# The future of science is open

## Rationale, goals and milestones of the EU policies

**COIMBRA**

High Level seminar on research policy

Venice

7-12-2018

Jc. Burgelman

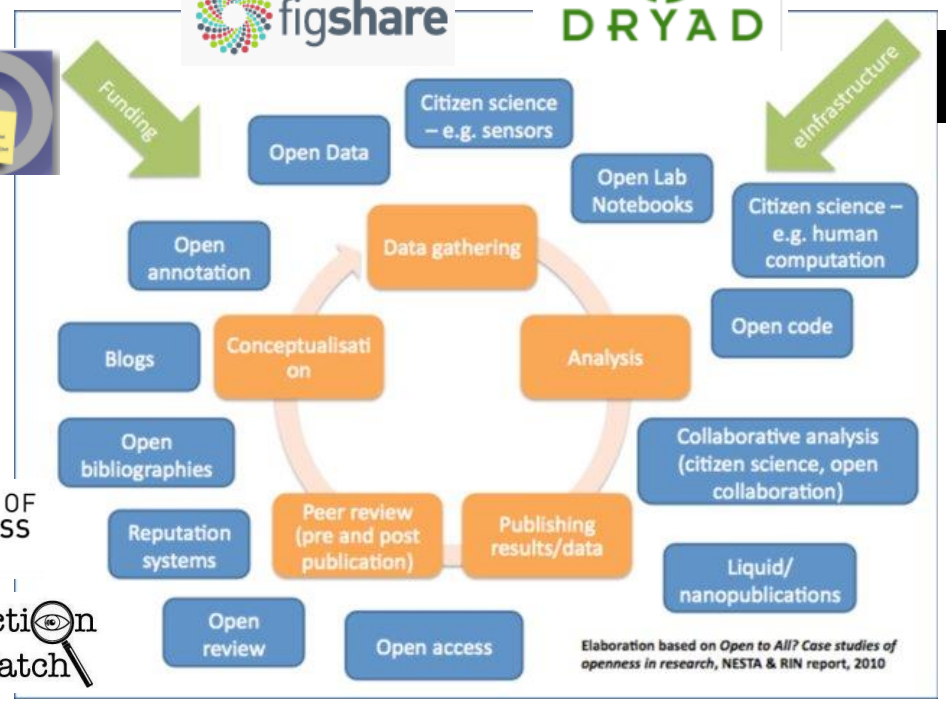
HoU Open Science, DG RTD

# The nature of science (modus operandi) is changing from a closed system to an open, sharing one

European Commission

**Open Research Fund: applications submitted**

Here you can see a list of eligible applications to the Open Research Fund in 2018, including project proposals.




cycle

# We embrace, support and enable the principles of Open Science

(Source, Ron Mobed, CEO Elsevier, meeting Brussels 11-2018)

Elsevier partners with the research community to empower open science. Working together, we can achieve a more inclusive, collaborative and transparent world of research. We believe open science can benefit research and society and drive research performance. Here are some of the ways in which we are supporting open science.


There are more options for researchers to share more kinds of research outputs than ever before. We support a more open and inclusive research experience through our journals, tools and platforms.

We provide platforms and partner in programs that facilitate collaboration. We help bring other stakeholders, including the public, into the world of research.

We are helping raise the bar on reproducibility, enabling researchers to share their methods and data and to gain more complete insights into research performance.

# It offers great opportunities 4 science, scientists & society

- **Better ROI of the R&I investments**: self evident: if all the results of our public research are made reusable, it will follow that better use is made
  Norori: Eco impact Human Gnoom sequencing:
  1 billion eco output, 4 million jobs, 30% more genetic testing, innovative new methods, cures etc )

- **Faster circulation of new ideas:** we have 22 million EU SME's that will have access to top notch research without having to significantly pay for it!

- **More transparency of the science system**: the public taxpayer has this right

- **Fit for 21st century science purpose**: all grand societal challenges NEED cross disciplinary research

# Top level policy goals

*"As I see it, European success now lies in sharing as soon as possible, (…). The days of **open science** have arrived."*

*Speech at "Presidency Conference Open Science", 04 of April, 2016, Amsterdam*

Open Innovation
Open Science
Open to the World

## 2016 - Holistic Policy Agenda: scope & ambitions

… 4 with regard to the use & management of research results and data

- ✓ **Open Data**: FAIR data sharing is the default for funding scientific research
- ✓ **Science cloud**: All EU researchers are able to deposit, access and analyse European scientific data through the open science cloud, without leaving their desk
- ✓ **Altmetrics**: Alternative metrics (next generation metrics) to complement conventional indicators for research quality and impact (e.g. Journal Impact Factors and citations)
- ✓ **Future of scholarly communication**: All peer reviewed scientific publications are freely accessible

# Policy Priorities

… 4 with regard to relations with research actors (researchers, institutions and funders)

- ✓ **Rewards**: The European research career evaluation system fully acknowledges Open Science activities
- ✓ **Research Integrity**: All publicly funded research in the EU adheres to commonly agreed Open Science Standards of Research Integrity
- ✓ **Education and skills**: All young scientists in Europe have the necessary skills and support to apply Open Science research routines and practices
- ✓ **Citizen Science**: CS significantly contribute and are recognised as valid knowledge producers of European science

# Open Science policy @ EC: bottom up & co-design


Extensive stakeholder consultation

✓Public consultation (July-September 2014)

✓Validation workshops (October-December 2014)

✓Final report (February 2015): http://ec.europa.eu/research/consultations/science-2.0/science_2_0_final_report.pdf

