

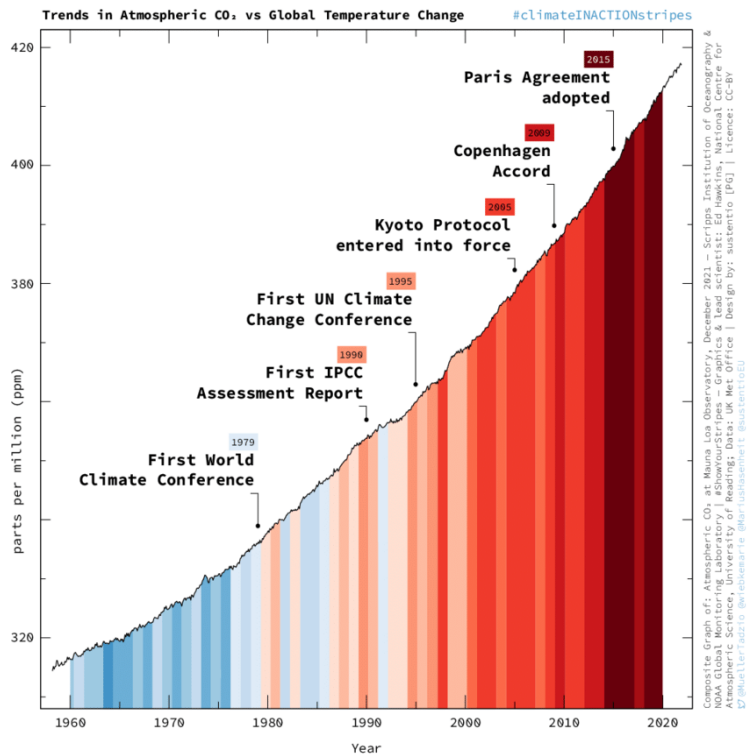
The links between Open Science and Ecology

Matthieu Koroma, PhD
(FNRS – Postdoctoral Researcher)
Physiology of Cognition Lab | GIGA CRC-Human Imaging
University of Liège

