



up **Universitatea  
Politehnica  
Timișoara**

Piața Victoriei nr. 2  
RO 300006 - Timișoara  
Tel: +40 256 403000  
Fax: +40 256 403021  
rector@upt.ro  
www.upt.ro

# Open Science and its Impact

**Prof.Dr.Ing. Radu Vasiu**

Universitatea Politehnica Timisoara

**Politehnica  
University of  
Timisoara**

#openeducationwk  
#Timisoara

Workshop **Digital Competences for Open education**, 6 Martie 2020, Timișoara





## Open Science

*Los Angeles Times: 3<sup>rd</sup> March 2020*

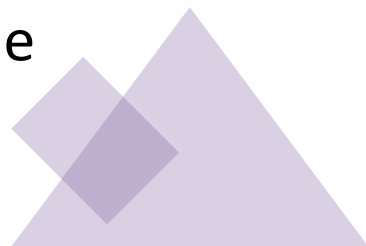
“COVID-19 could kill the for-profit science publishing model. That would be a good thing.”

- Coronavirus demonstrates the value of open access to scientific research.
- Unprecedented level of collaboration among researchers worldwide: this virtually real-time sharing is the exception in scientific research, not the rule.
- PubMed: free database of research papers maintained by the National Institutes of Health in the USA, growing daily.
- But: Among the major violators of the principle that a crisis demands more information, not less, is the U.S. government.

**The longstanding research publication model doesn't work when a critical need arises for rapid dissemination of data — like now.**




## Open Science

- The critics support an “open access” model, through which research grant institutions pay fees for publication, but require that their funded research be made accessible without charge.
  - **Elsevier, Springer and other commercial publishers have temporarily dropped their paywalls** on coronavirus-related research, but they say the action is limited to the duration of the crisis and doesn't apply to other published research.
  - “The responsible thing to do is to make all research freely available during epidemics or possibly pandemics where there are people at risk,” Edward Campion, executive editor of the New England Journal of Medicine
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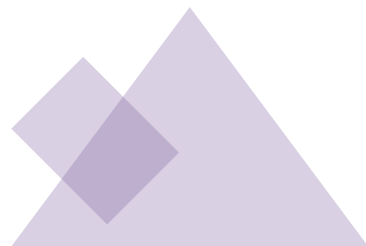


## Open Science

- ▶ Among the leaders in the open-access movement is the **University of California**, which ended its subscriptions to about 2,500 Elsevier journals after it failed to come to terms with the publisher on liberating access to UC research.
  - ▶ The university proposed that its annual subscription bill of about \$11 million cover not only access to the Elsevier journals but publication fees for articles that would be made freely available. Elsevier balked, and shut off UC's access to the journals in July 2019.
  - ▶ **Research consortiums in Germany and Sweden** have dropped their subscriptions to Elsevier, though the publisher has been able to work out compromises in other countries, including Italy and the Netherlands.
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## Open Science

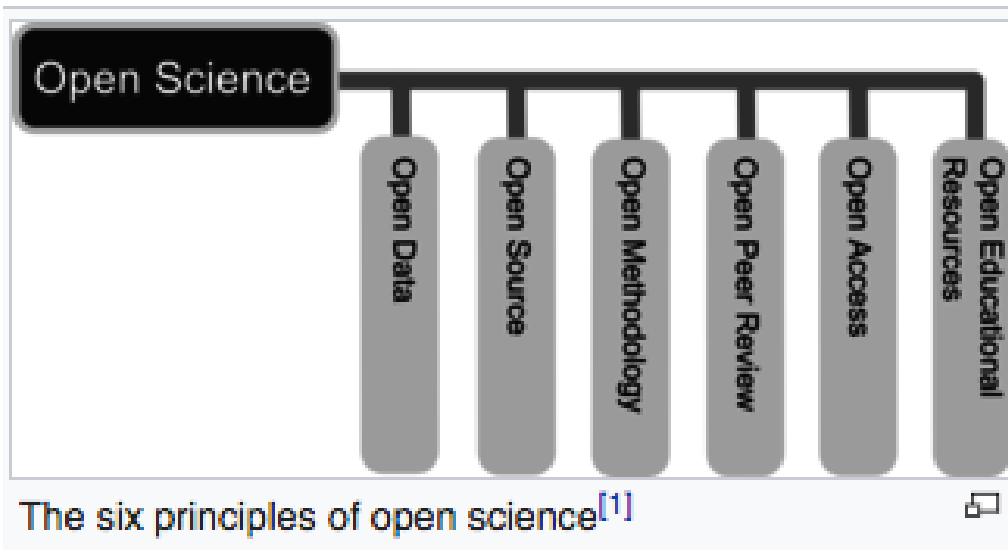
- ▶ “The scientific literature is controlled by largely commercial journals” says Randy Schekman, a Nobel laureate biologist at UC Berkeley who founded Elife, a non-profit open access publisher, in 2011 with support from the Howard Hughes Medical Institute and other backers. **“Decisions are made by professional editors who are in the business of selling magazines,** which make a huge profit by virtue of controlling copyright on the literature and by controlling access to the literature.”
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## Open Science

