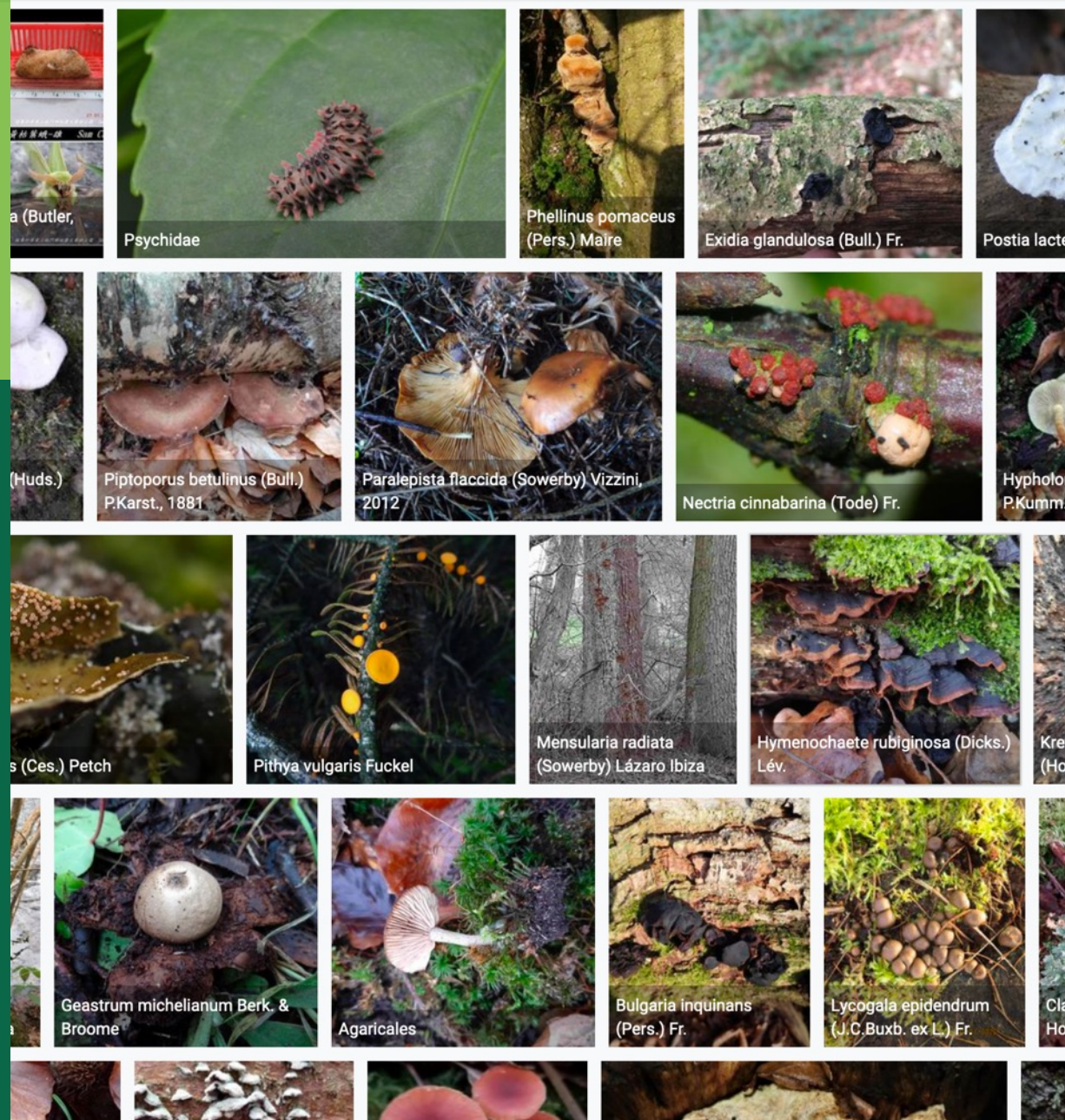
3 March 2022

**100 million records with taxonomically identified
images (Norway: 2,3 million)**

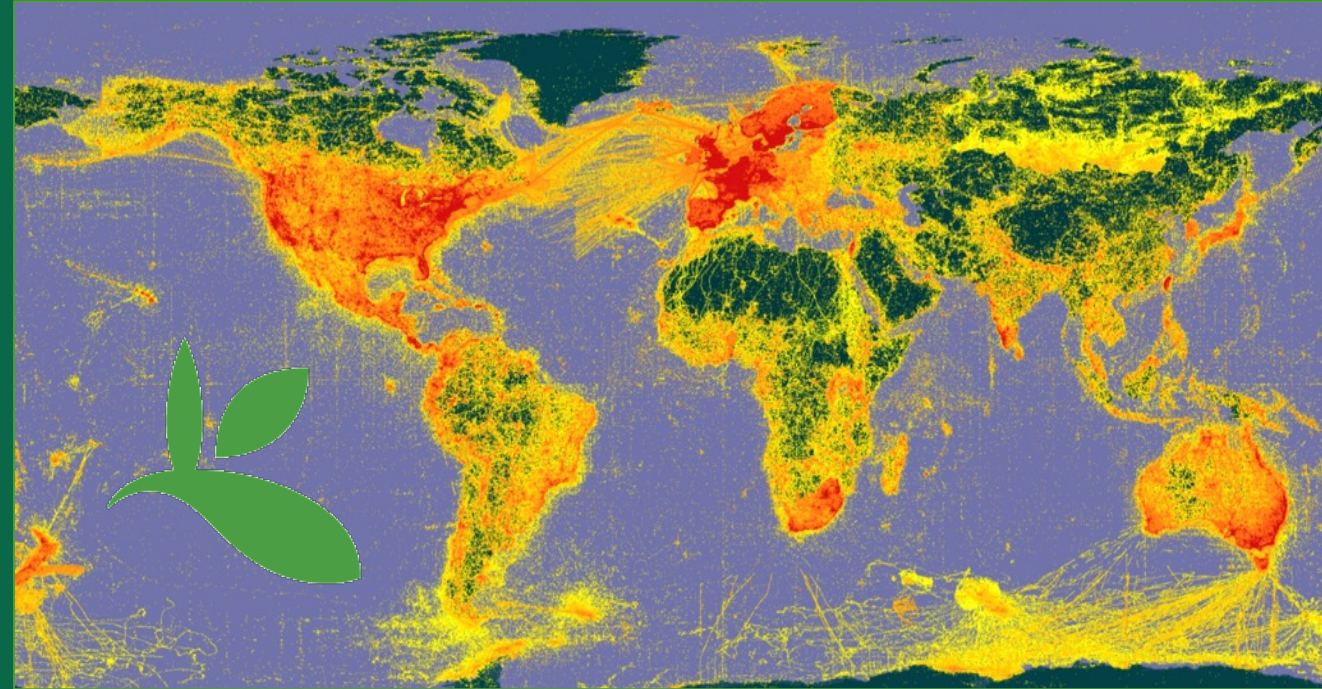
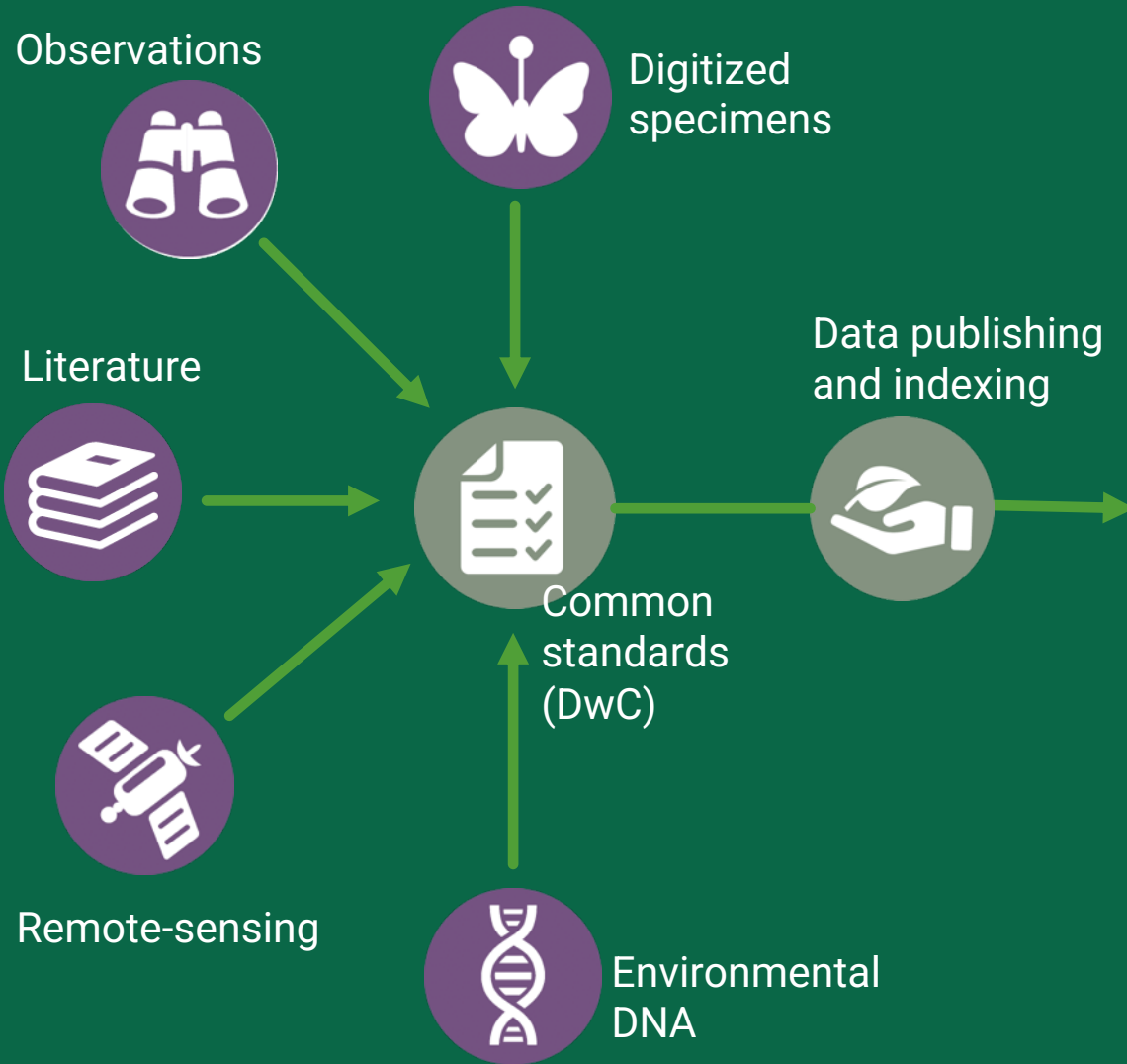
- 50.1 million human observations (Norway: 1,1 million)
- 47.6 million specimens (Norway 1,3 million)
 - 2.2 million material samples
 - 1.3 million fossil specimens