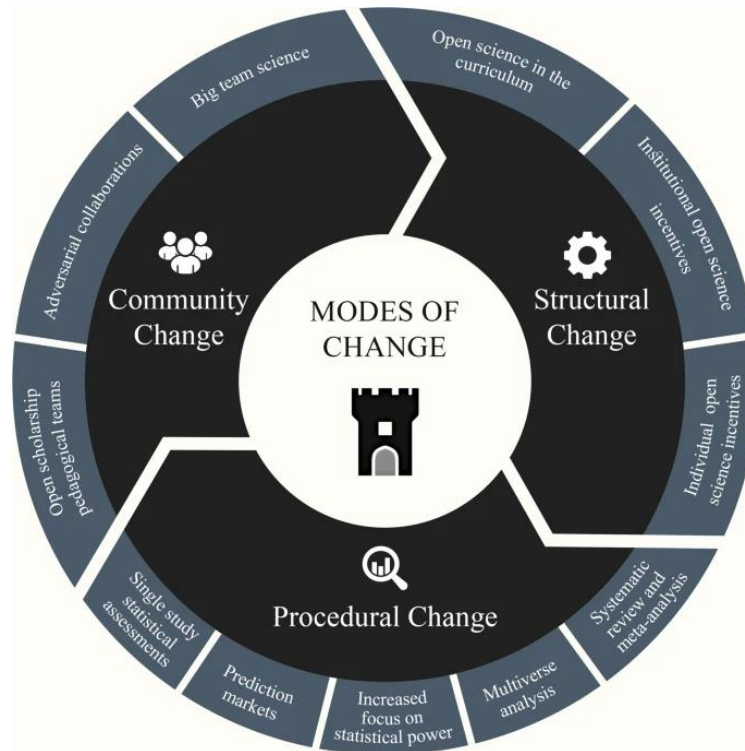


PHYSIOLOGY OF
COGNITION LAB

ECOLOGICAL AND REPLICATION CRISES

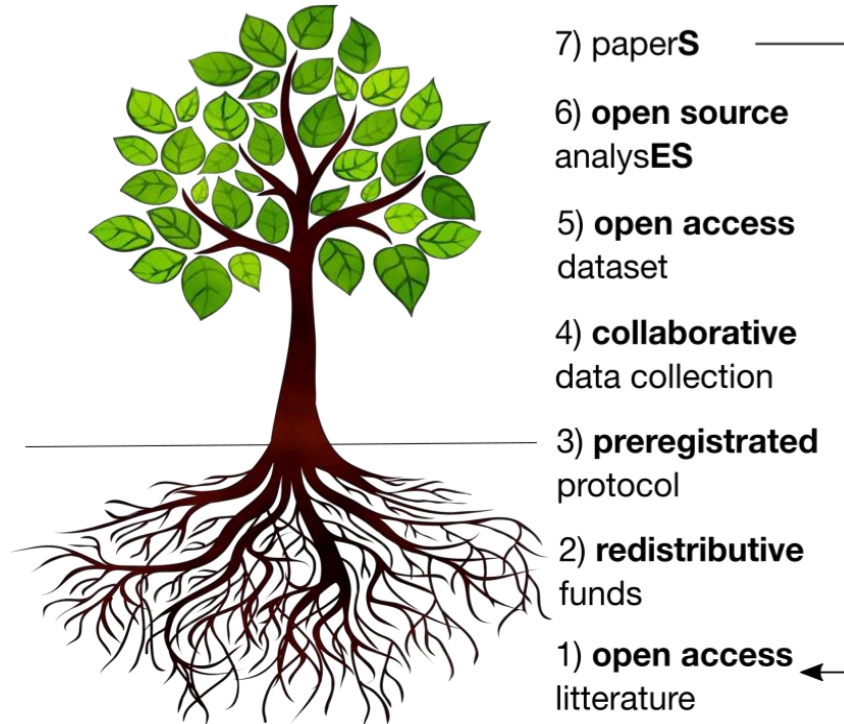


Spangenberg (2022)



Korbmacher et al. (2023)

THE OPEN SCIENCE TREE OF KNOWLEDGE



Koroma, 2020

A ROADMAP FOR OPEN SCIENCE



Photo credit : GOOD GOOD GOOD

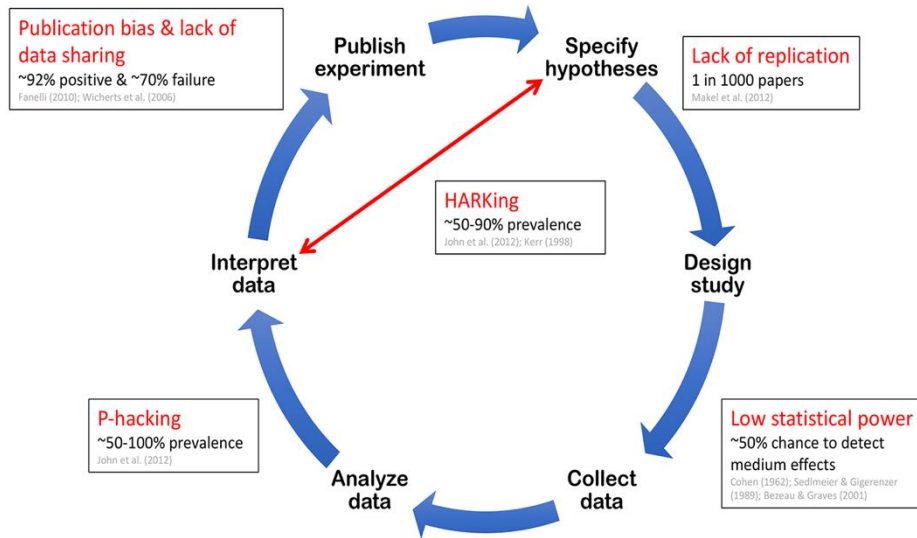
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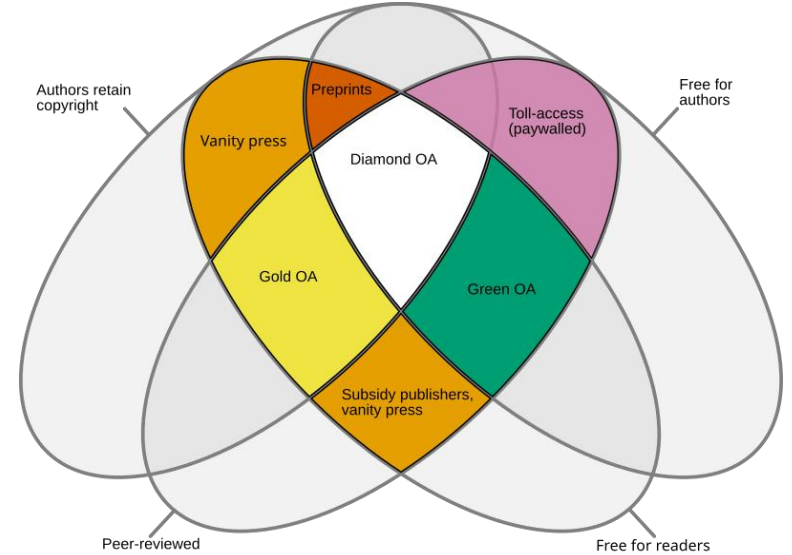
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REPAIR