Strong support by Member States and Competitiveness Council

✓Policy debate & Council conclusions 'data-driven economy' May 2015

✓Presidency conference Open Science &

✓Council conclusions 'open science') May 2016

European Open Science Agenda

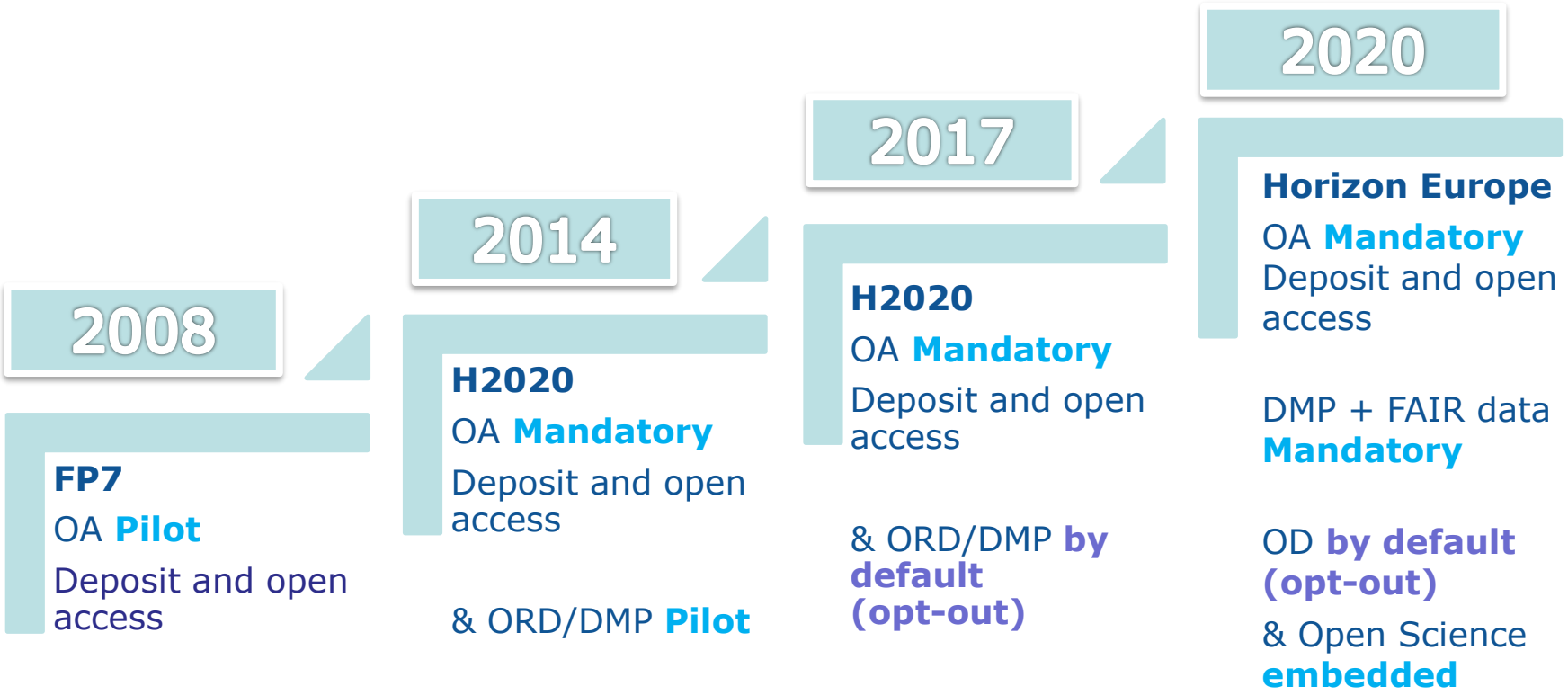
✓Broad consensus on five policy lines and 8 Actions

✓Open Science Policy Platform

✓Embedded in the Digital Single Market strategy

# Milestones...

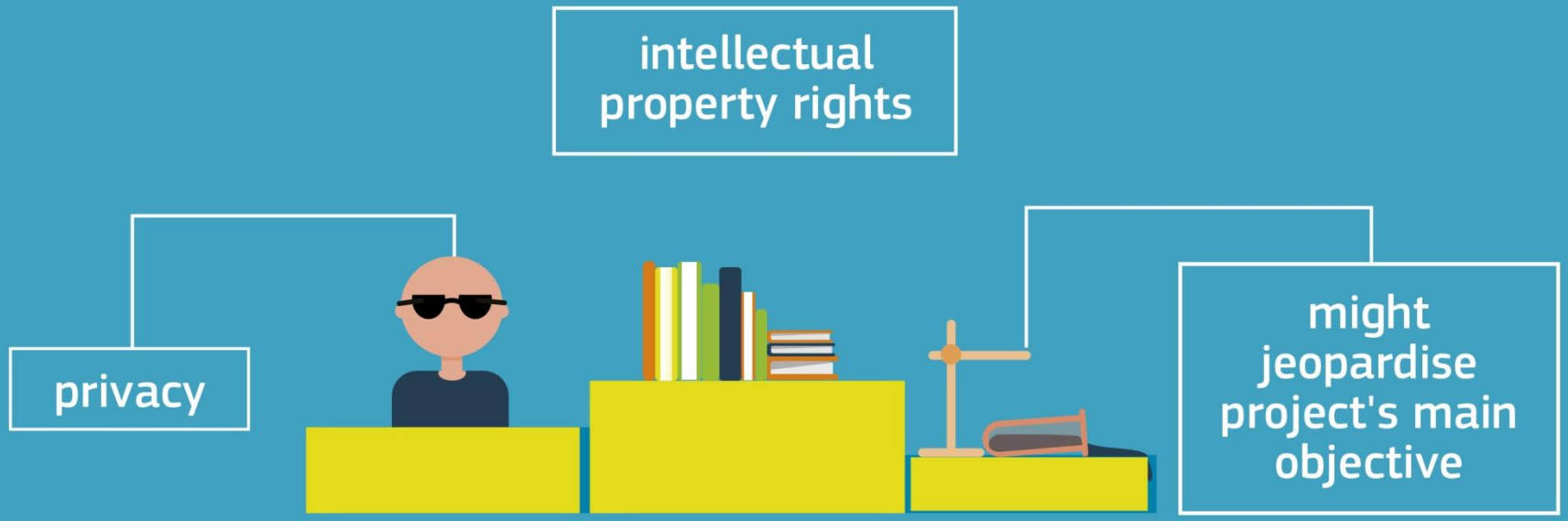
# The evolution of open access in the EU funding programmes for R&I



