



# Bringing data in sight

## Data citations in research

Forum Bibliometrie 2021

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# The rise of research data



Data as 'first class research objects'

## The First Principle: Importance (status)

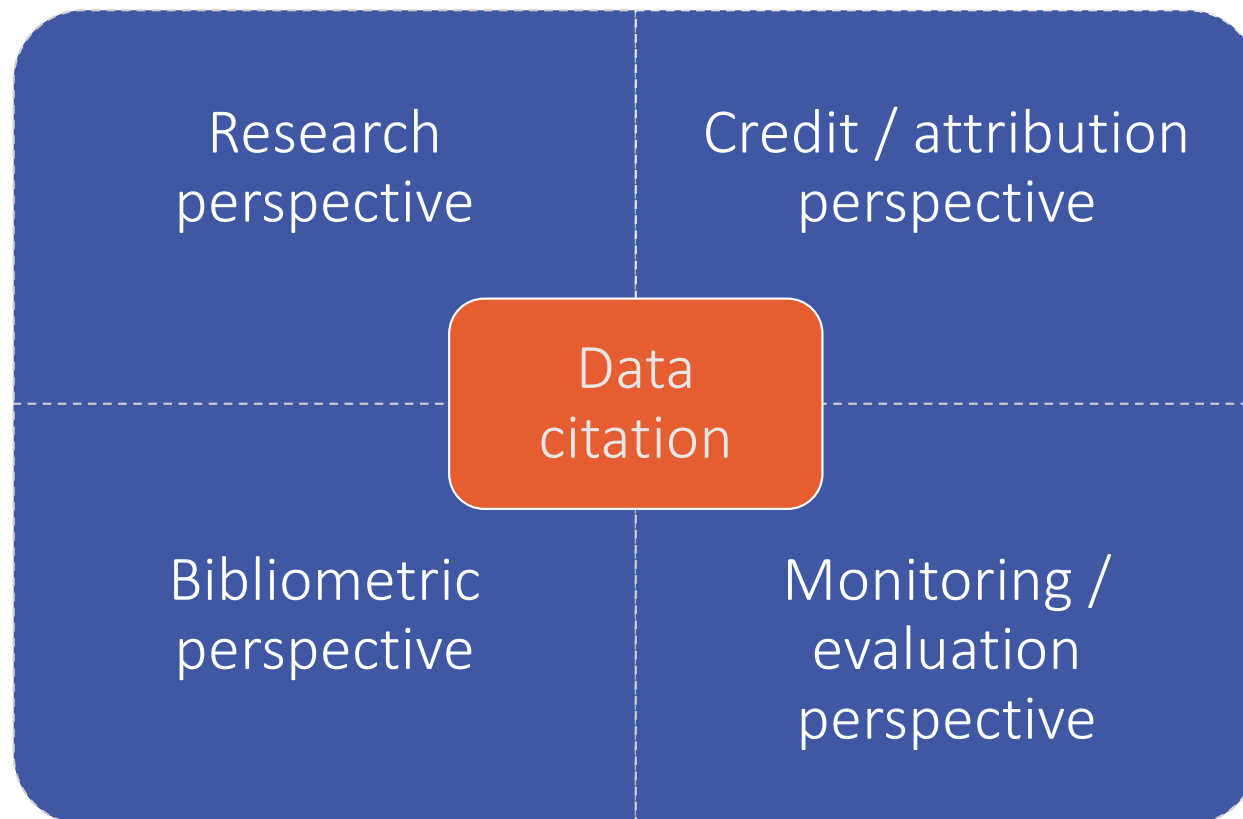
Data citations should be accorded the same importance in the scholarly record as citations of other research objects, such as publications

CODATA-ICSTI Task Group on Data Citation Standards and Practices, 2013.

Data Citation Synthesis Group: Joint Declaration of Data Citation Principles, 2014.

# The potentials and promises of data citation

Why is data citation important?



→ Why is data citation challenging?

→ Bringing data “in sight”

- Facilitating data citation
- Studying data citation practices

→ Bringing data insight

- Meaningful Data Counts project



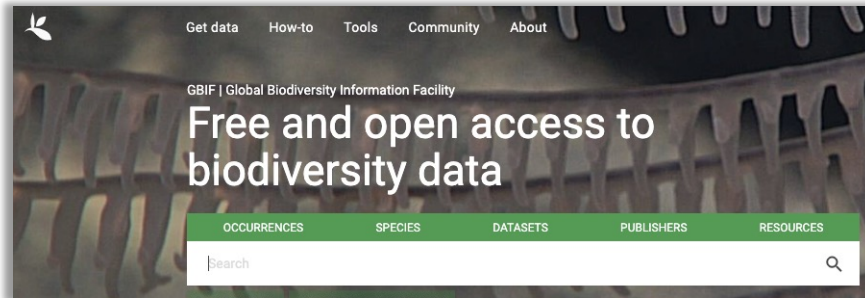
Why is data citation challenging?



