Open Science:

Introduction to bibliometrics

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“House rules”

- **Please turn on your camera if possible**
  - But keep your mic off unless you want to ask a question
- **Don’t hesitate to ask questions!**
  - You can use the chat
  - You can use the “raise your hand” feature
- **Rename yourself in zoom**
  - Your on-screen name need to match your registered name on Amethis
  - You can do so by clicking on the “…” next to your name in the participant list
- **This session is 2 hours long**
  - You need to attend at least **70%** for it to count (which means 1h30)
  - You also need an **active participation** during the quick quizzes

Outline

- **Introduction**
  - What is “Bibliometrics”?
  - Brief History – Why & How it is used?
- **Overview of main indicators**
  - Evaluating journals
  - Evaluating researchers
  - Evaluating articles
  - Other factors & indicators
- **Bibliometrics in the age of Open Science**
  - Potential abuses
  - Going forward

Wooclap activity

1 Go to wooclap.com

2 Enter the event code in the top banner

Event code
MNACOD

Enable answers by SMS

What is your main research area?

You can be as **general**

(e.g. *Biology*)

or as **specific** as you want

(e.g. "*The Aerodynamics of Reusable Shopping Bags in Urban Wind Tunnels*")

Event code

MNACOD

What are “*Bibliometrics*”?

What are “bibliometrics”?

Do you know what “bibliometrics**” are?**
What does it mean/represent?

- Yes
- No
- Unsure

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Definition of bibliometrics

> ***Bibliometrics*** *is the application of statistical methods to the study of* ***bibliographic data*** *(…) and is closely associated with* ***scientometrics*** *(the analysis of* ***scientific metrics and indicators****).*

Definition from the Wikipedia article "Bibliometrics"

For us, **Bibliometrics** (or scientometrics, interchangeably) is the study of metrics on scientific publications, measuring impact and reach.

→ *specifically on journals, articles, citations, researchers, etc…*

History of Bibliometrics

When was the first recorded instance of bibliometrics?

- Before 1900
- Between 1901 & 1949
- Between 1950 & 1979
- After 1980

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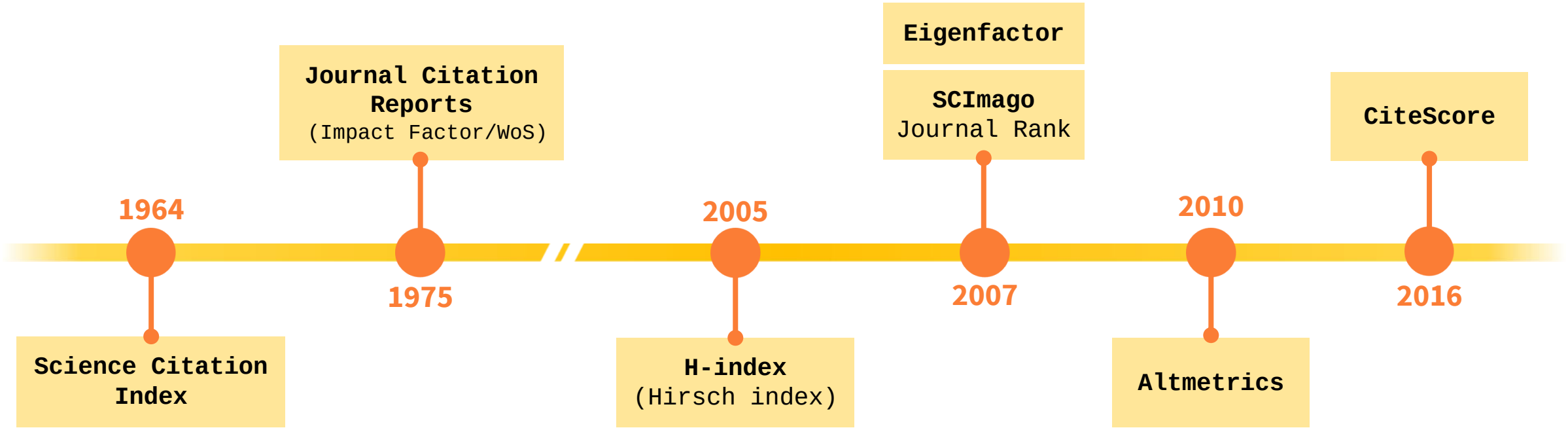
Brief history

*The **first occurrence** of analysis and statistics of bibliographical data was in **1873** with **Shepard's Citations**. Later, It directly inspired the **Science Citation Index**, created in **1964**, by Eugene Garfield, now owned by **Clarivate**.*

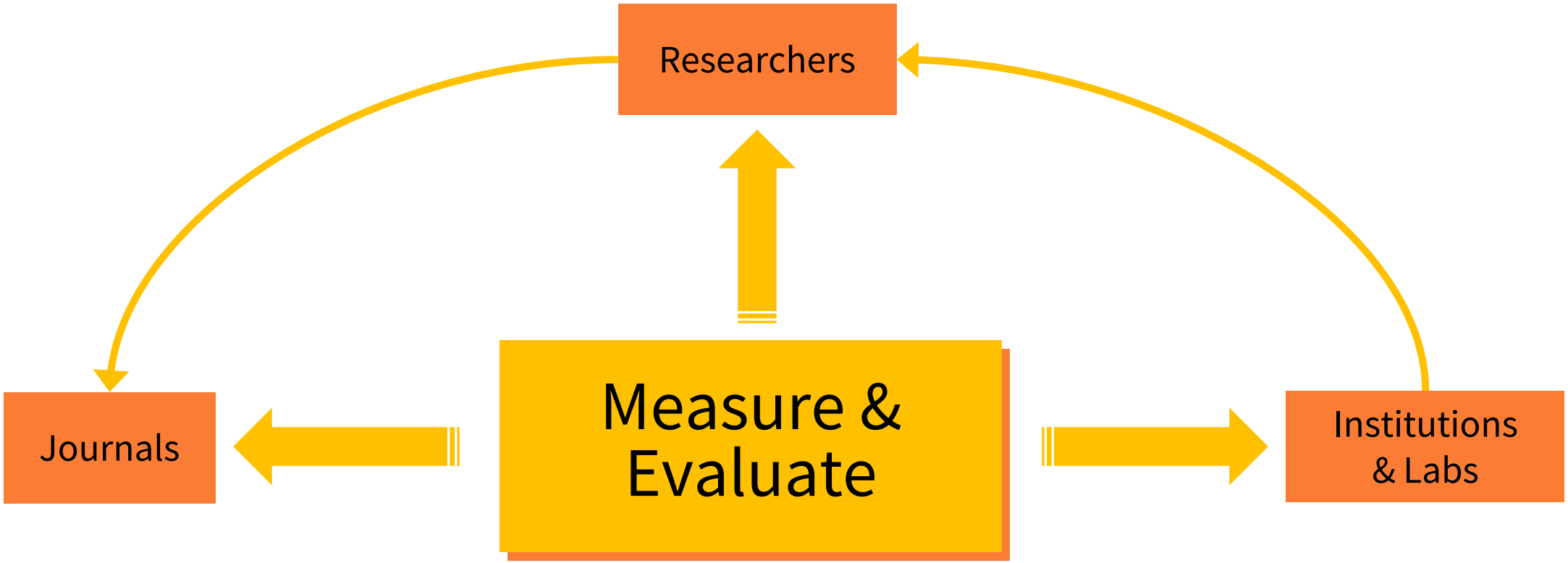
Shepard's Citations was used in **US legal research** as a way to provide **a list of all authorities citing a particular case**.