RECYCLE



Munafó et al. (2017)



Diamond open access. Wikipedia

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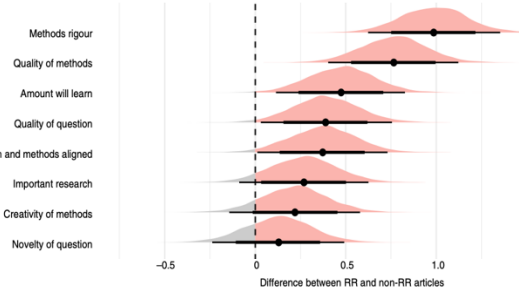
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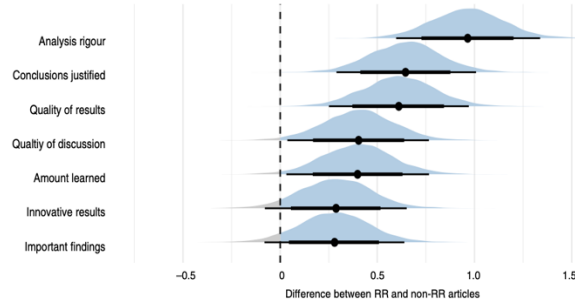


Center of Open Science

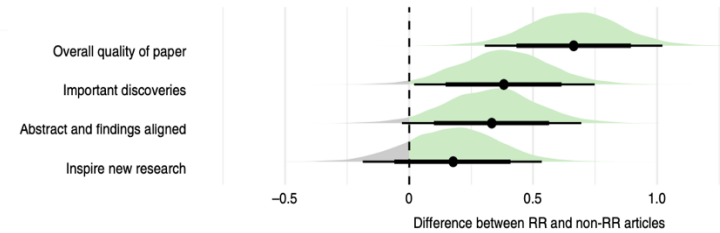
Evaluation before knowing study outcomes



Evaluation after knowing study outcomes



Evaluation after finishing the paper



Soderberg et al., 2021



Mechanisms of interoceptive-exteroceptive integration during cardio-auditory synchrony

Registration OSF Preregistration

template:

Registry: OSF Registries

Registered: Tue May 02 2023 18:52:12 GMT+0200

Last updated: Tue May 02 2023 18:51:19 GMT+0200

Contributors: [Koroma](#), [Nguy](#), [Pelentritou](#), and 2 more

Description: Both the brain and the bodily activity shape how we react to the external ...

Tags:

active inference

cardiac activity

cardio-audio synchrony

dynamical coupling

ECG

EDA

EEG

EMG

interoceptive exteroceptive integration

interoceptive prediction

neuroscience

pupillometry

respiration

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 macOS	 Free software	 Open-source software	 Freeware	 Public-domain software
Definition	"FREE" is a matter of liberty, not price	"OPEN" doesn't just mean access to the source code	"FREE" refers to price, while freedom of the use is restricted by creator	"PUBLIC DOMAIN" belongs to the public as a whole
Ground philosophy	Social movement	Development methodology	Marketing goals	Copyright disclamation
Ground rules	Four Freedoms https://www.gnu.org/philosophy/free-sw.html	Open Software initiative https://opensource.org/osd		Creative Common Organization https://creativecommons.org
Free of charge	Not necessary	Not necessary	✓ YES	✓ YES
Covered by copyright law	✓ YES	✓ YES	✓ YES	✗ NO
Examples	 	 	 	



LETTER TO THE EDITOR



Probing the embodiment of sleep functions: Insights from cardiac responses to word-induced relaxation during sleep

Koroma Matthieu / Cardiac_relaxation_Beck

GitLab Duo Chat

extract_cardiac_responses.ipynb 23.70 KIB

Preprocessing for analyzing the the modulation of heartbeat by stimulation around stimulation onset

In this script, we will obtain a dataframe from epoched ECG data to estimate how the heartbeat is modulated around stimulus onset. This requires a dataframe which contains the epoched data that have been preprocessed with mne. Epochs with additional parameters depending on your dataset. Doing so will allow us to test precisely how cardiac markers are modulated during windows of stimulation and use windows without stimulation as a way to control/normalize cardiac variations across conditions.