839,889 audio files

2,782 videos



A WINDOW ON EVIDENCE ABOUT WHERE SPECIES HAVE LIVED, AND WHEN



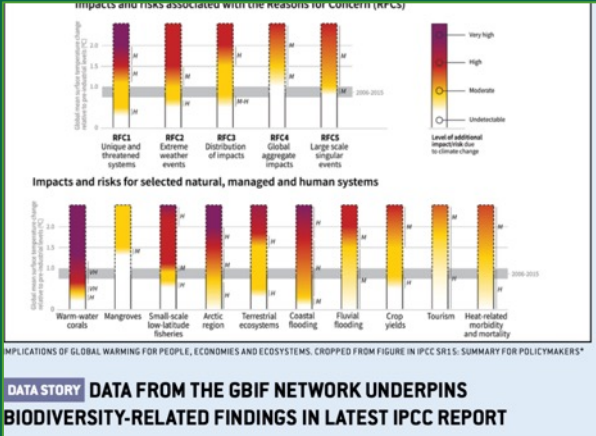
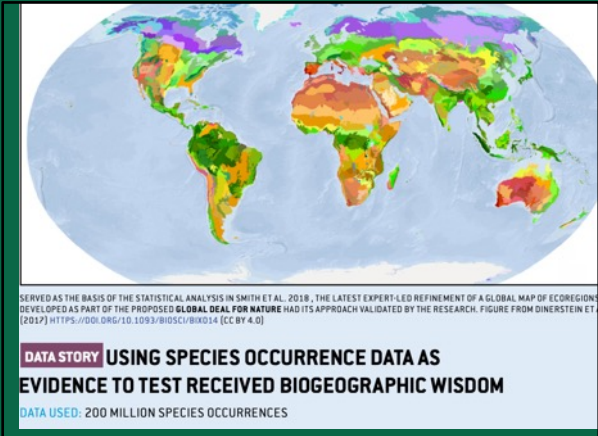
Data discovery and use



data use



A DATA RESOURCE TO SUPPORT RESEARCH AND SUSTAINABLE DEVELOPMENT



Conservation

- Protected areas
- Threatened species
- Invasive species risk

Food security

- Crop wild relatives
- *In situ, ex situ* conservation of genetic diversity
- Fisheries planning