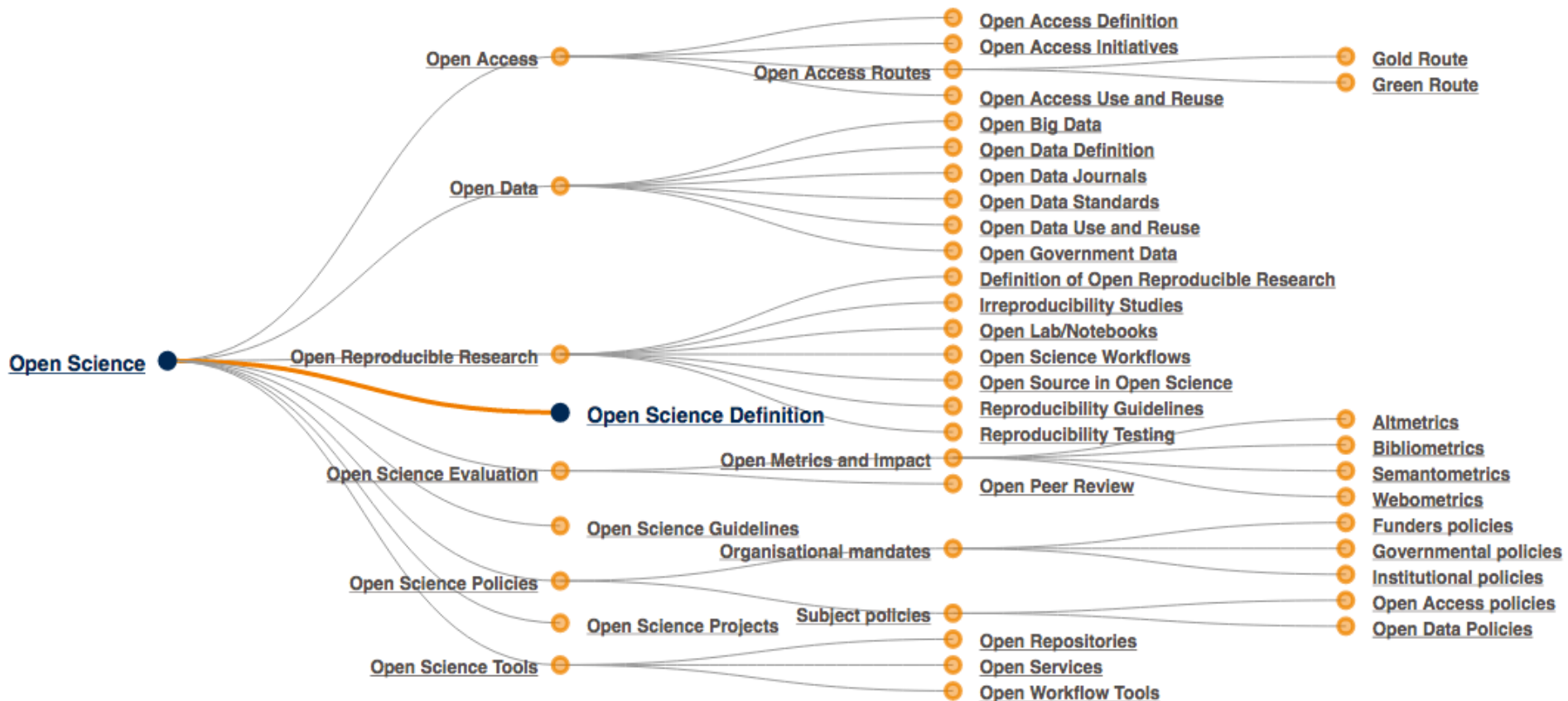
- ▶ 10 December 2019, “**Open Science, Open Data, and Open Scholarship: European Policies to Make Science Fit for the Twenty-First Century**”, article in *Frontiers in Big Data*
- ▶ Open science will make science more efficient, reliable, and responsive to societal challenges.
- ▶ Open Science is Science for the Twenty-First Century
- ▶ The cases of the Ebola and Zika epidemics show on the one hand the advantages of open science and on the other side researchers' dilemmas. The many deaths due to the Ebola epidemic in West Africa during 2014–2016 could have been prevented using existing public knowledge. On the verge of Ebola epidemics, researchers took the initiative to share data concerning the virus early on with the result that an experimental vaccine became quickly available.