Initialization of packages

Here, we define the packages used for this analysis. Noteworthy are :

- numpy, a package useful for language programming in Python
- pandas, a package useful for using dataframes
- mne, a package useful for signal analysis
- neurokit, a package used for ECG signal analysis

Koroma et al. (2024)

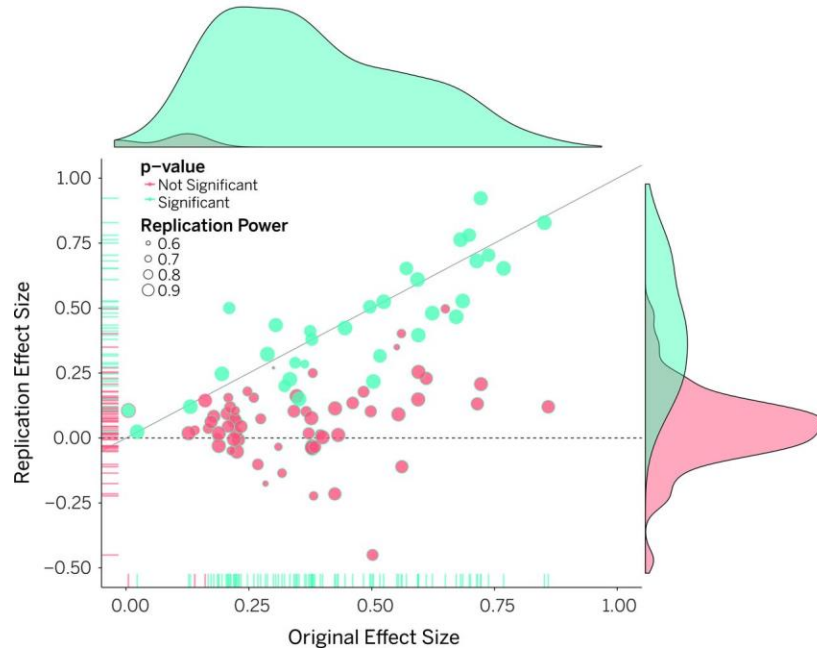
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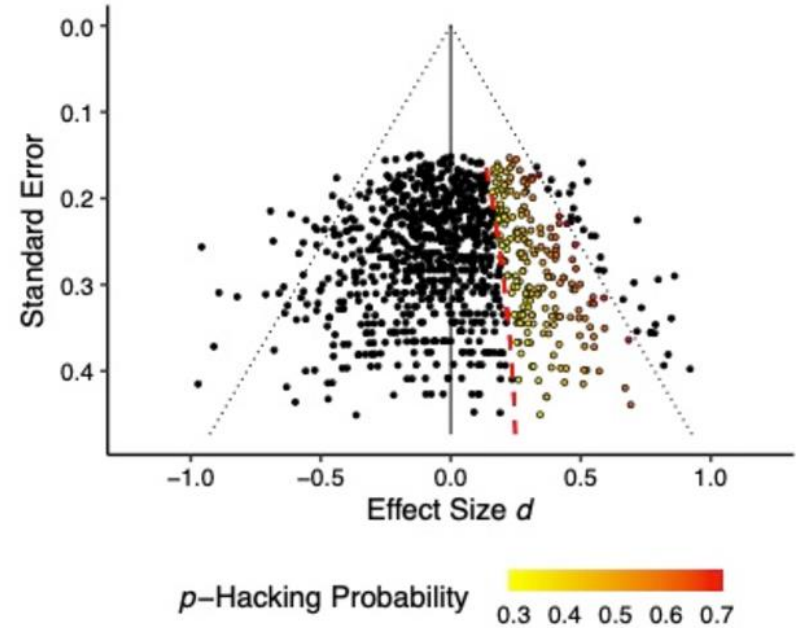
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Open Science Collaboration (2015)