# Open Data

## AS OPEN AS POSSIBLE, AS CLOSED AS NECESSARY

Top three reasons for **opt-out**:



# Policy focus now

## Open access to publications (2018/19)

- Implement Plan S
- Increasing uptake to 100% (incentives, 'sanctions')
- Launch ORE

## Open access and research data (2018/19)

- Launch EOSC
- Mainstreaming FAIR data (and DMP) across the FPs

## Citizen Science (2019)

- Pan European agreement on uptake

## Metrics, Incentives, Rewards (2019)

- Next generation metrics
- ''Bucharest'' Declaration
- Funding for OS skills/approaches

## Make HEeurope an open science programm (2020)

ORE

# The Open Research Europe publishing platform

- Help H2020 beneficiaries and their researchers comply with the open access mandate without paying APCs during and after the grant
- Improve uptake of OA in H2020
- Promote OA as THE mode for publishing from now on
- Support open science and lead by example
  - ✓ Early sharing of research (pre-prints + peer-reviewed articles)
  - ✓ Open peer-review+ post publication commenting
  - ✓ New generation metrics
- Explore business models in OA publishing and sustainability

- Tenders are under evaluation

# cOAlition S

**Group of national research funding organisations committed to implement Plan S, which consists of one target and 10 principles.**

**Main target: "After 1 January 2020 scientific publications on the results from research funded by public grants provided by national and European research councils and funding bodies, must be published in compliant Open Access Journals or on compliant Open Access Platforms."**

**cOAlition S members (29/11): 13 national research funding organisations and 3 charitable foundations from 13 countries**

**+ support statements from numerous actors (EUA, LERU, DFG, FNSNF, YERUN, EURODOC, LIBER, …)**

European Commission

# National funders

FWF Der Wissenschaftsfonds.

ACADEMY OF FINLAND

Agence Nationale de la Recherche ANR

Science Foundation Ireland sfi For what's next

INFN Istituto Nazionale di Fisica Nucleare

Luxembourg National Research Fund

NWO Netherlands Organisation for Scientific Research

The Research Council of Norway

NATIONAL SCIENCE CENTRE POLAND

arrs SLOVENIAN RESEARCH AGENCY

FORTE: Swedish Research Council for Health, Working Life and Welfare

FORMAS

UK Research and Innovation

# Charitable foundations

wellcome

BILL & MELINDA GATES foundation

RIKSBANKENS JUBILEUMSFOND THE SWEDISH FOUNDATION FOR HUMANITIES AND SOCIAL SCIENCES

European Commission

**Launch of Plan S** — September 4, 2018

**Guidance on implementation + public consultation** — November 27, 2018

**End of public consultation** — February 1, 2019

**Formal review of Plan S effects** — 2023

Public statement by Commissioner Moedas welcoming and supporting Plan S and cOAlition S + public statement by the ERC SC supporting Plan S

EC+ERC participation in the cOAlition S Task Force drafting the Guidance

Plan S

Making full and immediate Open Access a reality

Supported by

# Guidance on Plan S implementation

- Immediate publication in « compliant » journals or platforms. Immediate open access via « compliant » repositories.

- No funding of publication in hybrid journals (but publication in hybrid journals is accepted). If the journal is covered by transformative agreements funders can decide to fund publications fees but only for a transition period.

- Full copyright retention by authors/their institutions and publication under an open license allowing for re-use for any purpose, subject to proper attribution of authorship.

*! Copyright retention and open licenses are key for the re-usability of research data, TDM, ….*