*The **first use of the term** bibliometrics was in **1934** in French, by Paul Otlet, and in **1969** in English by Alan Pritchard, in place of the alternative "statistical bibliography". **Bibliometrics as we know it** started in the **1960s** and focused mainly on **indexing citations** of publications.*

Timeline of main current bibliometrics tools



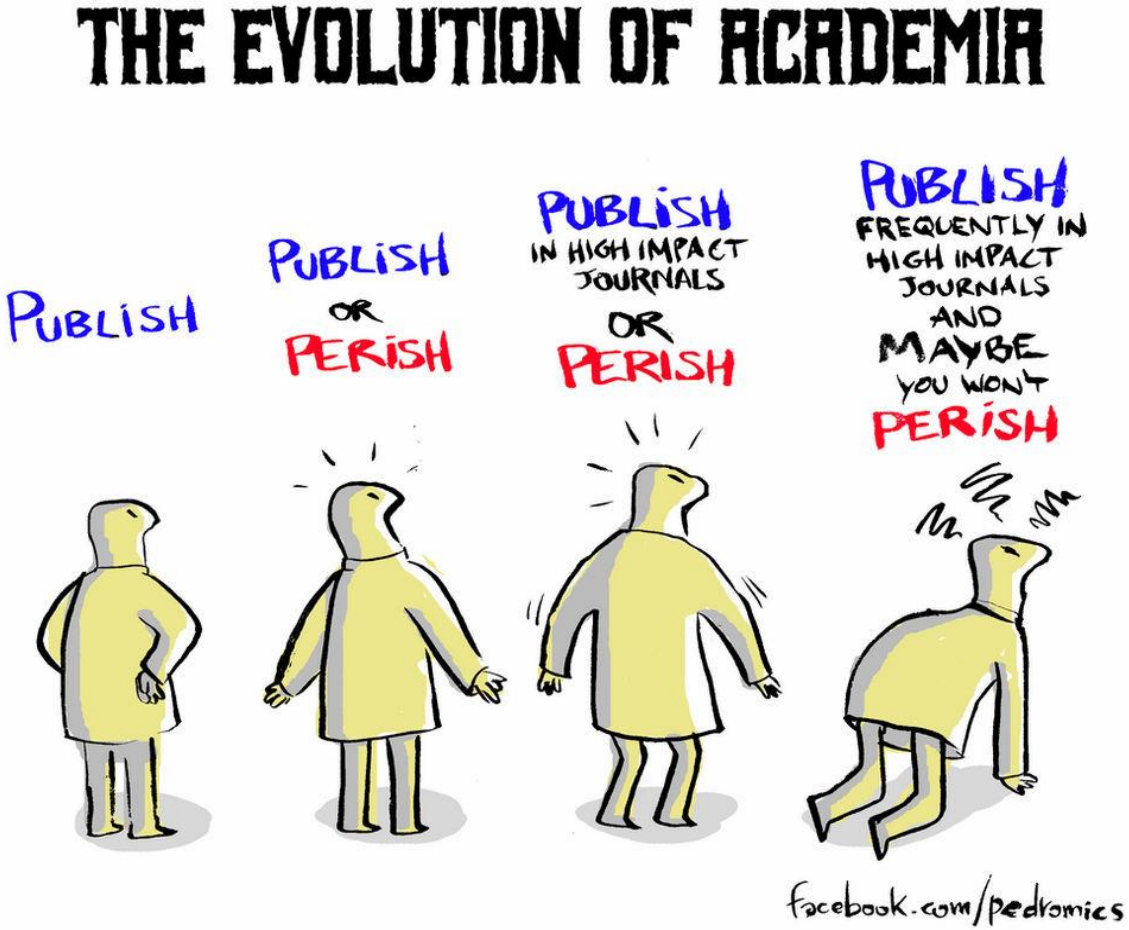
How & Why are these metrics used?



How & Why are these metrics used?

Main uses of these metrics:

- Grant applications
- Institutional funding
- Hiring & Promotions



How & Why are these metrics used?

Evaluations can be based on:

`Qualitative Data` **AND/OR** `Quantitative Data`

Bibliometrics is **fundamentally** based on **quantitative data**

Where does the data come from?

Commercial databases:

- **Clarivate**:
  Web of Science, InCite, JCR, Citation Indexes
- **Elsevier:**
  Scopus, SCImago, SciVal

Open databases:

- **Crossref** (Open bibliographic metadata)
- **OpenAlex:** Scopus, SCImago, SciVal

Overview of main indicators

Different indicators for different goals

- **Evaluating journals**
  - Impact Factor & its equivalent
- **Evaluating researchers**
  - H-Index
- **Evaluating articles**
  - Citation number
  - Altmetrics
- **Other indicators**

Journal metrics: Impact Factor

What does it represent?

"**Impact**" of the journal,
i.e. its reputation

How is it calculated?

$$IF_y = \frac{Citations_y}{Publications_{y-1} + Publications_{y-2}}$$

Based on the citations for the past 2 years compared to the articles published during the same period, as recorded in the Web of Science database.

Journal metrics: Impact Factor

What is the impact factor of the journal *Nature*?

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Journal metrics: Impact Factor

Do you think this is a good IF or not?

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Journal metrics: Impact Factor

Scale of IF:

Depending on the field, the “highest” IF can be widely different

The Observatory of International Research

You can check the OOIR website to compare

Journal metrics: Other indicators

CiteScore

Based on data from Scopus, same formula as IF but based on past 4 years.