# Challenges for data citation



## Granularity



**Global Register of Introduced and Invasive Species - United States of America (Contiguous)** Checklist dataset

The Global Register of Introduced and Invasive Species (GRIIS) presents validated and verified national checklists of introduced (alien) and invasive alien species at the country, territory, and assoc...

Published by Invasive Species Specialist Group ISSG

5,649 records 1 citation

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**Global Register of Introduced and Invasive Species - France** Checklist dataset

The Global Register of Introduced and Invasive Species (GRIIS) presents validated and verified national checklists of introduced (alien) and invasive alien species at the country, territory, and assoc...

Published by Invasive Species Specialist Group ISSG

3,182 records 1 citation

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**Global Register of Introduced and Invasive Species - Great Britain** Checklist dataset

**Global Register of Introduced and Invasive Species - Germany** Checklist dataset

The Global Register of Introduced and Invasive Species (GRIIS) presents validated and verified national checklists of introduced (alien) and invasive alien species at the country, territory, and assoc...

Published by Invasive Species Specialist Group ISSG

1,103 records

id	locationID	countryCode	occurrenceStatus	establishmentMeans
119000	Germany	DE	Present	Native Alien
119001	Germany	DE	Present	Alien
119002	Germany	DE	Present	Alien



Borgman, C. L. (2016). Data citation as a bibliometric oxymoron. In C. R. Sugimoto (Ed.), *Theories of informetrics and scholarly communication* (pp. 93–116). De Gruyter. <https://doi.org/10.1515/9783110308464-008>

Silvello, G. (2018). Theory and practice of data citation. *Journal of the Association for Information Science and Technology*, 69(1), 6–20. <https://doi.org/10.1002/asi.23917>

# Challenges for data citation

## Fixity – dynamic data

- Data which are constantly collected, evolving
- Example: High resolution climate change scenarios