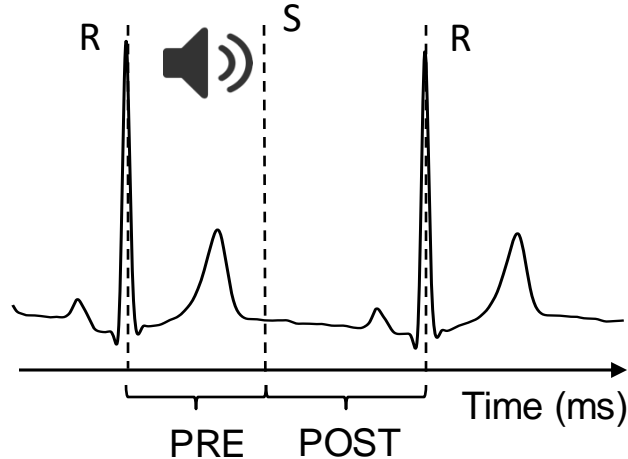
Friese, M., & Frankenbach, J. (2020)



Cardiac responses to auditory irregularities reveal hierarchical information processing during sleep

 Matthieu Koroma,
  Paradeisios Alexandros Boulakis,
  Federico Raimondo, Vaia Gialama,
  Christine Blume,
  Mélanie Strauss,
  Athena Demertzi

doi: <https://doi.org/10.1101/2024.09.24.614090>



Disruption of hierarchical predictive coding during sleep

Melanie Strauss^{a,b,1}, Jacobo D. Sitt^{a,b,c}, Jean-Remi King^{a,b,c}, Maxime Elbaz^{d,e}, Leila Azizi^{a,b}, Marco Buiatti^{a,b},
 Lionel Naccache^c, Virginie van Wassenhove^{a,b}, and Stanislas Dehaene^{a,b,f,g,1}

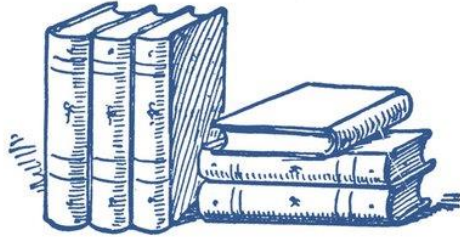
Melatonin suppression does not automatically alter sleepiness, vigilance, sensory processing, or sleep



[Christine Blume](#) ✉, [Maria Niedernhuber](#), [Manuel Spitschan](#), [Helen C Slawik](#),
[Martin P Meyer](#), [Tristan A Bekinschtein](#), [Christian Cajochen](#) [Author Notes](#)



Positive results



$$p < 0.05$$

Negative results



$$p > 0.05$$



Elsewhere or Blanked? Ongoing mental states are regulated by pupil-linked arousal and attentional style in healthy ageing

 Matthieu Koroma, Aurèle Robert de Beauchamp, Sepehr Mortaheb, Paradeisios Alexandros Boulakis,

 Christine Bastin,  Athena Demertzi

doi: <https://doi.org/10.1101/2022.07.08.499379>

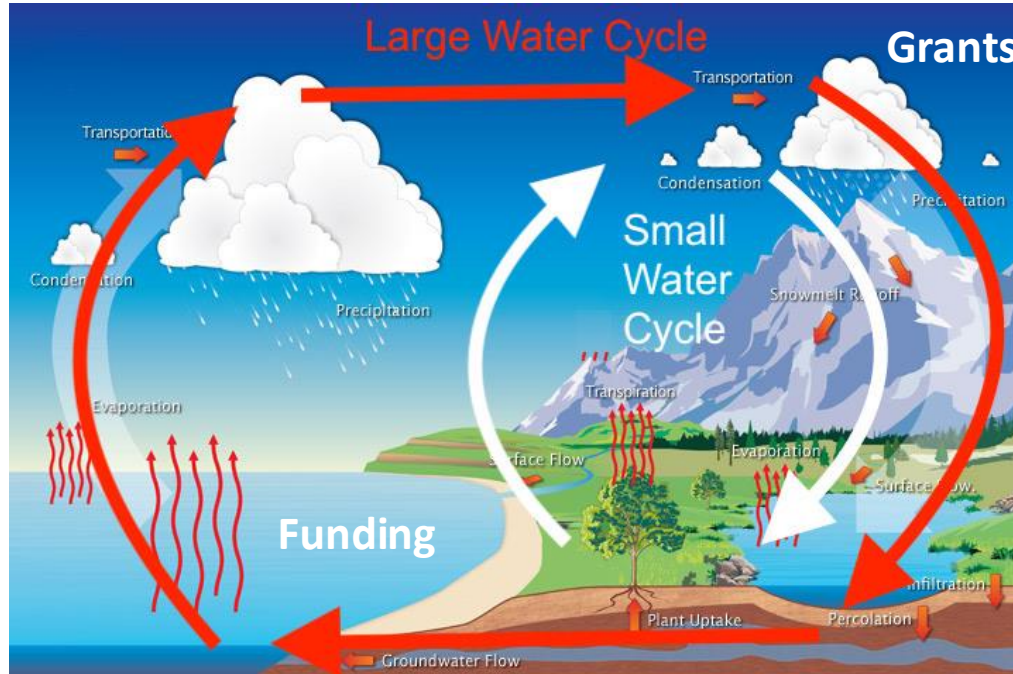
Review > [Trends Cogn Sci](#). 2020 Apr;24(4):285–301. doi: 10.1016/j.tics.2020.01.005.