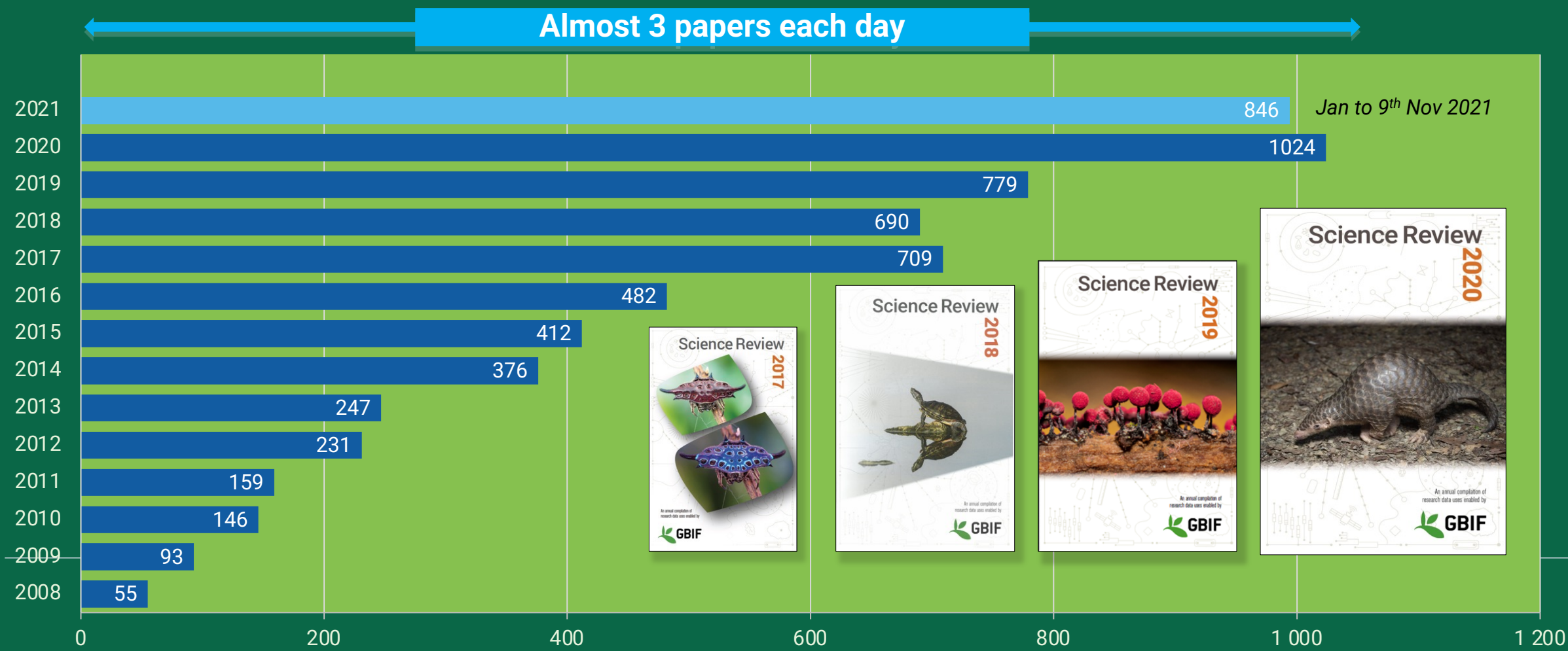
Climate change

- Modelling impacts on species ranges
- Adaptation strategies
- Mitigation benefits, risks

Human health

- Disease risk based on occurrence of vectors, hosts, reservoirs
- Medicinal plants
- Hazards e.g. snakebite

PEER-REVIEWED PUBLICATIONS USING GBIF-MEDIATED DATA

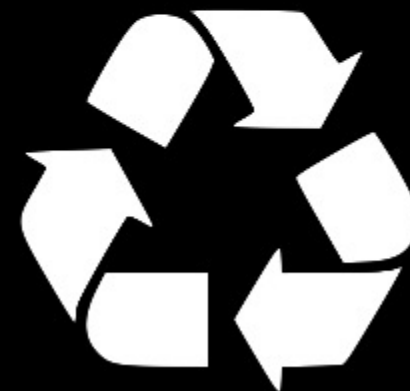
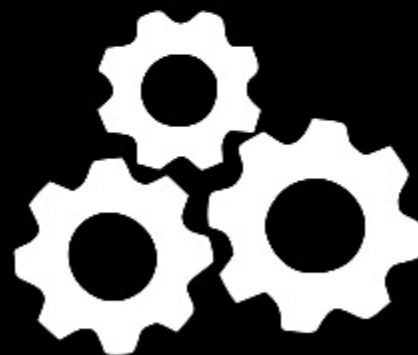


HOW TO CITE DATA MEDIATED BY GBIF

1. **Download data** from GBIF.org
2. and receive recommended citation with a **download DOI**
3. **Cite the DOI** in published research or other work

Example: GBIF.org (9 November 2021) GBIF Occurrence Download <https://doi.org/10.15468/dl.xxxxxx>

F_{indable} A_{ccessible} I_{nteroperable} R_{eusable}



FAIR data is about **machine-readable** data

*researchers & museums need to do more than simply post their data on the web for it to be **re-usable**.*

GBIF IS AN OPEN & “FAIR” BIODIVERSITY DATA INFRASTRUCTURE





OPPORTUNITIES

- Enables **new research methodologies** that were not possible before
- Skills for open research and open data are in **increasing demand!**
- **Career** opportunities
- **Funding** opportunities
- Open science brings **new benefits and opportunities** for our institutions

THANK YOU

GBIF Norway

Hugo de Boer | Head of Delegation

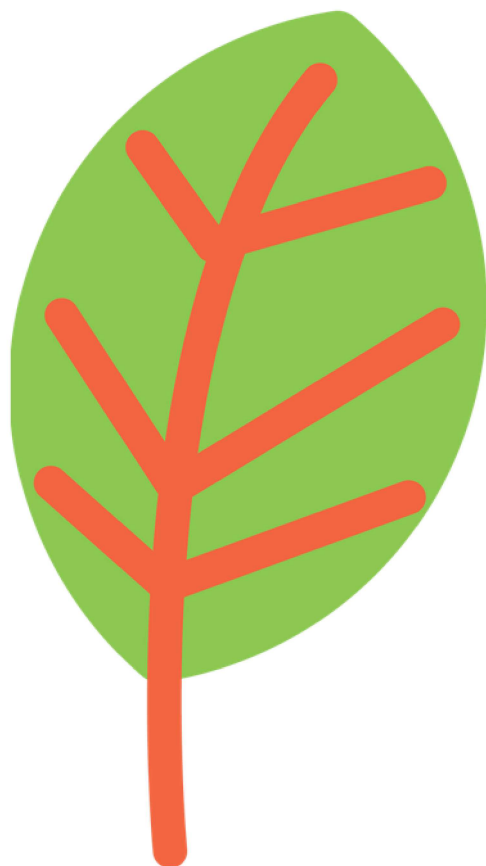
Dag Endresen | Node Manager

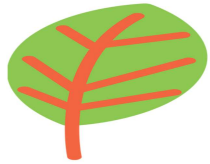
helpdesk@gbif.no



www.gbif.org



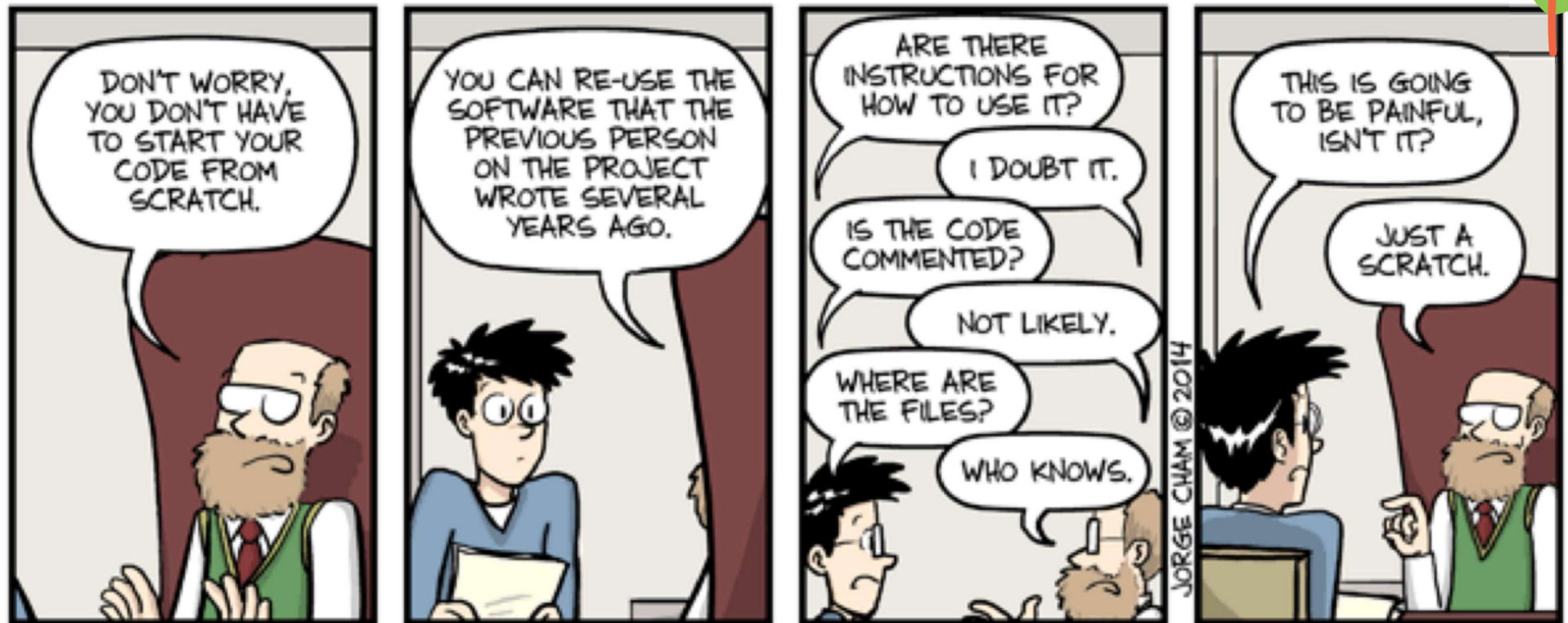
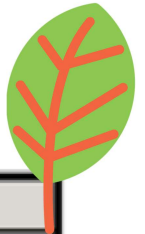