# Open Science



- **Open Science** is the practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methods.

# Open Science





# Open Access

- Open Access is the practice of providing unrestricted access via the Internet to peer-reviewed scholarly journal articles.
- Open Access is also increasingly being provided to theses, scholarly monographs and book chapters.





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## TERMS



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### Share Alike

Others can distribute your work only under a license identical to the one you have chosen for your work



### Non-Commercial

Others can copy, distribute, display, perform or remix your work but for non-commercial purposes only.



# Challenges of Open Science

## Challenge 1: Restrictions on flexibility

- ▶ Research questions tend to be formulated based on data exploration, giving priority to quantitative research
- ▶ Mistakes are more visible: open science researchers can pursue higher standards than closed science but can encounter difficulties and restrictions because of doing so.

*Tips: Be open about mistakes and do not reprimand others for their mistakes, rather applaud honesty.*

# Challenges of Open Science

## Challenge 2: The time cost

- ▶ Theoretical reasons why open science methods could save time, due to large access to research data.
- ▶ The additional requirements of open and reproducible sciences often consume more time: archiving, documenting, and quality controlling of code and data takes time.

*Tips: Where possible, researchers at all levels should take this time cost into account.*

# Challenges of Open Science

## Challenge 3: Incentive structure isn't in place yet

- ▶ Systems that reward open science practices are currently rare.
- ▶ Researchers are primarily assessed according to traditional standards.
- ▶ Some reviewers and journal editors remain to be convinced of the necessity or suitability of open methods.

Tips: *Be strategic with which open science practices suit your research.*

# Benefits of Open Science

## **Benefit 1: Greater faith in research**

- ▶ Open science methods can improve the quality and reliability of scientific work.
- ▶ Open science guard against questionable practices and can also increase the chances of publication
- ▶ A core aim of the open science movement is to make science more reliable. Sharing of protocols and data leads to replication, reproduction of analyses, and greater scrutiny.

*Tips: Make your work as accessible as possible and preregister experiments when suitable.*

# Benefits of Open Science

## Benefit 2: New helpful systems

- ▶ The structures developed around open and reproducible science are there to help researchers and promote collaboration: software tools, publishing mechanisms, incentives, international organisations.
- ▶ Open science movement provides opportunities to access free high-quality, standardised data: in genetics - repository Addgene, in neuroanatomy - Allen Brain Atlas, in brain imaging - Human Connectome Project, in biomedicine - the UK Biobank

*Tips: Make use of new tools that facilitate sharing and documenting your work efficiently and publicly.*

*Make data and materials, such as code, available - a relatively low-cost entry into open science.*

# Benefits of Open Science

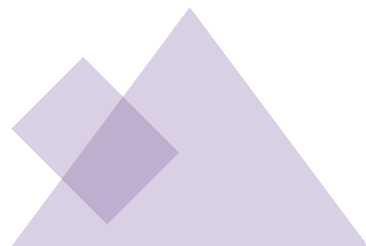
## **Benefit 3: Investment in your future**

- ▶ Open science increases opportunities for acknowledgment, exchange, collaboration and advancement.
- ▶ Reuse of open data can lead to publications which may not have happened under closed science
- ▶ Authors may receive early media coverage based on preprints