Eigenfactor

Same as SCImago Journal Rank but based on data from Web Of Science

SCImago Journal Rank

Based on Scopus, compares the number of citations received by a journal and the prestige of the journals where the citations come from

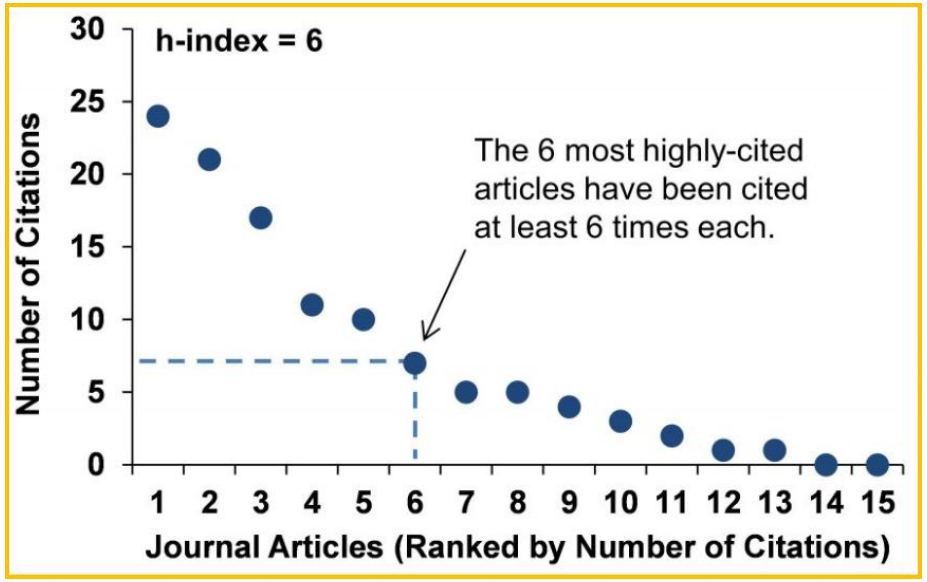
ELSEVIER

Clarivate™

Evaluating Researchers: H-index or Hirsch index

What does it represent?

"**Impact**" of the researcher



h-index

Paper	Number of Citations
1	100
2	78
3	62
4	43
5	32
6	18
7	3
8	2
9	1
10	1

h-index = 6

How is it calculated?

Based on the ratio between the number of publications and how many times they were cited.

Evaluating Researchers: H-index

Can you find the h-index of Brice Trouillet?

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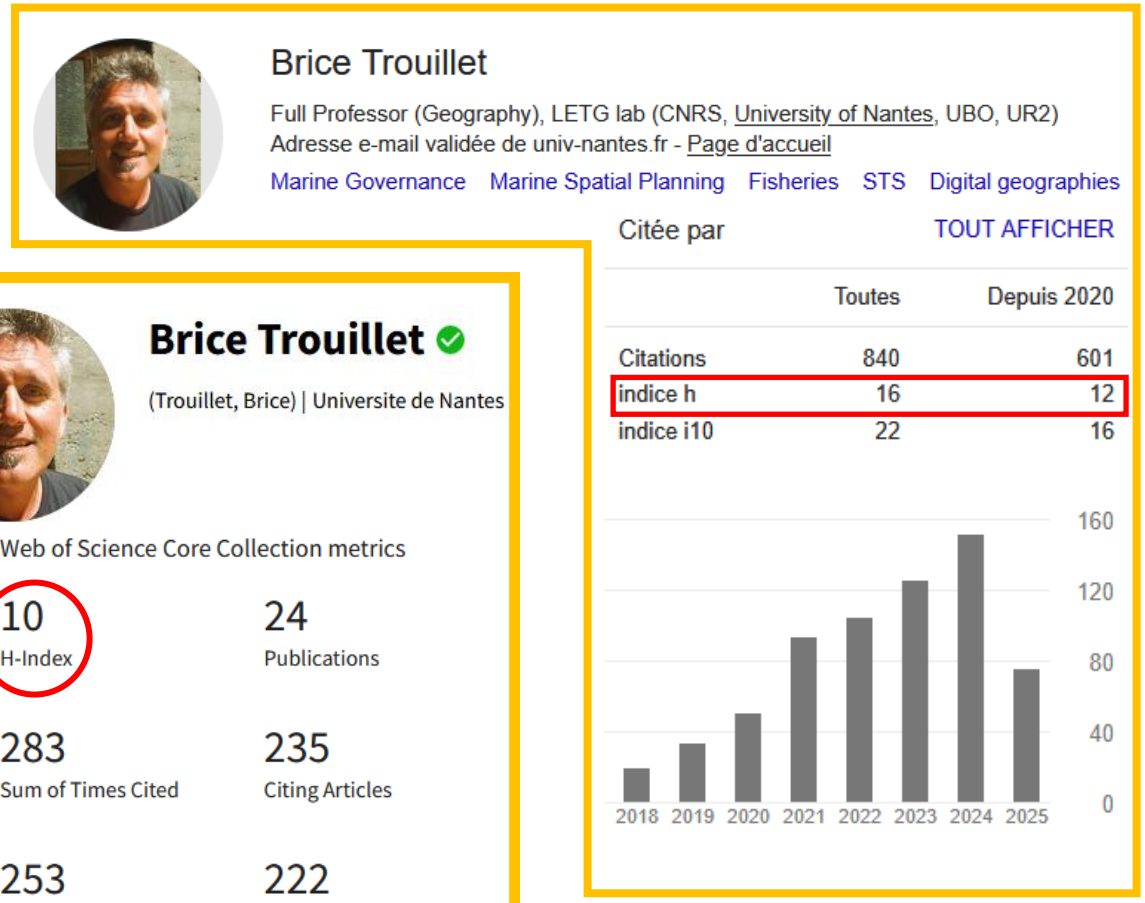
Evaluating Researchers: H-index or Hirsch index

Why does it varies?

Depends on where the data is coming from. Not all citations and articles are counted by Scopus, Web of Science, or Google Scholar.



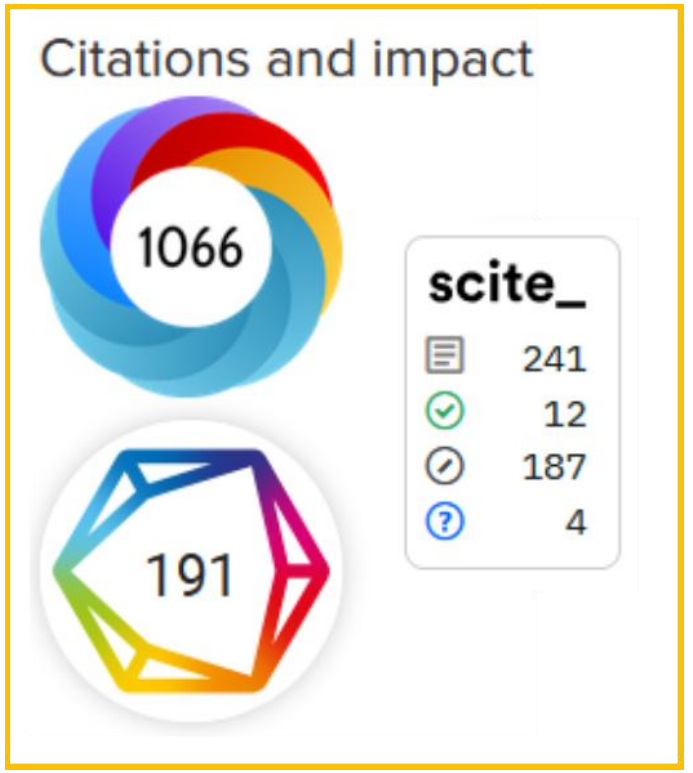
Evaluating Articles: Altmetrics & Citations

What are altmetrics?