Open Code & Tools

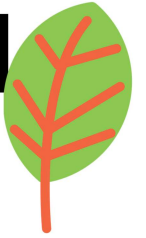
Matt Grainger

Why produce open tools and code?



WWW.PHDCOMICS.COM

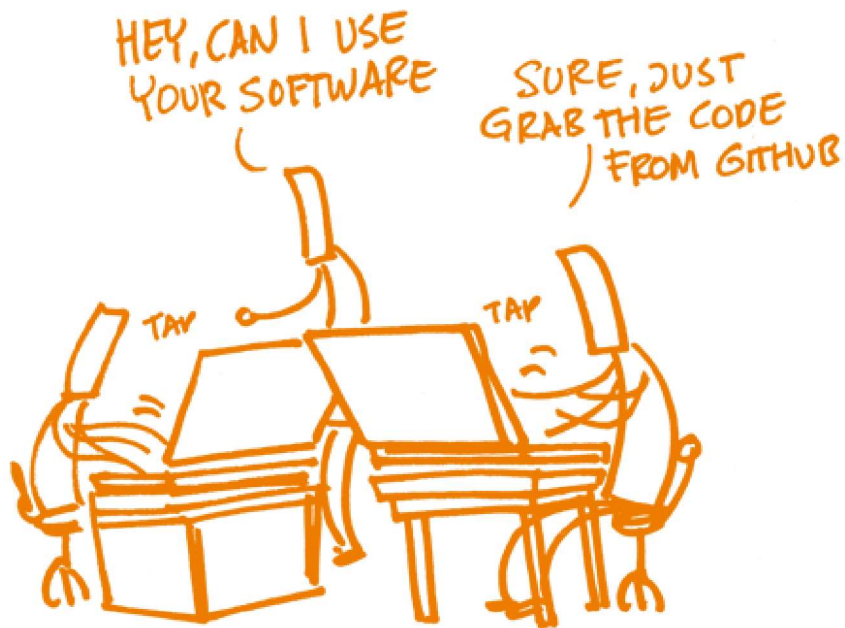
Common misconceptions about open software and code



OPEN SOURCE

VS

CLOSED SOURCE



Barnes (2010) (<https://www.nature.com/articles/467753a>)

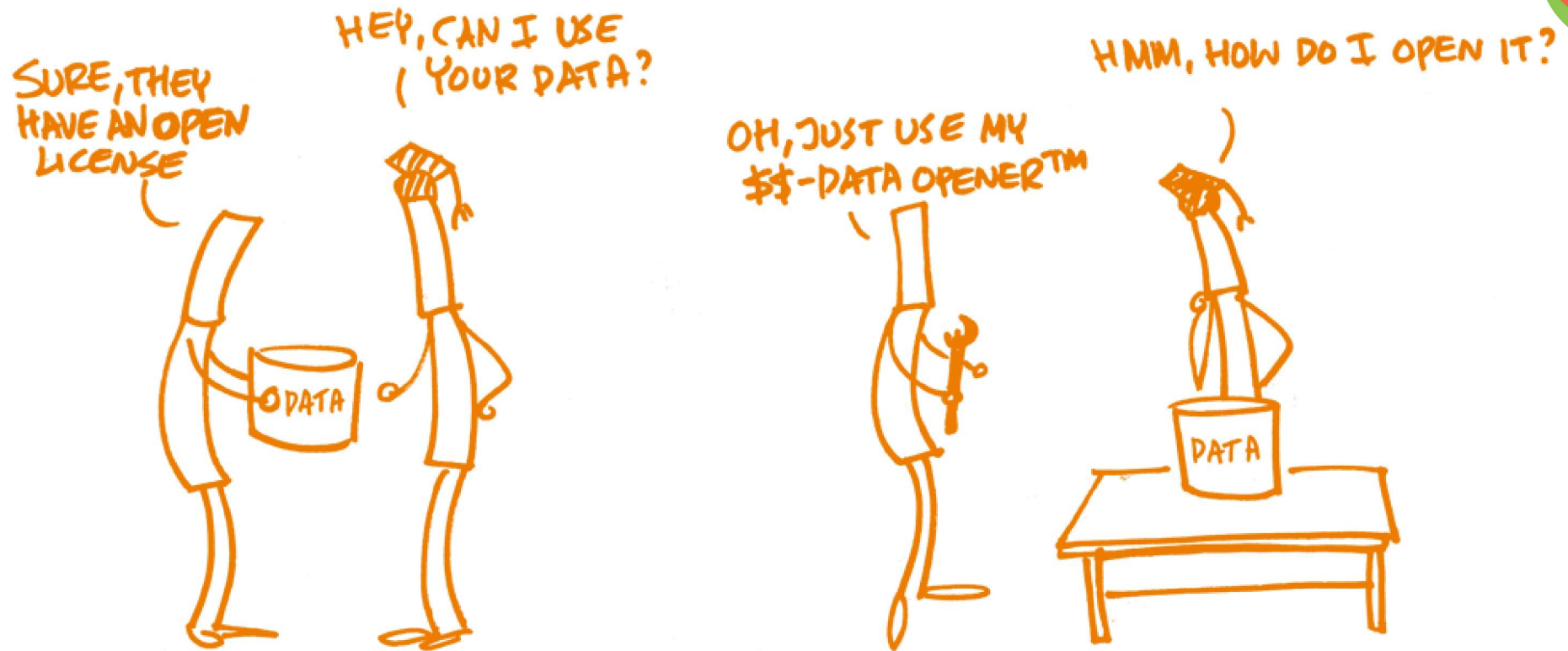


My code is not good enough “if your code is good enough to do the job, then it is good enough to release—and releasing it will help your research and your field.”

People will demand support and bug fixes. “Publishing code may see you accused of sloppiness. Not publishing can draw allegations of fraud. Which is worse? Nobody is entitled to demand technical support for freely provided code...”

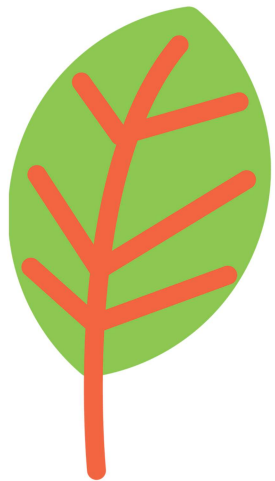
It is too much work. “For scientists, the word publication is totemic, and signifies perfectionism. But...the original code can be published as supplementary information, available from an institutional or journal website.”