Epub 2020 Feb 24.

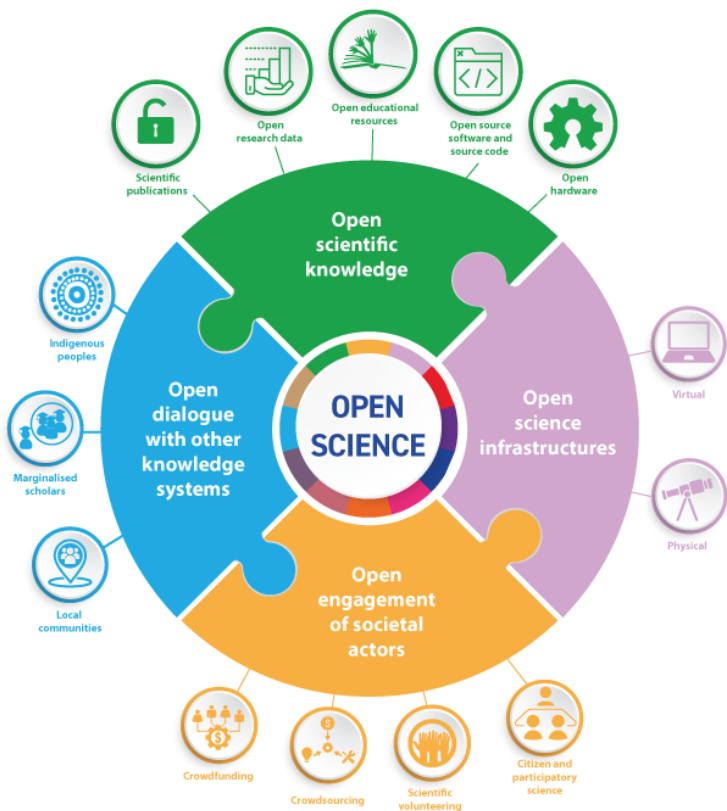
Deficits in Spontaneous Cognition as an Early Marker of Alzheimer's Disease

[Lia Kvavilashvili](#)¹, [Agnieszka Niedźwieńska](#)², [Sam J Gilbert](#)³, [Ioanna Markostamou](#)⁴