“Impact” on social media of a publication.

How is it calculated?

Based on the engagement a publication will generate on social media. Provided by many different actors.



N.B: *Altmetrics* & *Altmetric* are different. The first represent “alternative metrics” as a whole, and the second is a proprietary metric.

Evaluating Articles: Altmetrics & Citations

List of University Rankings

- **Times Higher Education** (THE) World University Rankings
- **QS World** University Rankings
- **Shanghai** Jiao Tong University Academic Ranking of World Universities
- CWTS **Leiden** Ranking

Other Metrics: University Rankings

What do you believe has the most weight in University Rankings?

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SIGAPS Points: a French oddity in Medicine

Author Position

- **4 pts** for 1st & last
- **3 pts** for 2nd
- **2 pts** for 3rd & 2nd-to-last
- **1 pts** for any other place

Journal Rank

- **8 pts** for Rank A Journal
- **6 pts** for Rank B Journal
- **4 pts** for Rank C Journal
- **3 pts** for Rank D Journal
- **2 pts** for Rank E Journal
- **1 pt** for unranked Journal

Total Points

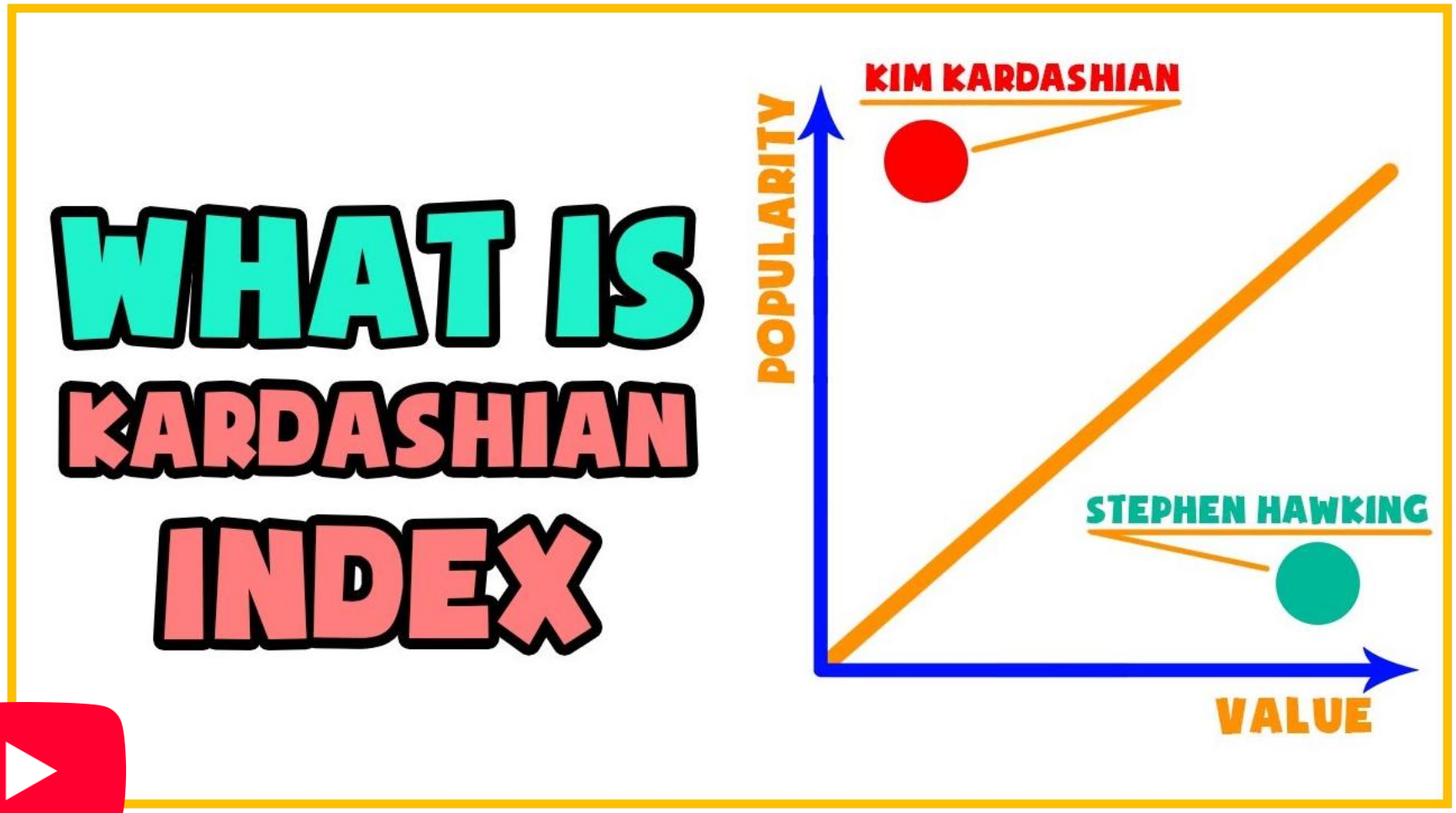
For the institution

1 point = 648€ per year for 4 year

For the researcher

Career Advancement:
200 pts for MCU
500 pts for PU

Other Metrics: Kardashian Index



Bibliometrics in the age of Open Science

Potential abuses

“When a measure becomes a target, it ceases to be a good measure”

“Goodhart's Law”

Focus on metrics leads to abuses and lower quality research:

- **Salami-slicing**: making multiple publications based on something that could have been just one article to multiply output.
- With **SIGAPS**: multiplication of authorship in multiple CHU to gain more points.
- Rise of **predatory publishing**: to grow publication lists.
- **Paper & Citation Mills** / **Authorship for sale**: quick way to exchange money for articles, citations, or author placement.

Movement to change Research Assessment

San Francisco DORA (2012)

Declaration **O**n **R**esearch **A**ssessment:
→ call to move away from Journal-based metrics and to focus on quality of research instead of its publisher

Leiden Manifesto (2015)

10 principles to guide research evaluation:
→ call to combine quantitative and qualitative evaluation and to be aware of the biases in current metrics

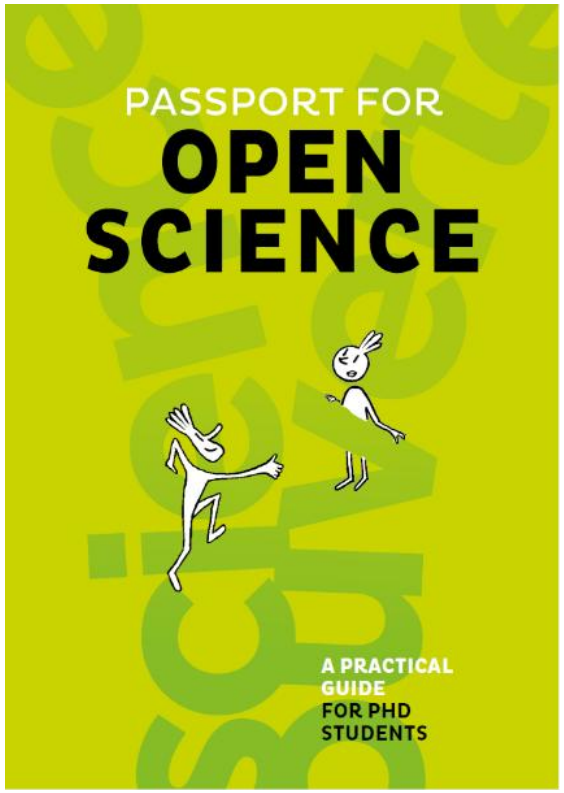
Coalition for Advancing Research Assessment

Joined by Nantes University in 2025

With the goal of establishing new directives on research assessment, more transparency in metrics and assessment.