Code and tools without a license are not open



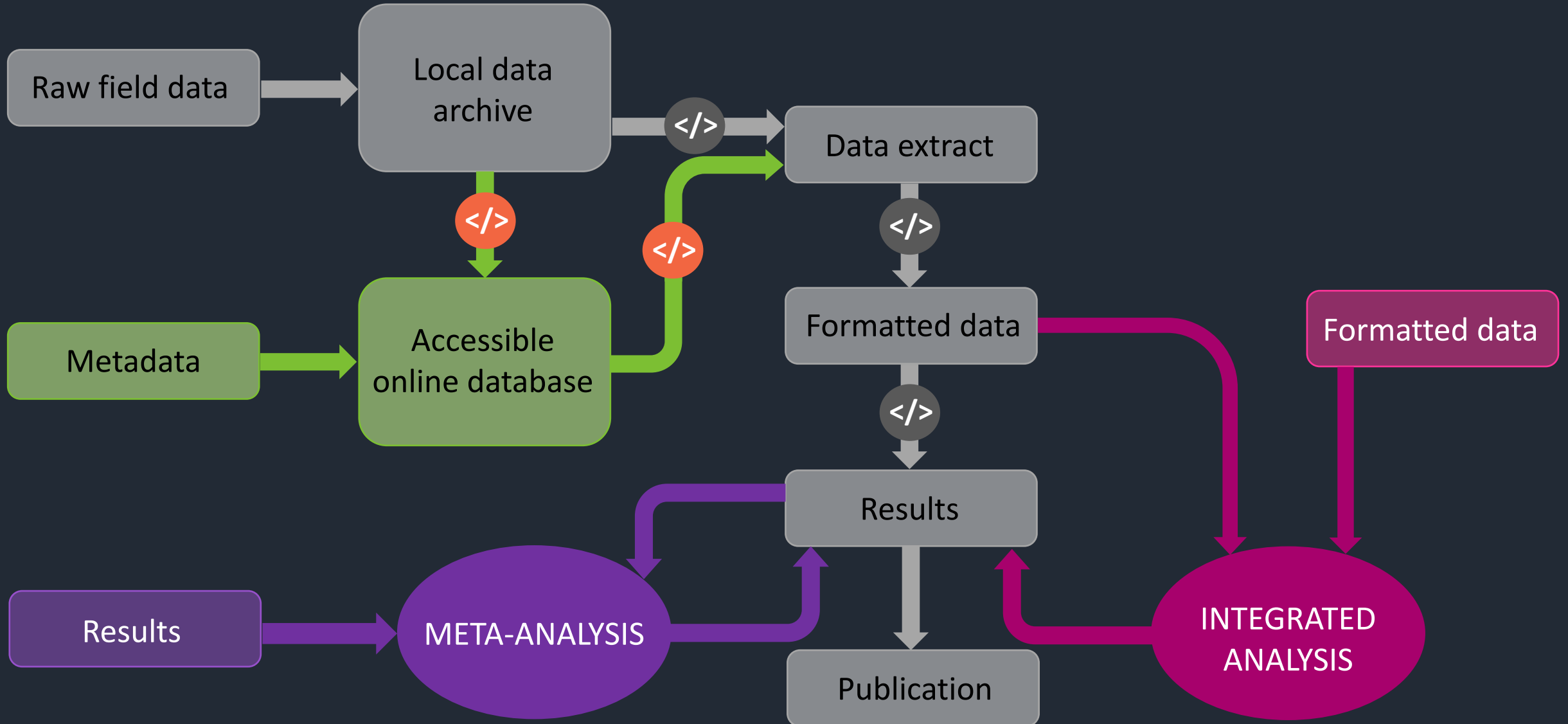
Open Code...

All code for this presentation is available here: <https://github.com/DrMattG/OpenCode-Tools>
(<https://github.com/DrMattG/OpenCode-Tools>)

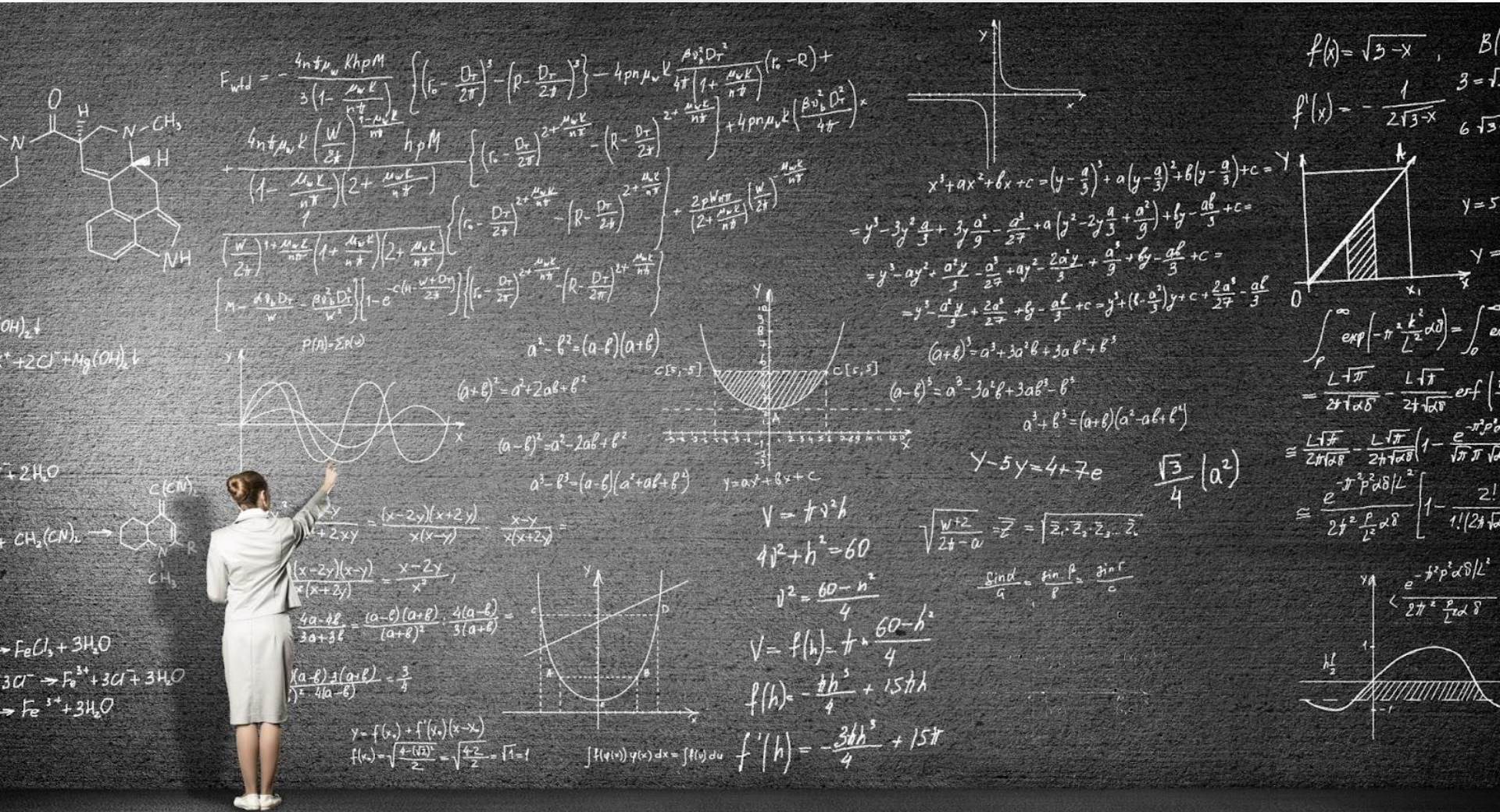


Living Norway Ecological Data Network

Images come from The Open Science training handbook: <https://open-science-training-handbook.github.io/> (<https://open-science-training-handbook.github.io/>)