# Guidance on the implementation of Plan S

The Guidance clarifies and « softens » some of Plan S principles

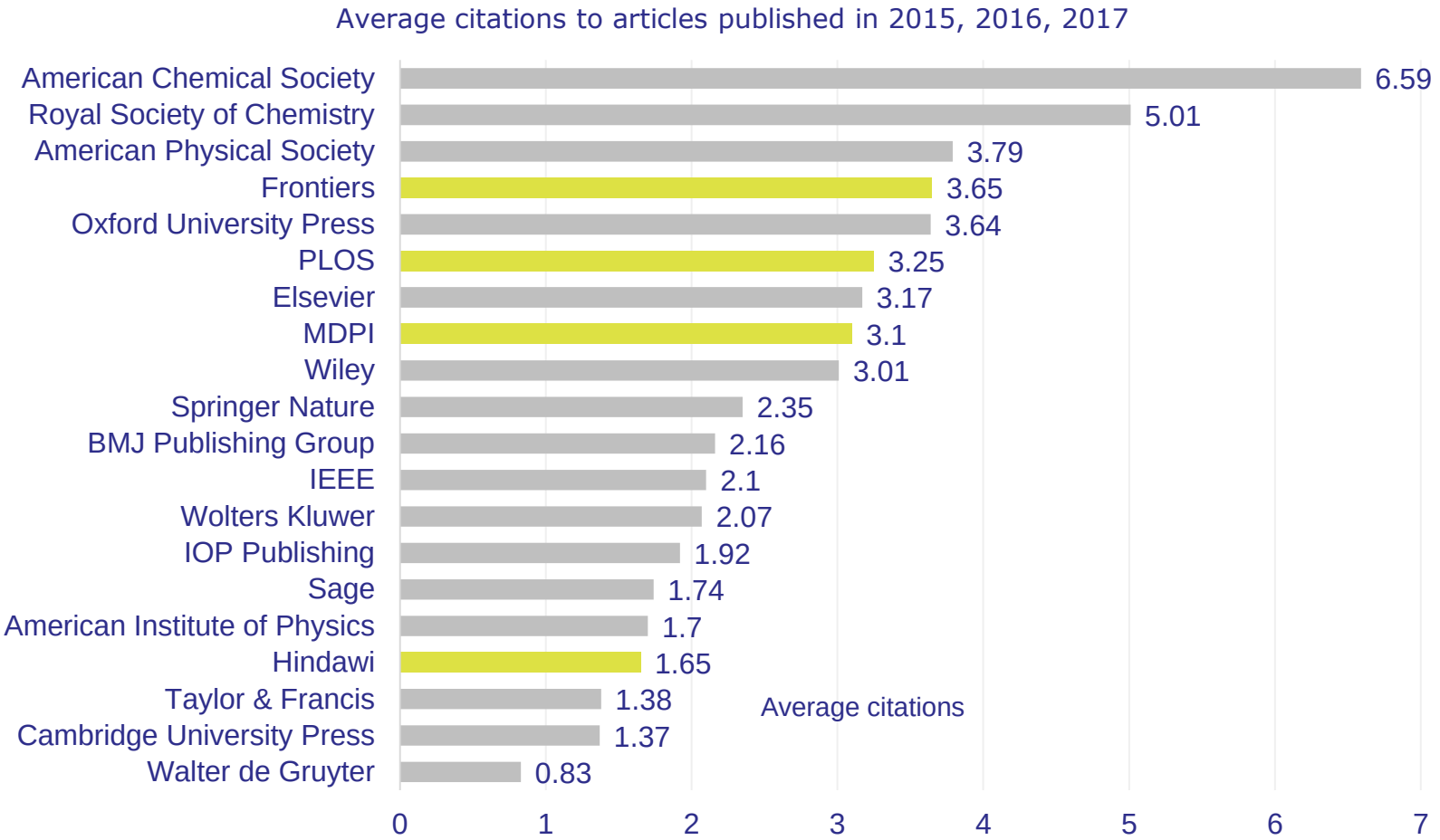
- Capping and standardisation of publication fees => independent study to be commissioned by cOAlition S
- Green OA => accepted as long as there is no embargo, copyright retention , CC-BY license , and « compliant » repository
- Publication in hybrid journals => accepted during a transition period although publication fees will not to be funded. If the journal is covered by « transformative agreements », funders can decide to fund
- End of the subscription-based model as goal (Preamble to Plan S) => « cOAlition S calls for a definitive shift towards new models of academic publishing »

# Open Access works*

* Source: K. Makram, enabling the OS modus operandi in Europe. Frontiers 29-11-2018

European Commission

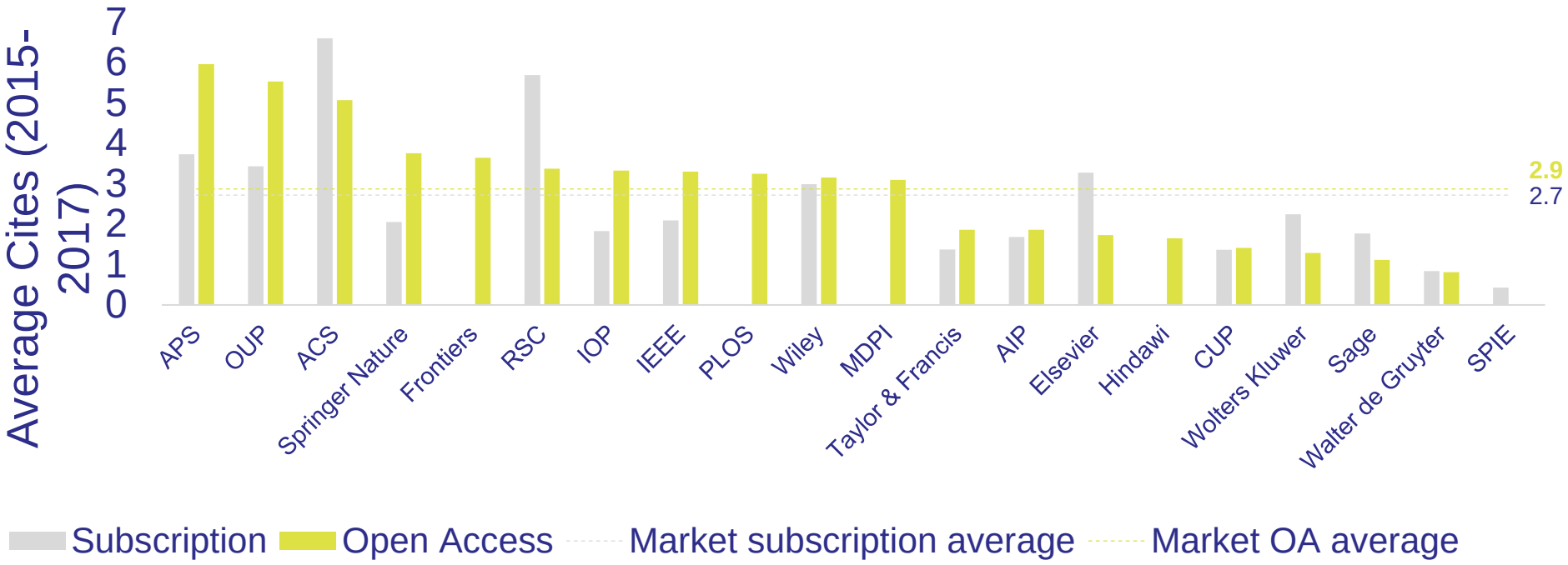
## Open Access publishers are top cited (2015-2017)