Helpful guides

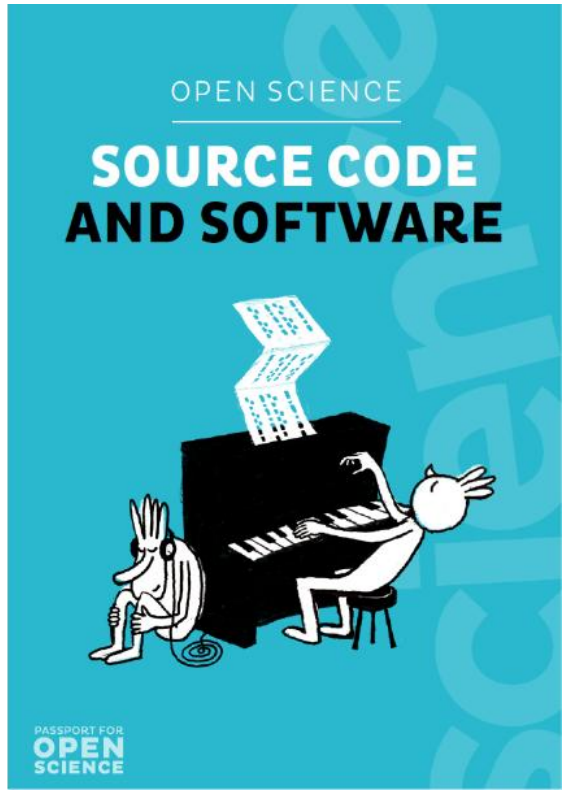
For further information: Open Science Guides



[PASSPORT FOR OPEN SCIENCE]

[JOIN THE DEBATE]

[RESEARCH DATA]



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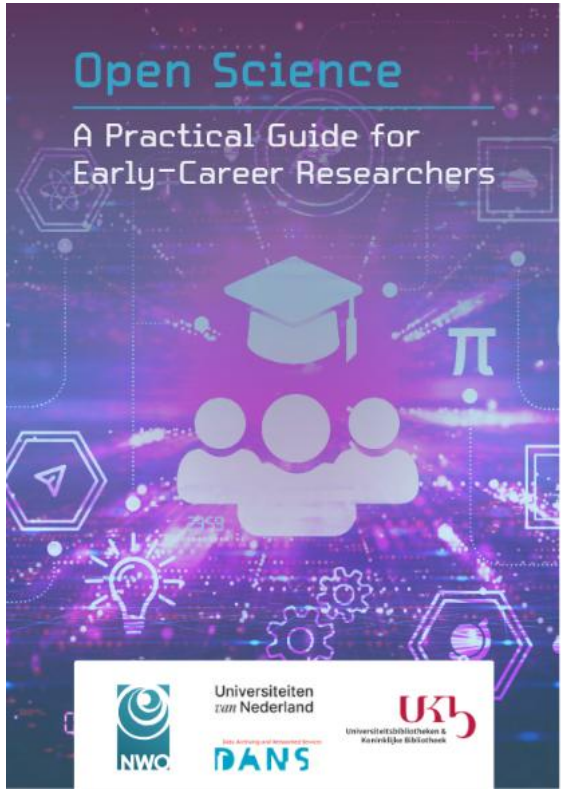
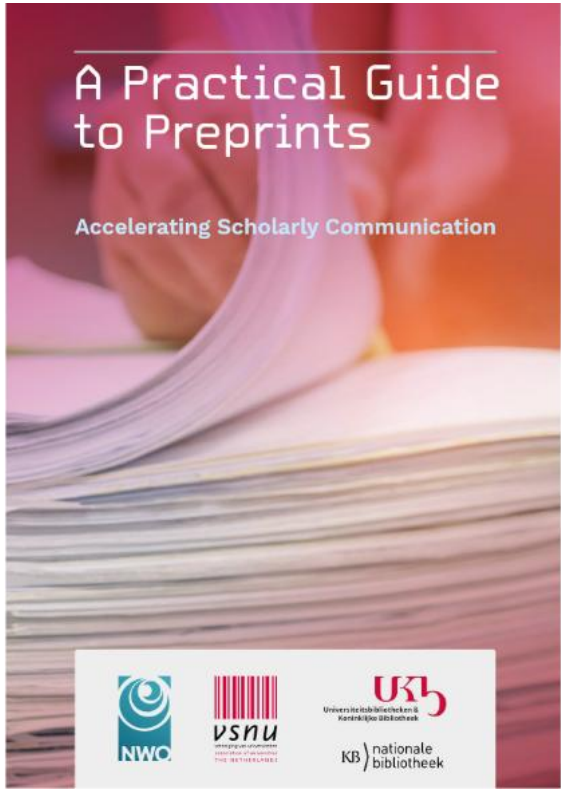
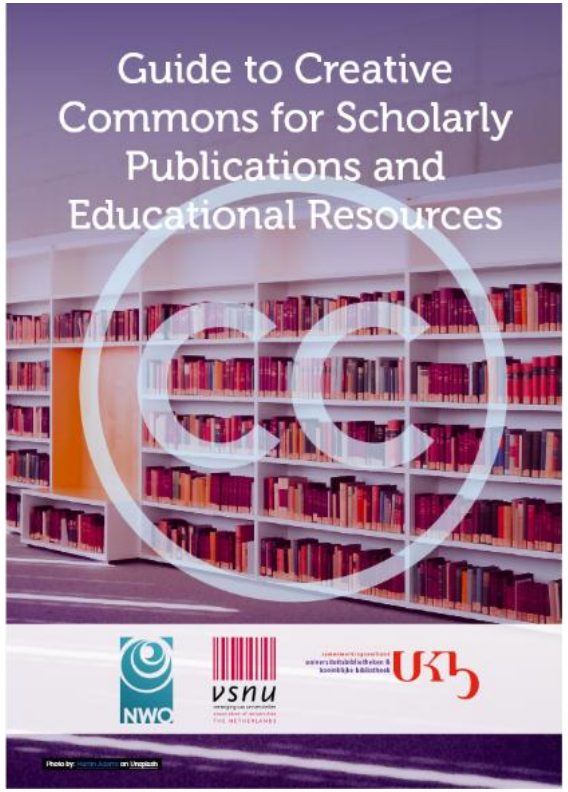
For further information: Open Science Guides (NL)