Traditional teaching





Research based education

- Education embedded in 'real' research (research context)
- Learning by doing research (research skill)





Communicate like a scientist

Think like a scientist

Use tools & technology like a scientist

Critique & consensus

Peer-review

Relate to theory/
context

Write scientific
text

Illustrate,
use figures
and tables

Analyse and
statistically
test results

Collect and
manage data

Record and
Document

Use scientific
equipment

Sampling design

Explore ways
to test
predictions

Develop
hypothesis and
testable
predictions

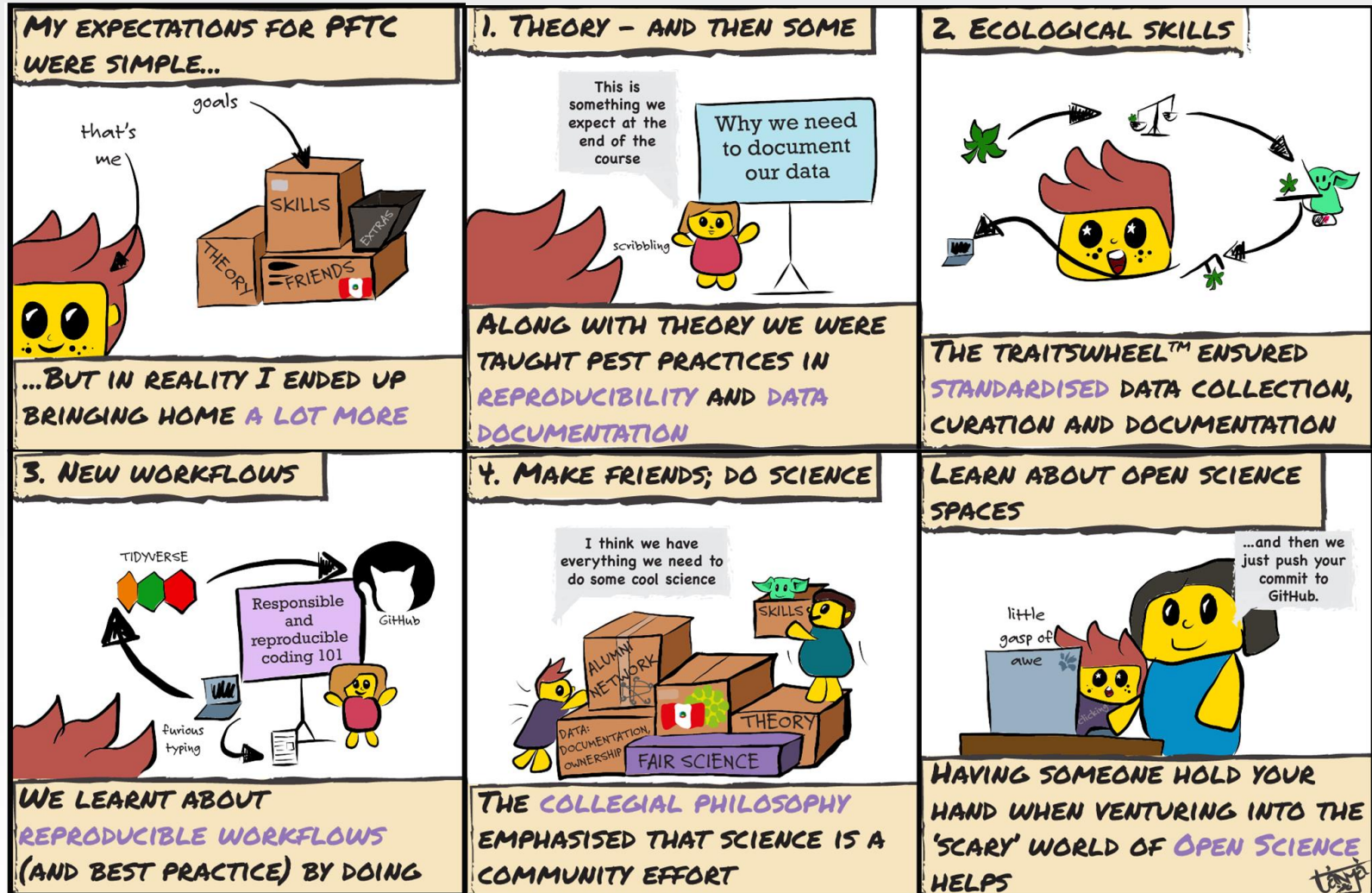
Make observations
Read literature

Formulate
scientific
questions

Elements of
the research-
teaching
nexus



Incorporate OS in field courses



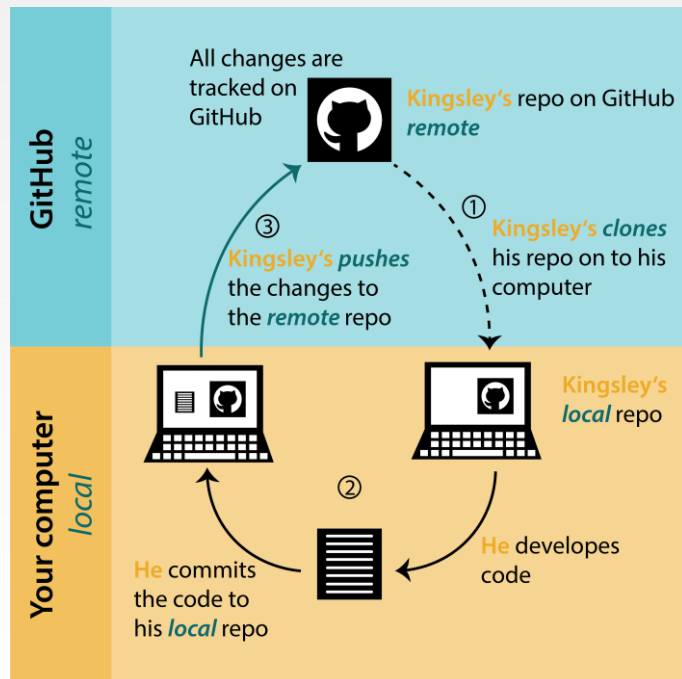
Incorporate OS in biology education and supervision