Source: Scimago (2018). Data based on 20 top publishers by volume in 2017. Total document and citation counts are for the 3-year period ending 2017. Publisher and business model assignments based on Scopus, DOAJ and official journal listings on publisher websites. More info and full dataset: https://blog.frontiersin.org/2018/07/11/scientific-excellence-at-scale-open-access-journals-have-a-clear-citation-advantage-over-subscription-journals/

# Open Access works*

## Open Access journals get more cites across publishers

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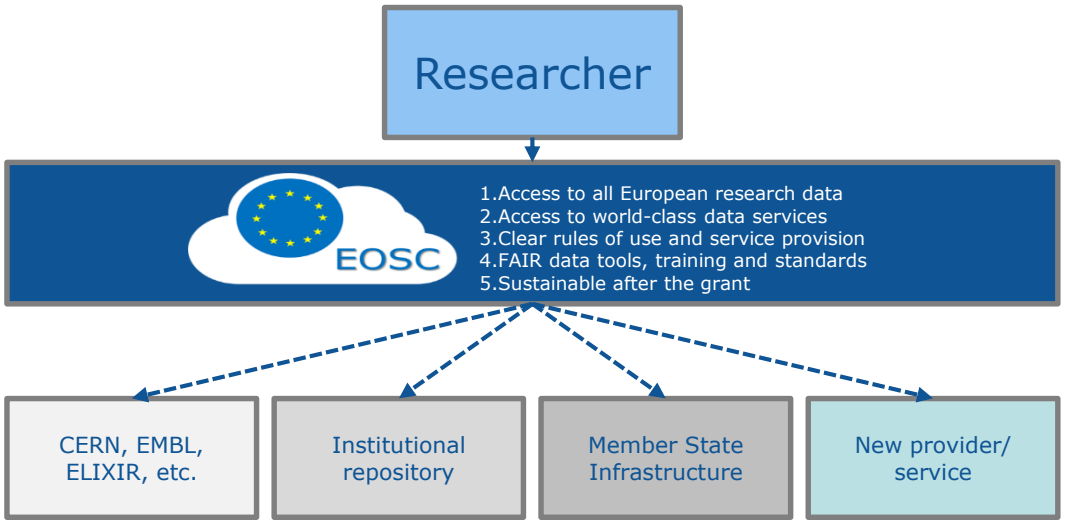
* Source: K. Makram, enabling the OS modus operandi in Europe. Frontiers 29-11-2018

# EOSC: a researcher-centric project

EOSC will allow for universal access to open research data and create a new level playing field for EU researchers