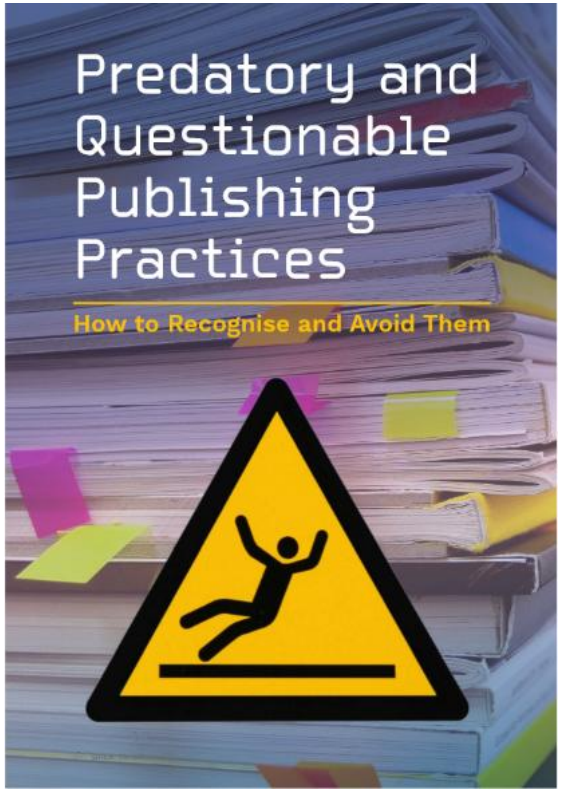
Open Science: A Practical Guide for Early-Career Researchers



Preprints: Accelerating Scholarly Communication

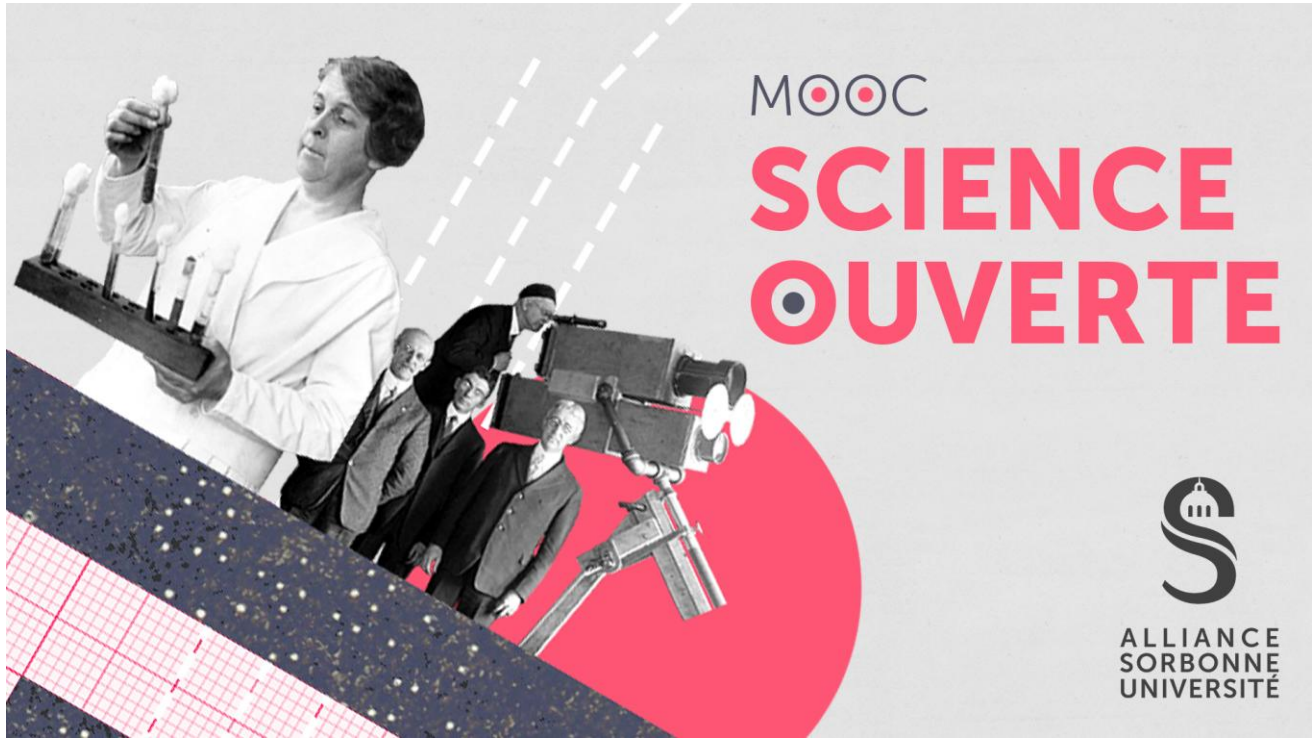


Guide to Creative Commons for Scholarly Publications and Educational Resources



Predatory and Questionable Publishing Practices: How to Recognise and Avoid Them

For further information: Open Science MOOC



Course plan

- ⊕ INTRODUCTION module
- ⊕ PUBLICATION module
- ⊕ RESEARCH DATA module
- ⊕ EVALUATION, TRUST, INTEGRITY module
- ⊕ CITIZEN SCIENCE module
- ⊕ SCIENCES AND SOCIETY module
- ⊕ PERSPECTIVES module