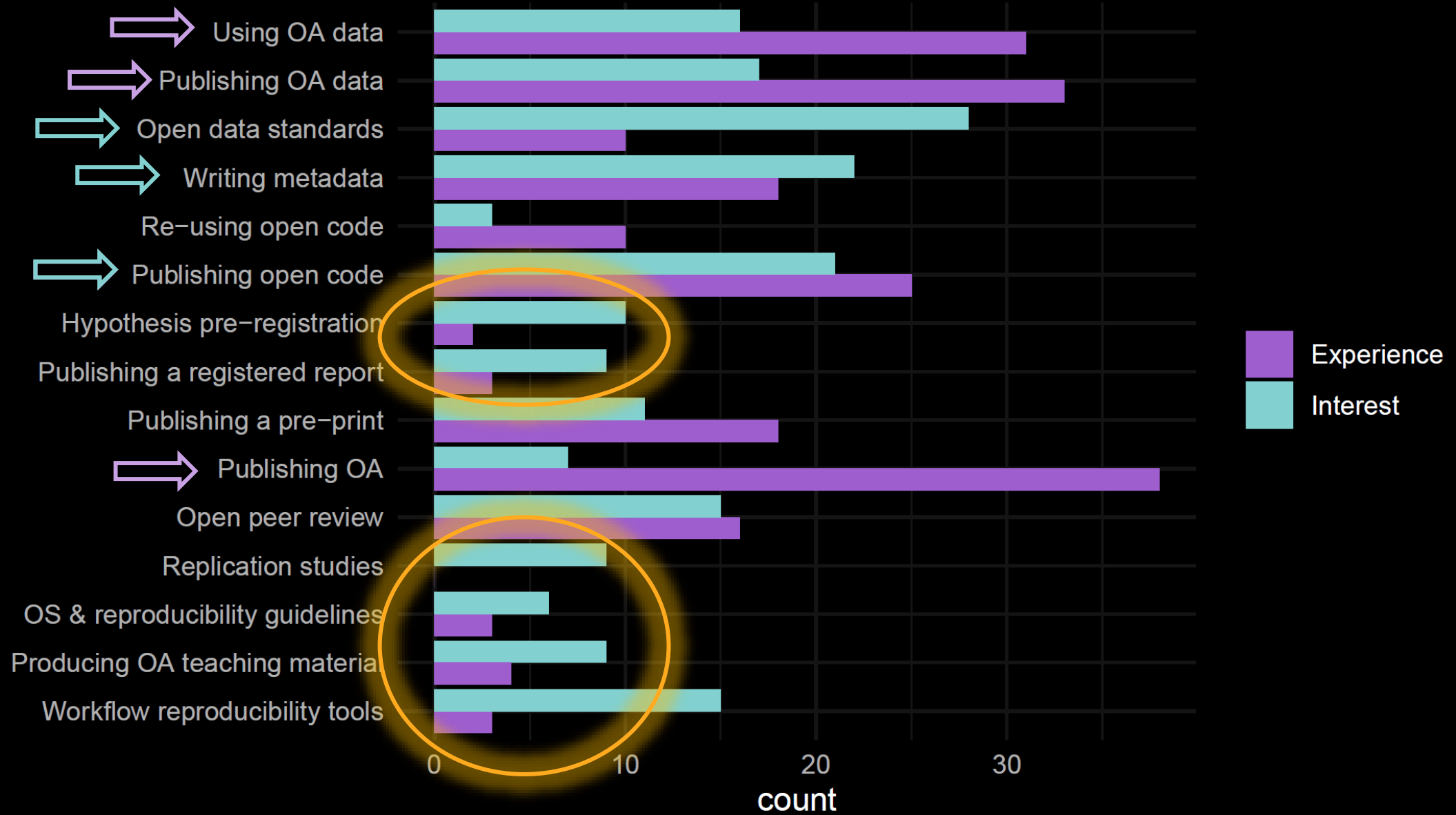
Best-practise

- Data management
- Data handling
- Coding
- Data analysis
- Registered reports

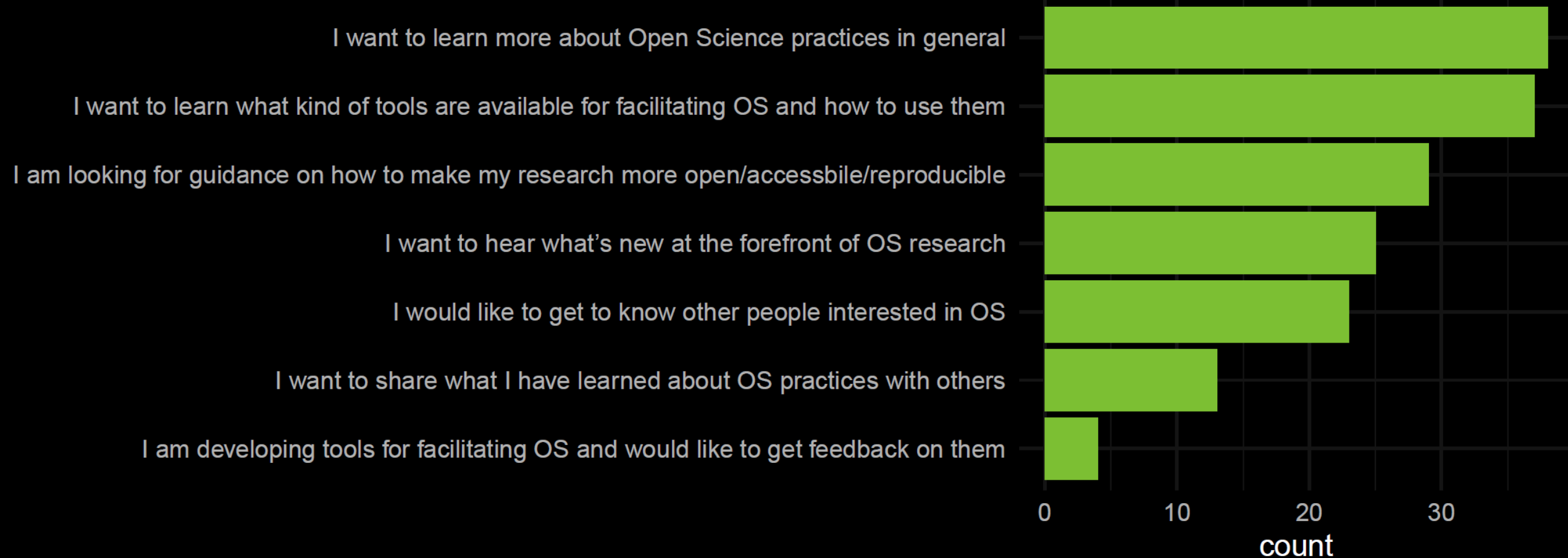
<https://biostats-r.github.io/biostats/>



Survey results



Survey results



Open Science Lab

Aims & Vision



- Build general competence
- Learn skills and tools

Open Science Lab

Aims & Vision



- Build general competence
- Learn skills and tools
- Share knowledge and experience
- Get help

Open Science Lab

Aims & Vision



- Build general competence
- Learn skills and tools
- Share knowledge and experience
- Get help
- Contribute to tool development
- Find tool/code «testers»

Open Science Lab

Aims & Vision



- Build general competence
- Learn skills and tools
- Share knowledge and experience
- Get help
- Contribute to tool development
- Find tool/code «testers»
- Be part of positive change!

Upcoming webinars



April

Seminar no. 2

Do's and don'ts for publishing your data

When: 07. April 2022

Time: 02:00 PM

Where: Teams

| When, where, and how to publish your (meta)data

May

Seminar no. 3

Best practices for accessible and reproducible code

When: 05. May 2022

Time: 02:00 PM

Where: Teams

| What makes code accessible and reproducible, and what the GitHub hype is all about

Upcoming webinars



- What's it about?