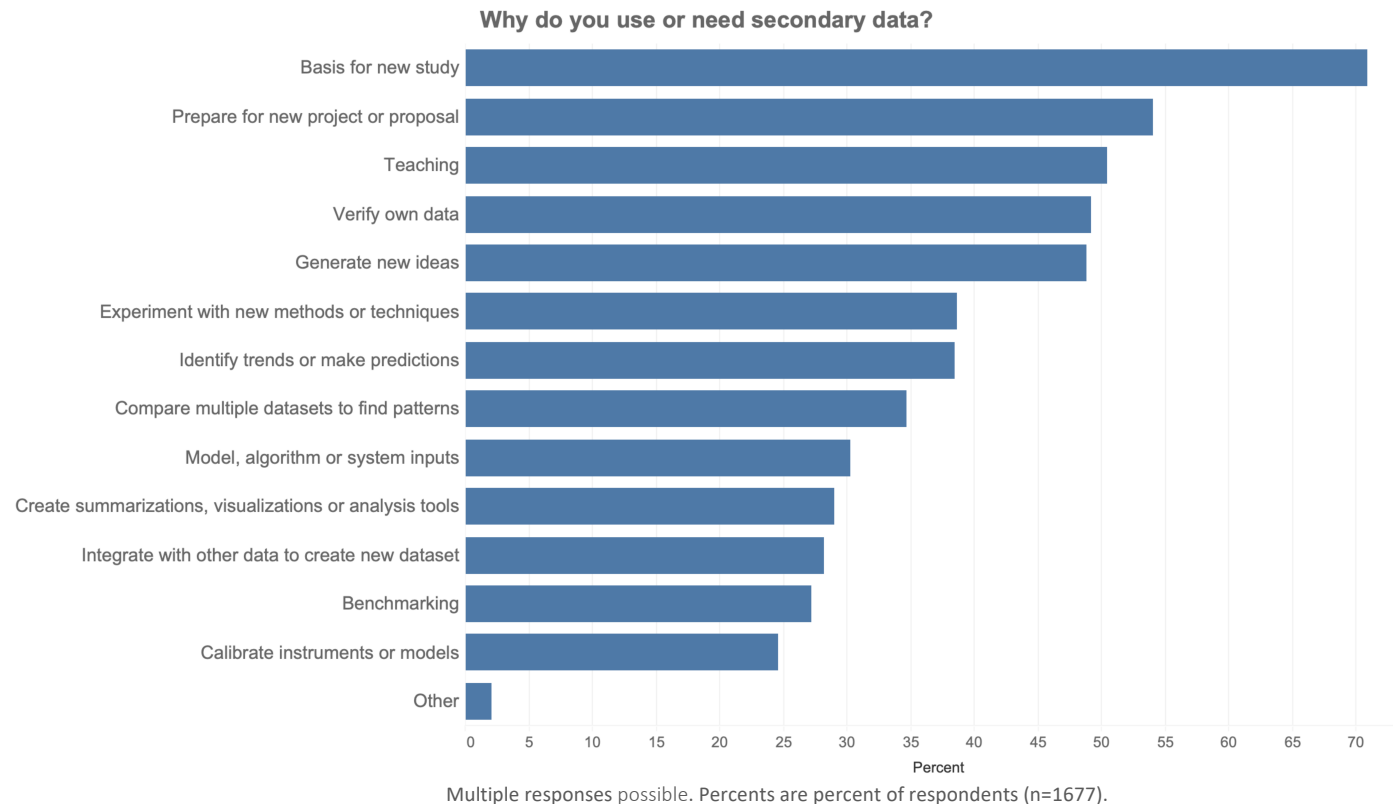




# Challenges for data citation



Not all uses may be cited.



Gregory, K., Groth, P. Scharnhorst, A., Wyatt, S. (2020). Lost or found? Discovering data needed for research. Harvard Data Science Review. <https://doi.org/10.1162/99608f92.e38165eb>



# Bringing data “in sight”

Facilitating data citation

Studying data citation practices

# Facilitating data citation



Many principles, roadmaps, projects, working groups

**FORCE11**  
The Future of Research Communications and e-Scholarship

ABOUT ▾ COMMUNITY ▾ CODE OF CONDUCT GROUPS RESOURCES ▾

## JOINT DECLARATION OF DATA CITATION PRINCIPLES

**PRINCIPLES**

The Data Citation Principles cover purpose, function and attributes of citations. These principles recognize the dual necessity of creating citation practices that are both human understandable and machine-actionable.

These citation principles are not comprehensive recommendations for data stewardship. And, as practices vary across communities and technologies will evolve over time, we do not include recommendations for specific implementations, but encourage communities to develop practices and tools that embody these principles.

The principles are grouped so as to facilitate understanding, rather than according to any perceived criteria of importance.

- 1. Importance**  
Data should be considered legitimate, citable products of research. Data citations should be accorded the same importance in the scholarly record as citations of other research objects, such as publications[1].
- 2. Credit and Attribution**

# SCIENTIFIC DATA

**OPEN** **A data citation roadmap for scientific publishers**

Helena Cousijn<sup>1,4,\*</sup>, Amye Kenall<sup>2,\*</sup>, Emma Ganley<sup>3</sup>, Melissa Harrison<sup>4</sup>, David Kernohan<sup>5</sup>, Thomas Lemberger<sup>6</sup>, Fiona Murphy<sup>7</sup>, Patrick Polischuk<sup>8</sup>, Simone Taylor<sup>9</sup>, Maryann Martone<sup>10</sup> & Tim Clark<sup>11,12</sup>

Received: 18 September 2018  
Accepted: 4 October 2018  
Published: 20 November 2018

This article presents a practical roadmap for scholarly publishers to implement data citation in accordance with the Joint Declaration of Data Citation Principles (JDDCP), a synopsis and harmonization of the recommendations of major science policy bodies. It was developed by the Publishers Early Adopters Expert Group as part of the Data Citation Implementation Pilot (DCIP) project, an initiative of FORCE11.org and the NIH BioCADDIE program. The structure of the roadmap presented here follows the "life of a paper" workflow and includes the categories Pre-submission, Submission, Production, and Publication. The roadmap is intended to be publisher-agnostic so that all publishers can use this as a starting point when implementing JDDCP-compliant data citation. Authors reading this roadmap will also better know what to expect from publishers and how to enable their own data citations to gain maximum impact, as well as complying with what will become increasingly common funder mandates on data transparency.