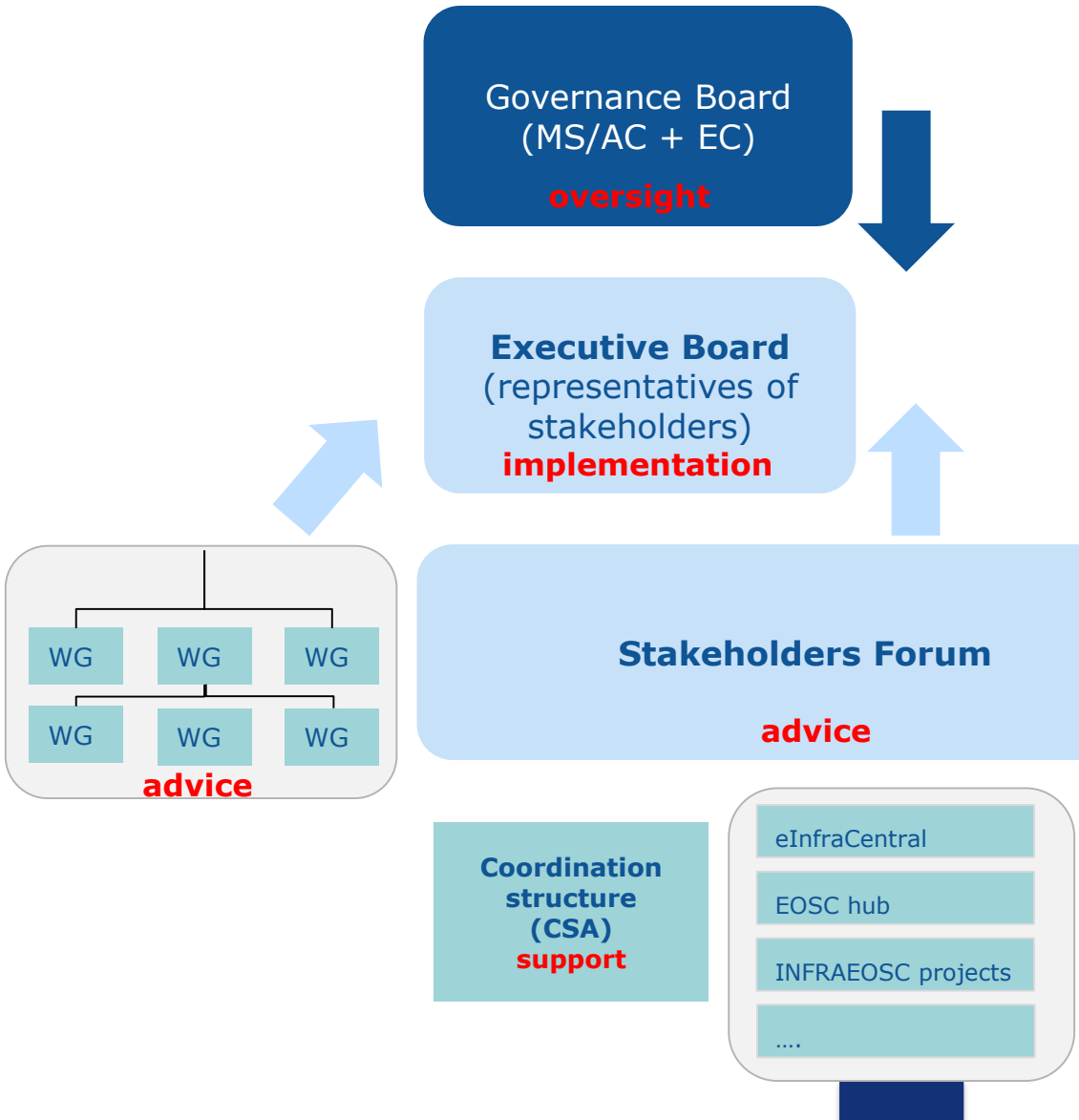

- Easy access through a universal access point for ALL European researchers
- Cross-disciplinary access to data unleashes potential of interdisciplinary research
- Services and data are interoperable (FAIR data)
- Data funded with public money is in principle open (as open as possible, as closed as necessary)

Seamless environment and enabling interdisciplinary research

Source: RTD

# EOSC: launched 23-11-2018

# The EOSC Governance




Three layer structure

- *EOSC Board* of MS/AC and EC representatives to ensure effective supervision of EOSC implementation
  - **Working Group of the strategic configuration of the Programme Committee**
- *Executive Board* of stakeholder representatives to help ensure proper EOSC implementation and accountability
  - **Commission expert group**
- *Stakeholder Forum* to provide input from a wide range of actors
  - **Self-organised with EC support**

# The EOSC Executive Board

**Chair** Karel LUYBEN – Representative of CESAER,
supported by ALLEA and EUA

**Vice Chair** Cathrin STÖVER – Representative of GEANT

## Organisations and their representatives

1. CESAER represented by Karel LUYBEN
2. CESSDA ERIC represented by Ronald DEKKER
3. EMBL represented by Rupert LÜCK
4. European Spallation Source ERIC represented by John WOMERSLEY
5. GÉANT represented by Cathrin STÖVER
6. OPENAIRE represented by Natalia MANOLA
7. Research Data Alliance (RDA) represented by Juan BICARREGUI
8. Science Europe represented by Stephan KUSTER

## Individual experts

1. Sarah JONES
2. Jean-Francois ABRAMATIC
3. Jan HRUSAK

# Citizen Science

Open science offers opportunities for citizens and scientists together to step up their contribution to science to a scale unthought of even a decade ago.

Barriers and challenges still prevent citizen science from living up to its full potential (OSPP).

Goal: **Ensure maximum recognition and impact of citizen science**:

- Laying out a long-term vision for citizen science in Europe as part and parcel of open science
- Development of guidelines, toolkit or protocol(s) that can be applied across scientific disciplines to ensure, in particular, maximum recognition and use of the data produced by citizen science.
- Have all funders, research performing organizations and universities to agree on it (in co-development)

# The Achilles heel of OS: metrics and incentives


## Recommendation OSPP (input: # Expert groups)

- **Quantitative and qualitative indicators** need to be identified and developed for research assessment that captures the full range of contributions to the knowledge system (e.g. context, discipline dependent)
- Display a broad range of indicators for **all research outputs**.
- Indicators have to **match Rewards** for Open Science
- Do **not use journal brand or IF** for individual researcher assessment as proxy for quality
- Apply **ORCID** and develop best practices

# Healing the heel

- By January 2019 EG proposes set of generic OS indicators PLUS how to calibrate this over different research trajectories (frontiers, mission oriented etc.)
- Buy in of OSPP
- Before Summer 2019: have University associations and Funders agree on it (‘’Bucharest declaration’’)