THE UPDATED METAPHOR



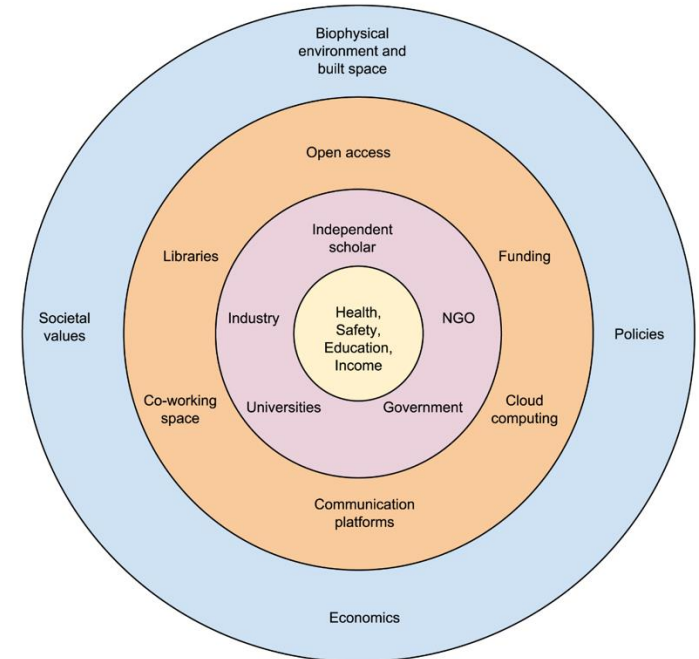
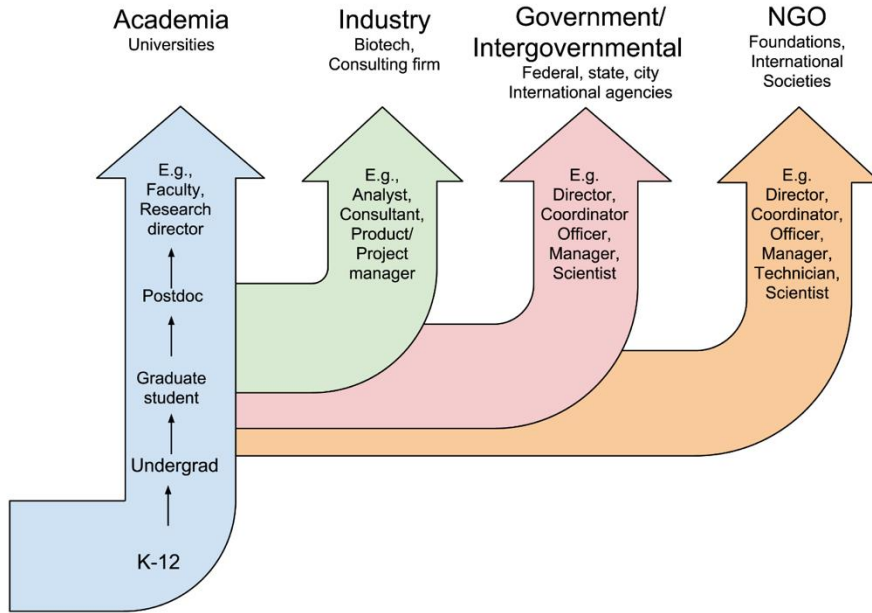
THE (ECO)SYSTEMIC CHANGE



Repair Café at University of Liège

Thank you !

THE CLASSICAL vs OPEN SCIENCE PIPELINE



Lancaster et al., 2018

THE ECOSYSTEMIC PROPOSITION



	Pattern	Pipeline metaphor emphasizes	Ecosystem metaphor emphasizes
1	Basic development of scientist	Linear: K-12, grad school, postdoc, "superdoc", tenure-track "What is your job?"	Multiple pathways, life-long learning, multiple jobs, moving into and out of specific roles/industries "What are you working on?"
2	Career model	Single breadwinner in a static environment: singular focus on productivity for a tenure-track job Standardized career ladders defined by a job title in: academia, industry, NGOs Success defined by job title	Diverse family arrangements: dynamically responding to changing needs Multiplicity of niches not restricted to corporate or academic hierarchies: scientific work and identity that transcends job title Self-defined measures of success
3	Academic positions	One-way valve Independence: defined by securing of Assistant Professor position (financial)	Open ecosystem: flows in and out Independence: claimable at any time (conception and pursuit of your own ideas)
4	Budget and pace	One-size fits all, bigger and faster always better "All-or-nothing": singular focus of life	Diversity of scales, both in pace and budgets "Fractional" science/scholarship
5	Working style	Principal investigator + apprentices Hierarchical, top-down, permissions culture Individualistic, competitive	Peers + collaborators Peer-to-peer, collaborative, permissionless culture Solidarity, cooperative
6	Resource access and publishing models	Private or institutionally based, closed to outsiders Closed-access "high prestige" journals, data hoarding for competitive advantage	Commons-based access: community labs, MakerSpaces, DIY Biology Open science, open access, preprints, data sharing
7	Funding	Competitive, winner-take-all. Concentration of resources in high prestige institutions	Collective allocation, experiment with alternative means of proposal evaluation Wider distribution, not dependent on affiliation.
8	Institutional changes	Keep structure: limit access, train fewer PhDs Scarcity, long-term permanent institutional employment accessible to lucky few	Transform institutions: engage ever more scientists Abundance, platform cooperativism, project-oriented work, basic income, universal health care

Lancaster et al., 2018