**Data Citation of Evolving Data** 

Recommendations of the Working Group on Data Citation (WGDC)  
Andreas Rauber, Ari Asmi, Dieter van Uytvanck and Stefan Pröll

**MAKE DATA COUNT**

**DataCite**

## Data Citation Index and (increasingly) DataCite

### Data Citation Index

- Clarivate (2012)
- 380+ data repositories indexed
- [Selection criteria](#): subject, repository attributes, geographic scope
- Document types: repository, data study, data set, software
- WoS subject categories / research areas

<https://clarivate.com/webofsciencegroup/solutions/webofscience-data-citation-index/>

### DataCite

- Non-profit organization (2009)
- Assigns DOIs to data, etc.
- DataCite members input metadata according to [DataCite schema](#)
- Or DataCite collects data externally
- 6 required metadata fields
- Subject not required

<https://datacite.org/>

## Lack of permanence, standardization, citations

- Possibly impermanent citations: URLs, low incidence of DOIs, link rot  
(Yoon et al., 2019; Peters et al., 2016; Pepe et al., 2014)
- Informal references in text or acknowledgements  
(Park et al., 2018)
- Majority of data remain uncited; certain data types cited more (DCI)  
(Robinson-Garcia et al., 2016; Peters et al., 2016)

## Disciplinary practices

- Hard sciences (biomedical in particular) account for ~80% of records in Data Citation Index  
(Torres-Salinas et al., 2014)
- Disciplinary distribution of data citations varies by document type (DCI)  
(Robinson-Garcia et al., 2016)
- Tendency to use URLs rather than DOIs in natural & life sciences (DCI)  
(Peters et al., 2016)

## Gaps and opportunities

- DataCite as a potential source for bibliometric research
  - But...metadata incompleteness, lack of standardization, ambiguous definitions (Robinson-Garcia et al., 2017)
- Knowledge of the 'why' behind data citation practices (Mayernik, 2012)
- Opportunity to critically examine assumptions about data citation (Parsons & Fox, 2013; Borgman, 2016)



# Bringing data *insight*

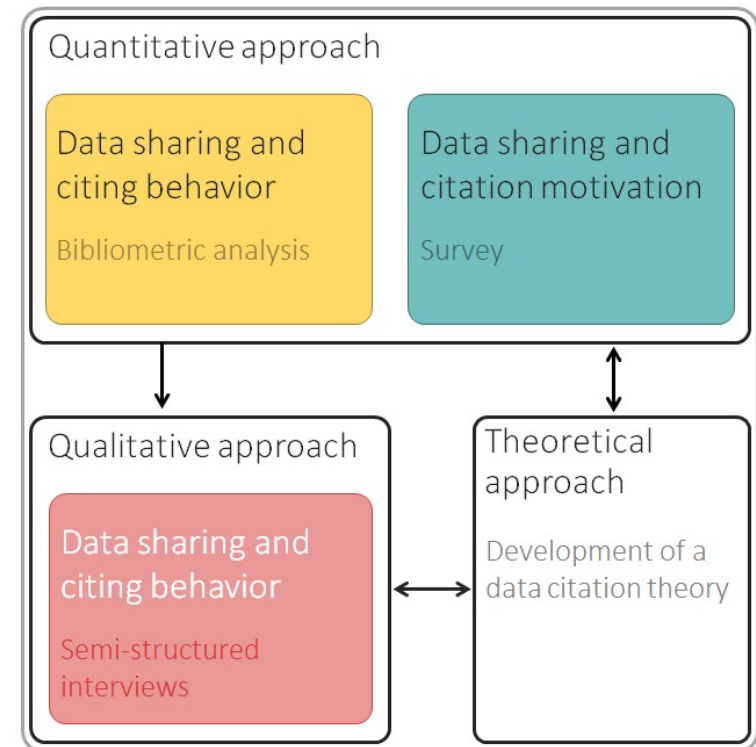
## Meaningful Data Counts



# Meaningful Data Counts Project

## MDC research project – Bibliometricians + infrastructure

- Generating empirical evidence
  - Data sharing and citation patterns
    - Bibliometric analysis
    - Theoretical approach
  - Motivations to (not) share, use and cite data
    - Survey
    - Semi-structured interviews
    - Theoretical approach
- Creating infrastructure for bibliometricians



# More questions than answers



## Bringing insight takes work

### → Disciplining data

- How are disciplinary fields assigned to data?
- What do they represent – context of creation, aboutness, context of reuse?
- How can metadata be enriched?

### → Data communities

- Going beyond disciplines

### → Responsible evaluation of data practices

- Situated within communities (Mustajoki et al; 2021)



# Thank you!

<https://zenodo.org/communities/meaningfuldatacounts>

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Thanks to the MDC project team:

Anton Ninkov, Stefanie Haustein, Isabella Peters

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