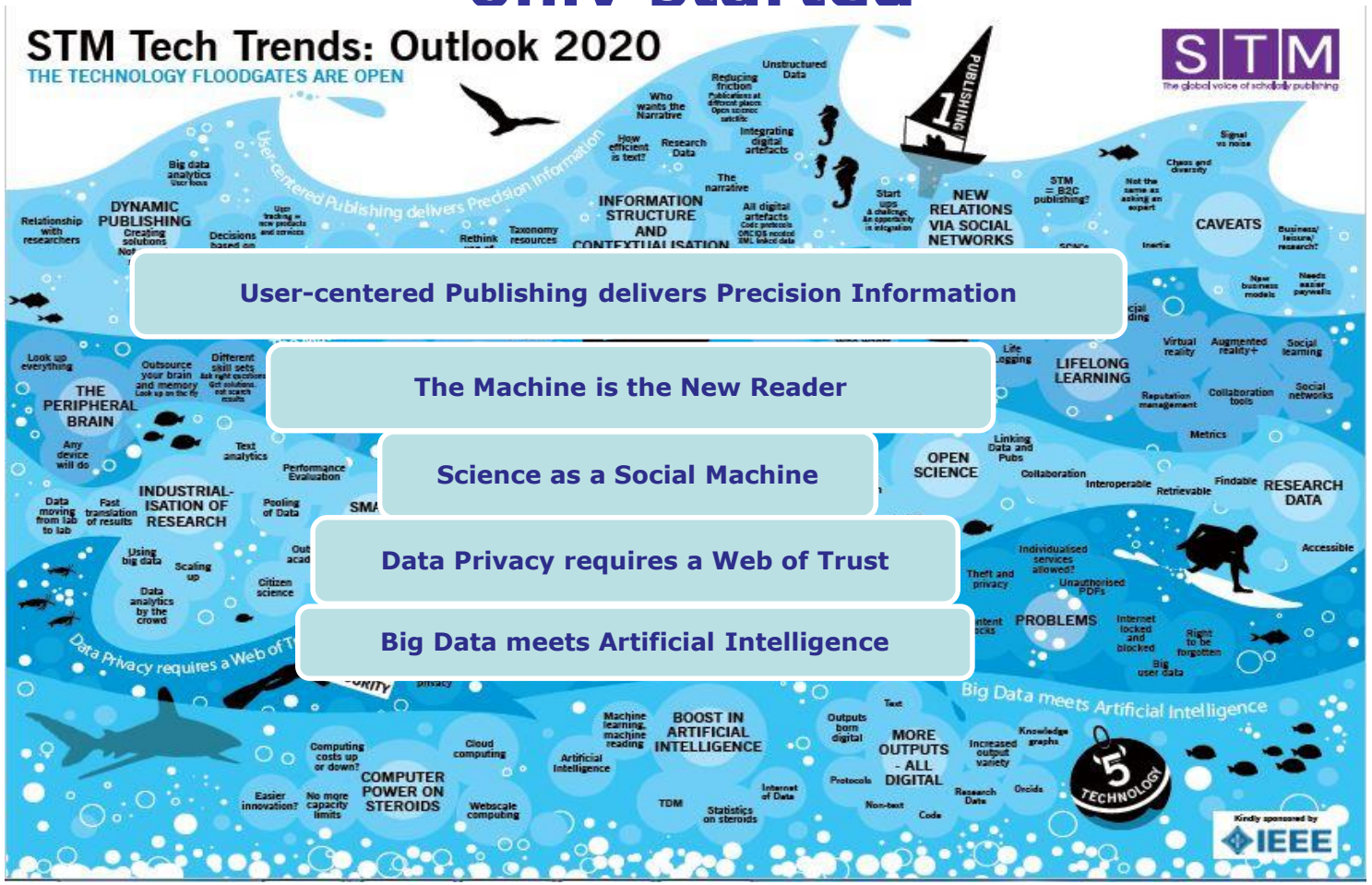
Let’s complement the DORA declaration (‘’what we don’t want’’) with **a declaration that states what we do want as indicators for the future**!

# Open Science in Horizon Europe

## FP9 goes beyond OA (publications & data) to embrace & incentivise Open Science as modus operandi for science

- Clarifies and strengthens the **OA obligations**;
- **Empowers the authors** of scientific publications;
- Is home of **FAIR data sharing** while complying with IPR rules and exploitation obligations set in the GA;
- **Broadens Open Access** (with opting out options) to other research output;
- Promotes compliance with **'Open Science principles'** through a combination of obligations and incentives;
- Implements **sanctions** for those beneficiaries that repeatedly and consistently fail to provide the required open access, requiring institutions to assume responsibility for their intellectual output;
- Introduces the use of **'new generation' metrics** for better assessing the impact of research output and the engagement in Open Science**.**

# Let’s not be complacent - the journey onlv started



# For example


- Due to the power of cyber science tools, it is quite realistically to assume that we will evolve from peer reviewed open access publications to: **peer reviewed open access research workflows**

- Implying that scientific publishers become **open science platforms** in which an article is ONE of the many products (and not even not per se)

- When launching the Chan Zuckerberg Foundation (goal: eliminate all diseases by 2100) its director Cori Bargmann stated (1-2018):

  ''Finally, on openness. We believe that research advances when people build on each others' work. So our principles include making data, **protocols, reagents and code** freely available for other scientists to use" (my underlining) https://www.nature.com/articles/d41586-017-08966-z

Data explosion ("Here's the evidence, now what is the hypothesis?")