- State-of-the-art

- Available tools, tips & tricks

- Challenges & solutions

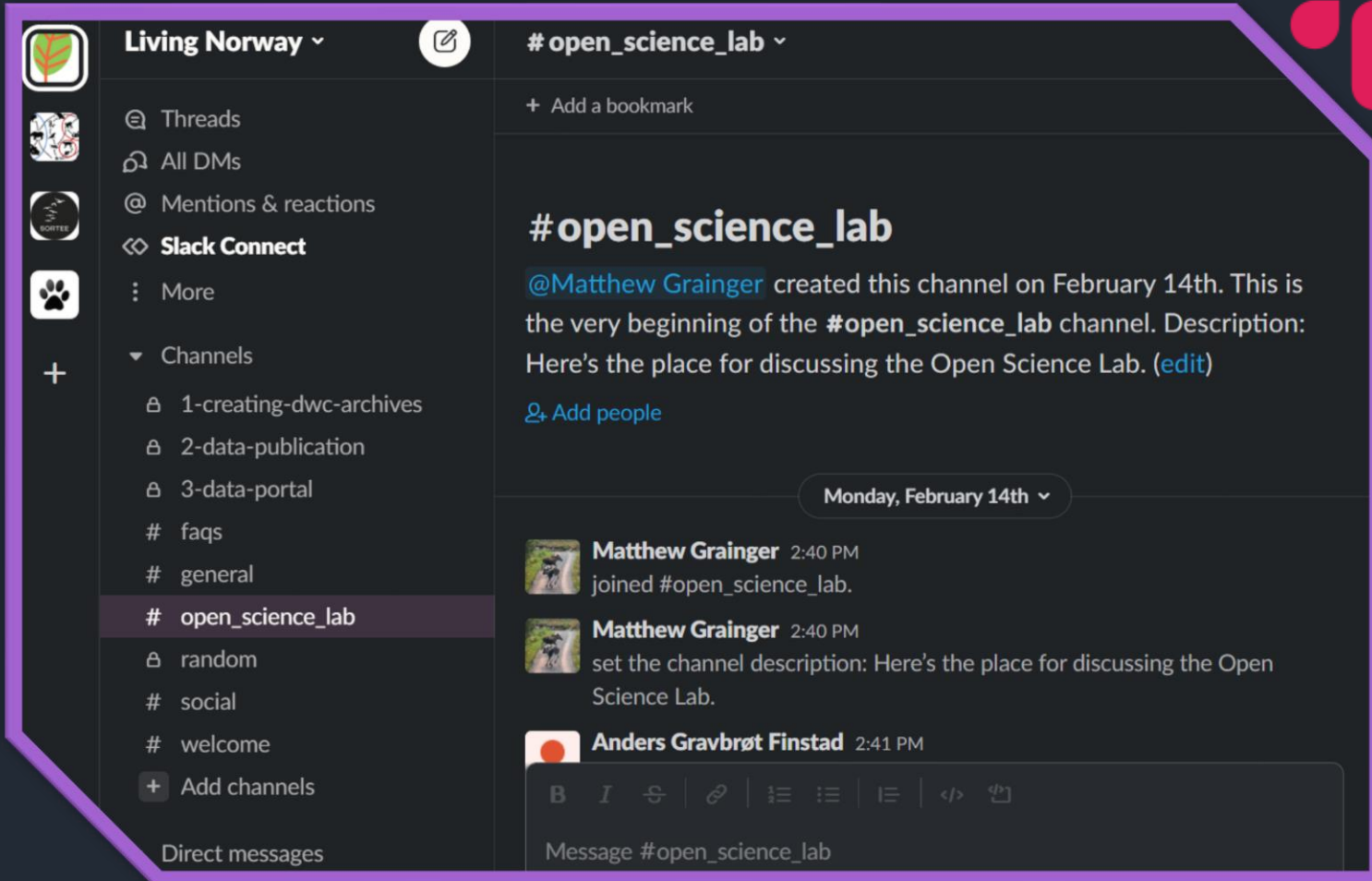
- Discussion rounds

Invited subject experts

→ Idea collection & polls on Slack 

Using Slack

Communication & Networking



open_science_lab

faqs

welcome

social

Other activities

Mini-
workshops

?

?

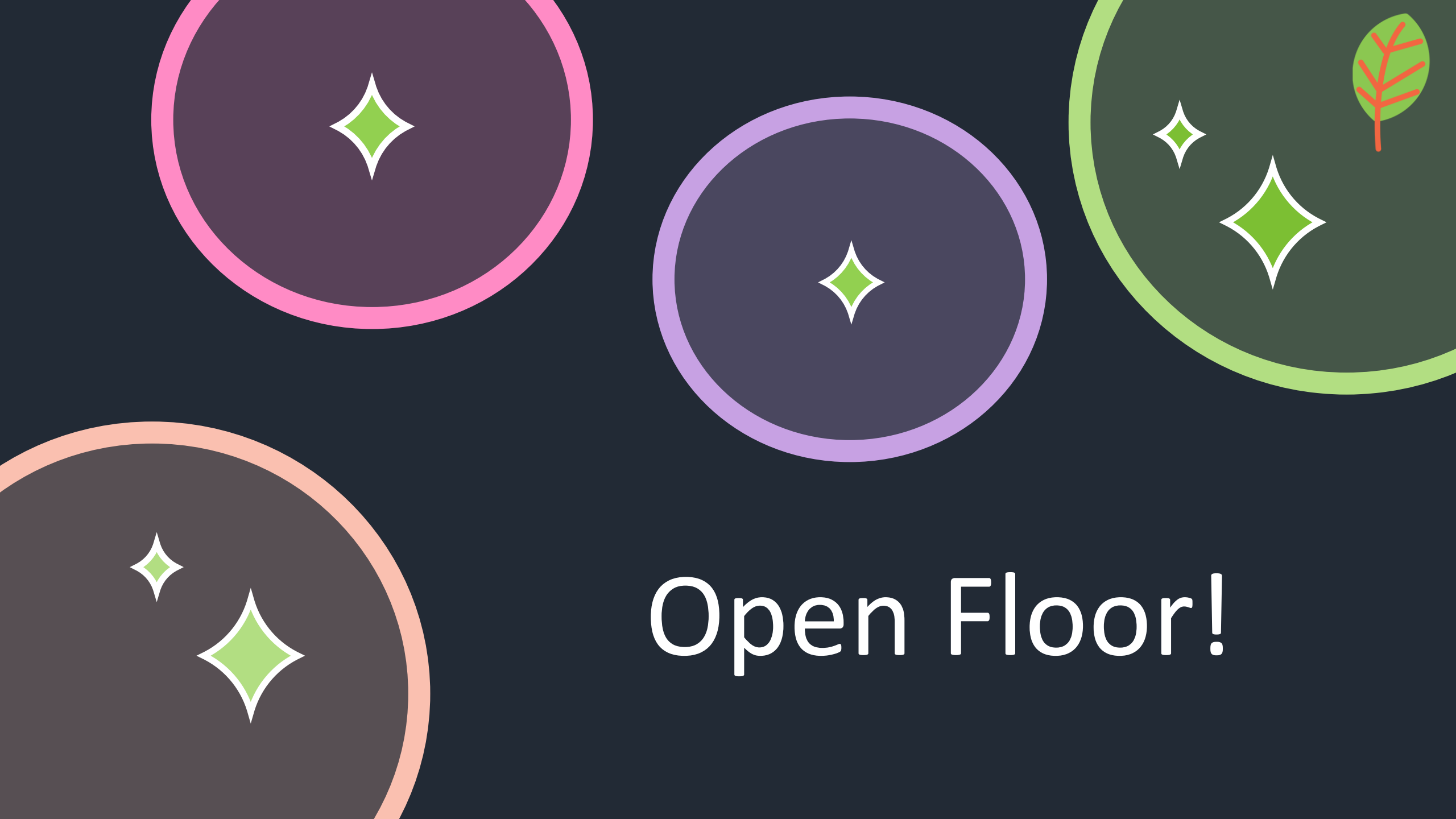
?

Hackathons

Skill
showcases

Outreach
(blog etc.)





Open Floor!