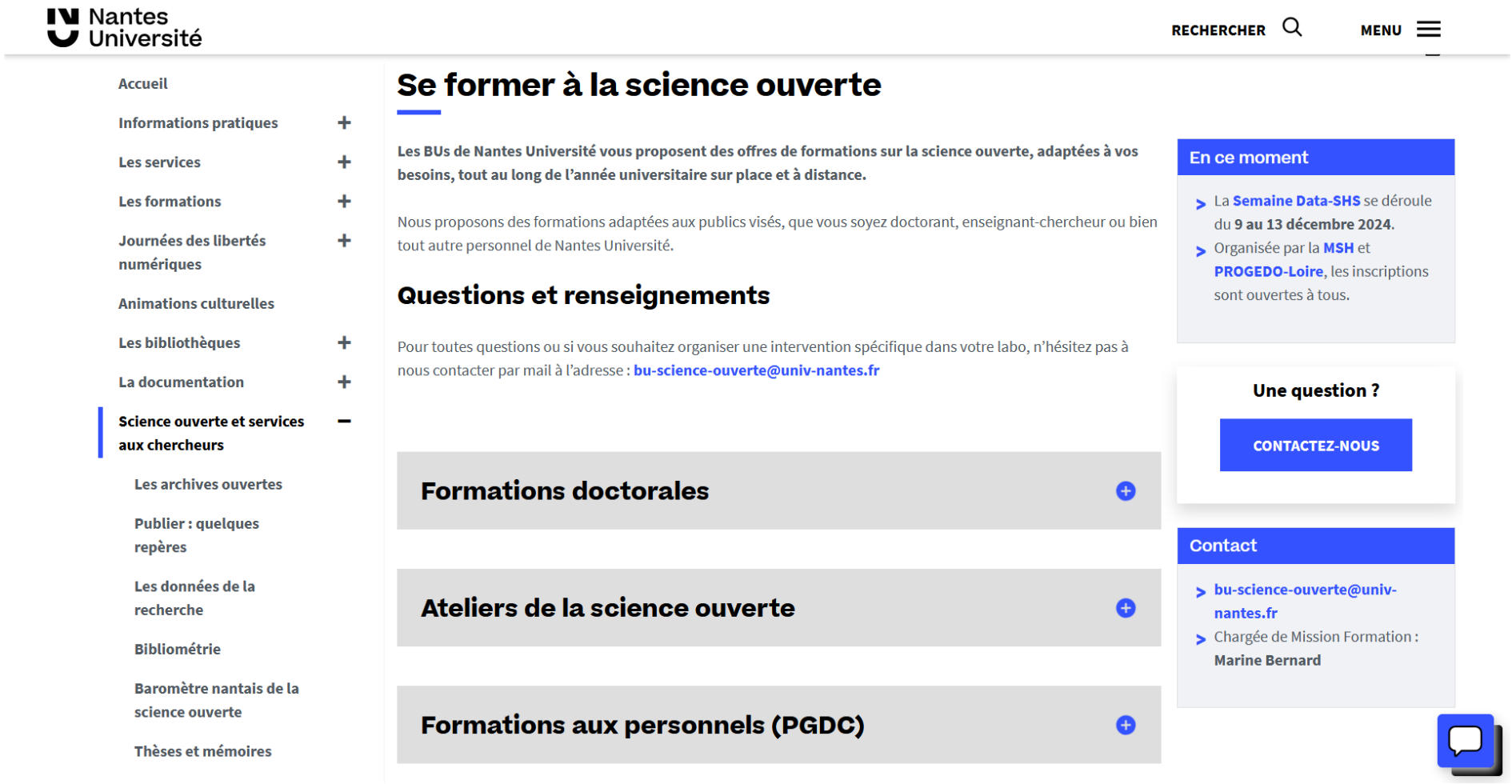
Available on Fun MOOC (in FR & EN)

FUN FRANCE UNIVERSITÉ NUMÉRIQUE

https://www.fun-mooc.fr/fr/cours/la-science-ouverte/

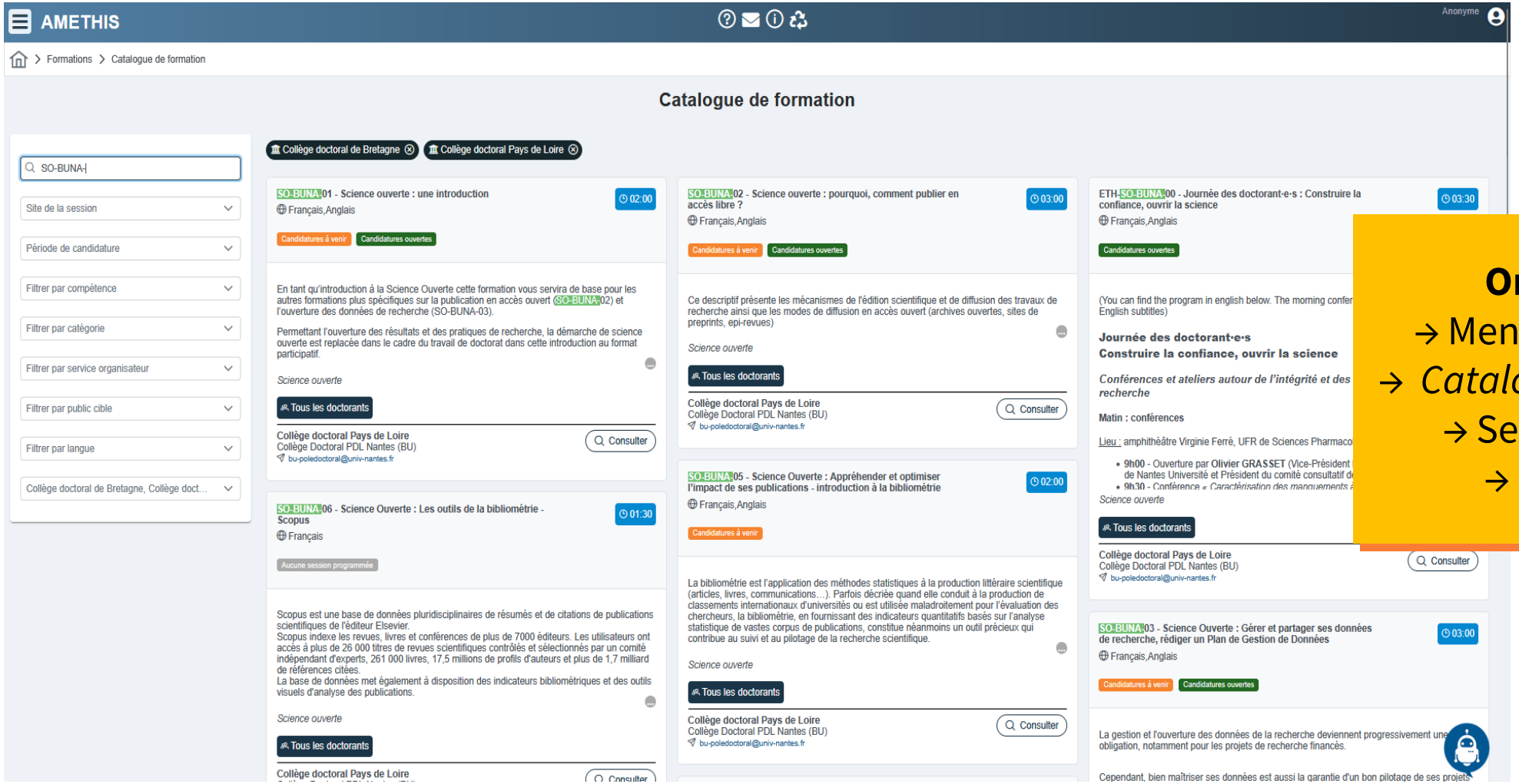
- Open to all. Self-paced. Free. Only require to register on the platform. Bilingual.
- **6 thematic modules** that can be taken in any order.