- A 4th model of science in the making?

| | Manual | Computational |
|---|---|---|
| **Deductive** | 2nd paradigm: theoretical (*Newton)* | 3rd paradigm: computational (*Von Neumann*) |
| **Inductive** | 1st paradigm: empirical (*Bacon*) | 4th paradigm: data-intensive (*Venter, DNA sequencing*) |

- Epistemology and critical thinking back at the heart of every discipline

# Open science only takes off

**By 2030 one can assume that the science system to be:**

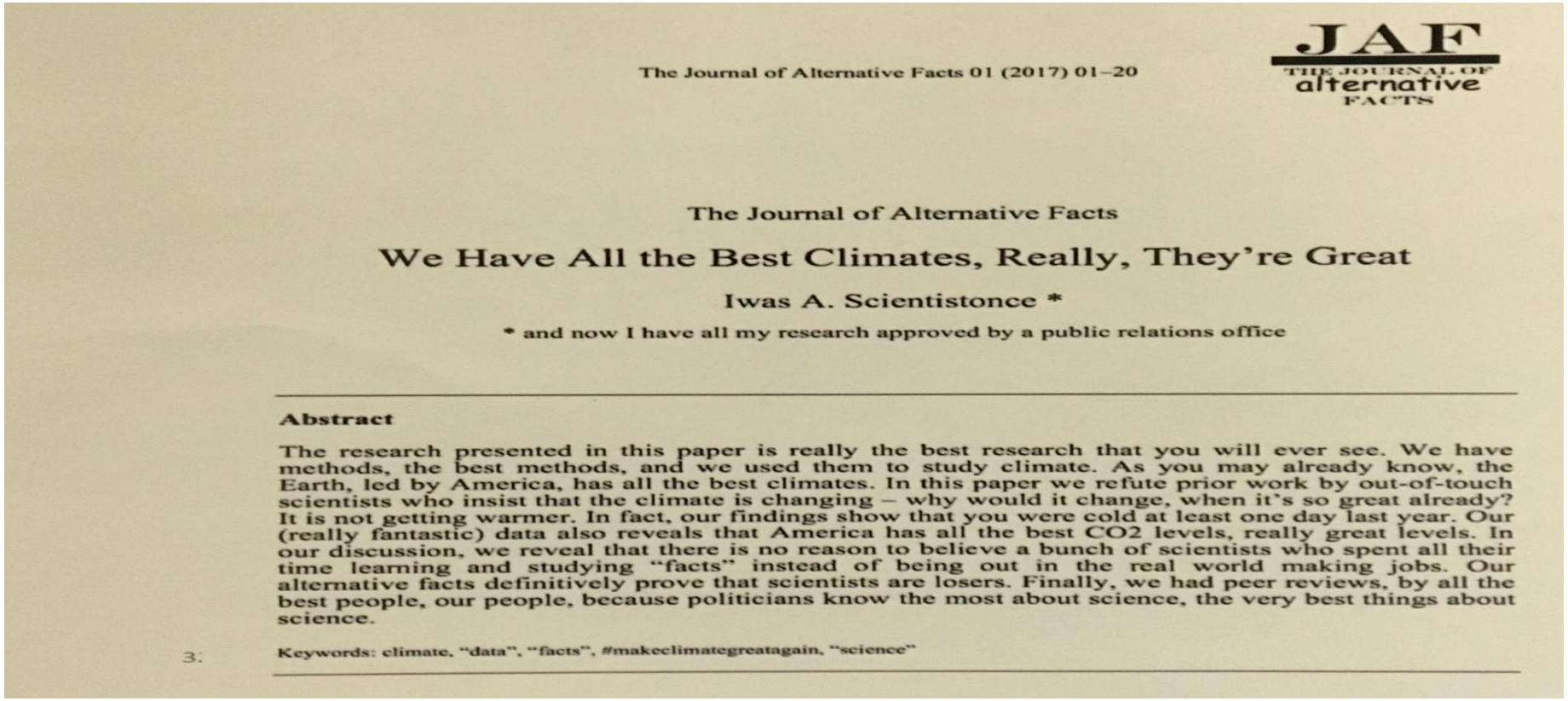
- Completely data driven (AI!)
- With open research data as a renewable resource for research and innovation (via EOSC)
- Full & immediate open access to the whole life cycle of a research process
- ‘’liquid’’ science (like in SW development)
- Multiple ways to measure and reward scientific productivity and impact

**Allowing reproducible research, full cross disciplinary set up and faster take up**

# What won't change by 2030

European Commission

By 2030 Independent Quality assurance via peer review will still be the core mechanism to progress science



The Journal of Alternative Facts 01 (2017) 01–20

JAF THE JOURNAL OF alternative FACTS

The Journal of Alternative Facts

## We Have All the Best Climates, Really, They're Great

Iwas A. Scientistonce *

* and now I have all my research approved by a public relations office

**Abstract**

The research presented in this paper is really the best research that you will ever see. We have methods, the best methods, and we used them to study climate. As you may already know, the Earth, led by America, has all the best climates. In this paper we refute prior work by out-of-touch scientists who insist that the climate is changing – why would it change, when it's so great already? It is not getting warmer. In fact, our findings show that you were cold at least one day last year. Our (really fantastic) data also reveals that America has all the best CO2 levels, really great levels. In our discussion, we reveal that there is no reason to believe a bunch of scientists who spent all their time learning and studying "facts" instead of being out in the real world making jobs. Our alternative facts definitively prove that scientists are losers. Finally, we had peer reviews, by all the best people, our people, because politicians know the most about science, the very best things about science.

Keywords: climate, "data", "facts", #makeclimategreatagain, "science"

# To conclude

Open Science is here to stay:

**If you want to go fast, go alone.**
**If you want to go far, go together**

(African saying)

**Thank you!**

**More information at**
**http://ec.europa.eu/research/openscience**

**OS monitor**
**http://ec.europa.eu/research/openscience/monitor/**