*Tips: Explore opportunities for open science collaborations in consortia or research networks and connect with others to build a local open science community.*



## **Open Science Institutes**

- ▶ Montreal Neurological Institute, as a leading neuroscience institution, has recently declared itself to be a fully open science centre.
  - ▶ Ludwig Maximilian University München, University of Cologne, University of Cardiff have recently asked some candidates applying for positions in university to provide a track record of open science methods.
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**25.02.2020**  
**UNESCO**  
**global**  
**consultation**  
**on Open**  
**Science**  
**standards**

- In the context of pressing planetary and socio-economic challenges, sustainable and innovative solutions must be supported by an efficient, transparent and vibrant scientific effort - not only stemming from the scientific community, but from the whole society.
- Open Science embodies the need to transform and democratize the entire scientific process to ensure that science truly drives and enables the achievement of the United Nations Sustainable Development Goals for the benefits of all.

<https://en.unesco.org/news/unesco-launches-global-consultation-develop-standard-setting-instrument-open-science>

**UNPAYWALL**  
**Open**  
**Database of**  
**over 25**  
**million free**  
**articles**

- Uses data from open indexes like Crossref and DOAJ.
- Majority of content comes from independently monitoring over 50,000 unique online content hosting locations, including Gold OA journals, Hybrid journals, institutional repositories and disciplinary repositories.

# OSF platform

- Open platform to support research and enable collaboration
- Mission: to increase openness, integrity, and reproducibility of research
- Vision: a future scholarly community in which the process, content, and outcomes of research are openly accessible by default

# SCHOOL OF DATA global network

- a network of data literacy practitioners composed of organisations and individuals
- committed to advancing data literacy in civil society
- includes 13 organisations across the world and 101 active individuals
- delivers hands-on data training and data literacy skills



# EOSC European Open Science Cloud

- Mission: shift scholarly communication towards openness and transparency and facilitate innovative ways to communicate and monitor research
- Vision: Transform society through validated scientific knowledge, allow citizens, educators, funders, civil servants and industry find ways to make science useful for themselves, their working environments, the society.



# EOSC European Open Science Cloud

## Activities:

- Align policies
- Provide Open Science services
- Link research
- Monitor Open Science
- Train for Open Science
- Build global bridges
- Facilitate Open Innovation

<https://www.openaire.eu/achieving-open-science-in-eosc>

# European Commission OPEN SCIENCE

## **Eight ambitions:**

- Open Data: FAIR (Findable, Accessible, Interoperable and Re-usable data)
- European Open Science Cloud (EOSC)
- New Generation Metrics
- Future of scholarly communication
- Rewards
- Research integrity
- Education and skills
- Citizen science

[https://ec.europa.eu/info/sites/info/files/research\\_and\\_innovation/knowledge\\_publications\\_tools\\_and\\_data/documents/ec\\_rtd\\_factsheet-open-science\\_2019.pdf](https://ec.europa.eu/info/sites/info/files/research_and_innovation/knowledge_publications_tools_and_data/documents/ec_rtd_factsheet-open-science_2019.pdf)

# European Holistic Policy to Open Science

- ▶ To make open access to peer-reviewed publications mandatory and to encourage open access to research data for the projects funded by the EC
- ▶ Access to and re-use of research data generated by Horizon 2020 and subsequent projects will be improved. Research data will be open by default while taking into account the need to balance openness and protection of scientific information, commercialization and Intellectual Property Rights, privacy concerns and security.
- ▶ Open access to publications is already mandatory in Horizon 2020. Researchers need to deposit a copy of the published version or final peer-reviewed manuscript in a repository of their choice at the latest on publication and ensure open access to the publication *via* the repository within 6 months of publication or 12 months in case of the social sciences and humanities.

# CONTACT

## Prof.Dr.Ing. Radu Vasiu

Presedinte Senatul Universitatii Politehnica Timisoara,  
Romania



Director, Centrul de Cercetare Multimedia

Tel: +40.256 403300

Email: [radu.vasiu@upt.ro](mailto:radu.vasiu@upt.ro)

<http://www.cm.upt.ro/staff/raduvasiu>



<http://www.slideshare.net/RaduVasiu/>

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