Our other training opportunities



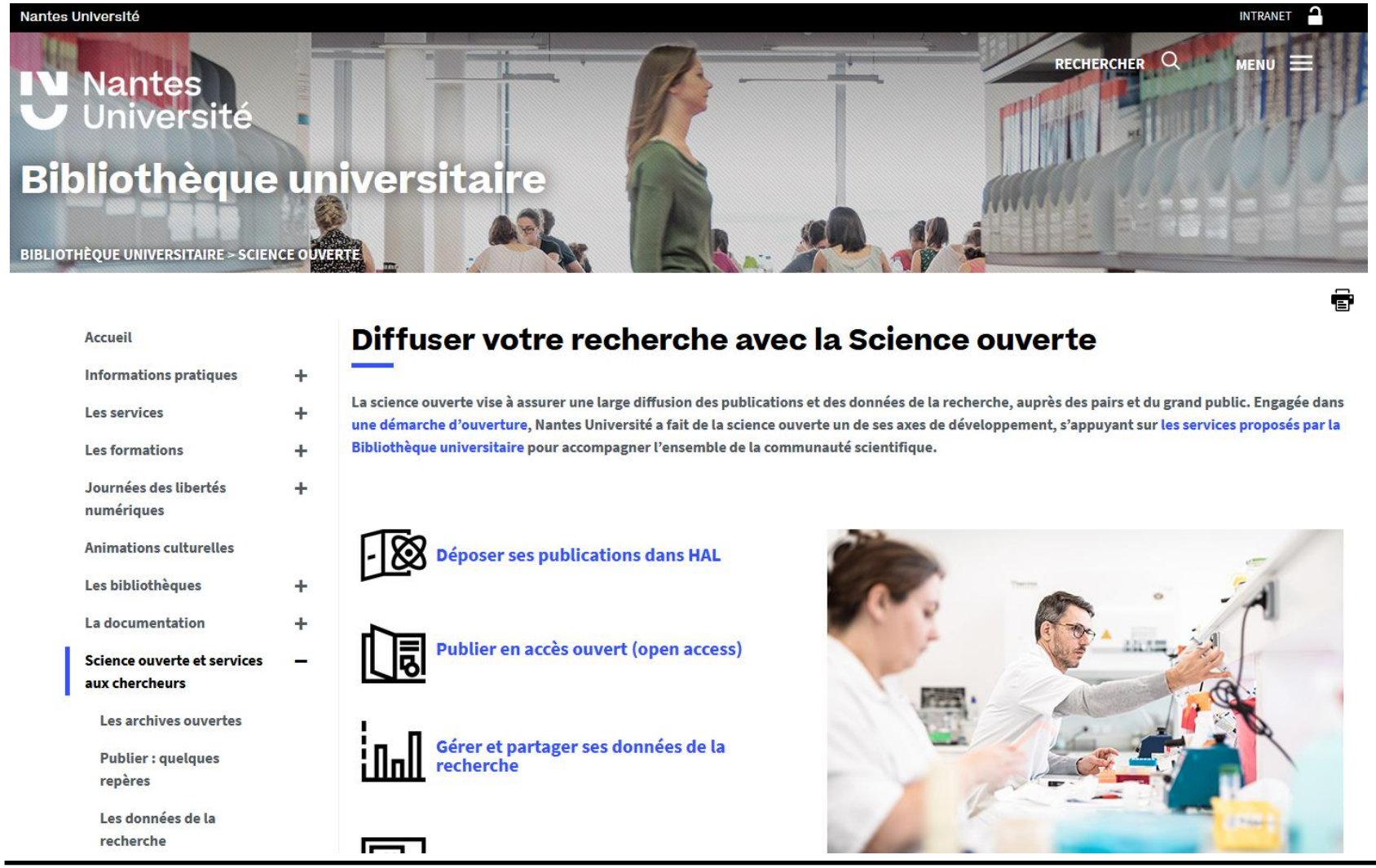
Find all our other training opportunities: here

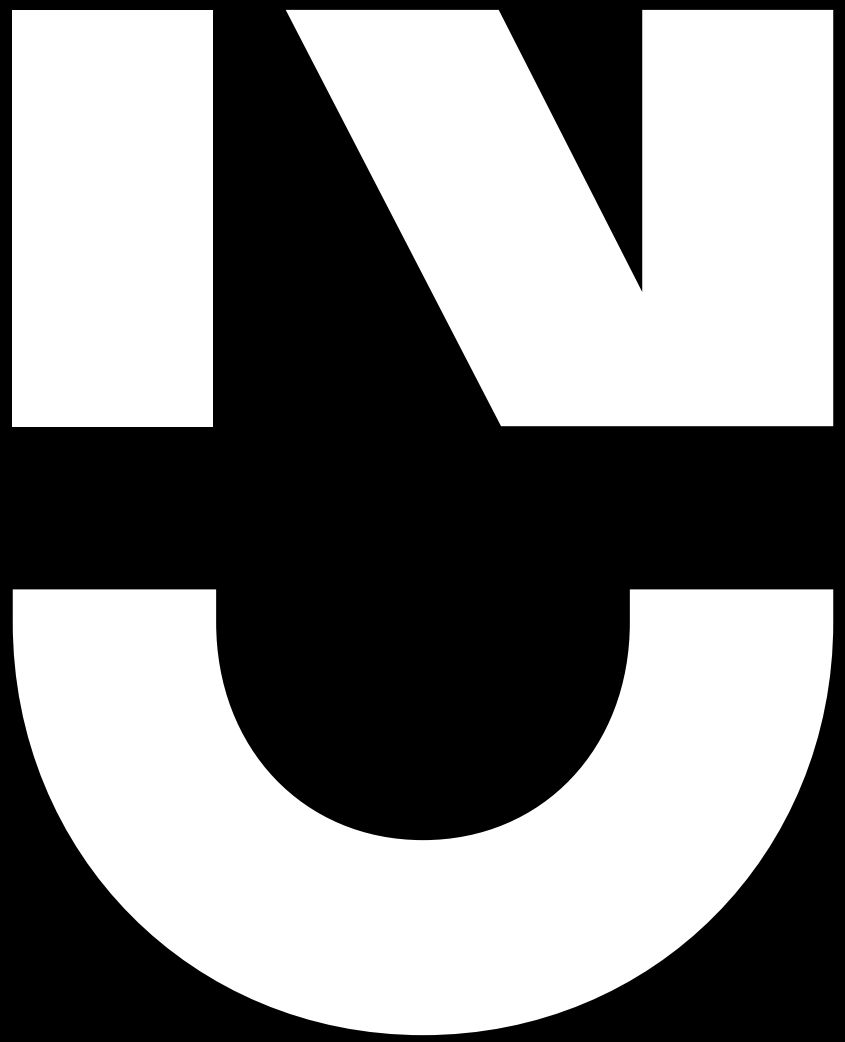
On Amethis ↓



On Amethis:
→ Menu → *Formations*
→ *Catalogue de formation*
→ Search by code:
→ "SO-BUNA"

How to contact us?



BY EMAIL:

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