





¹ Laboratoire d'Océanographie Physique et Spatiale, UMR 6523 (IFREMER, CNRS, IRD, UBO), IUEM, FR-29200 Brest, France
² Naval Academy Research Institute, Brest 29240, France

Scientist sample

- 1/3 of the lab participate to the discussion (~45 out of 150)
- All carrier stage and education
- No administrative staff

Perceived environment

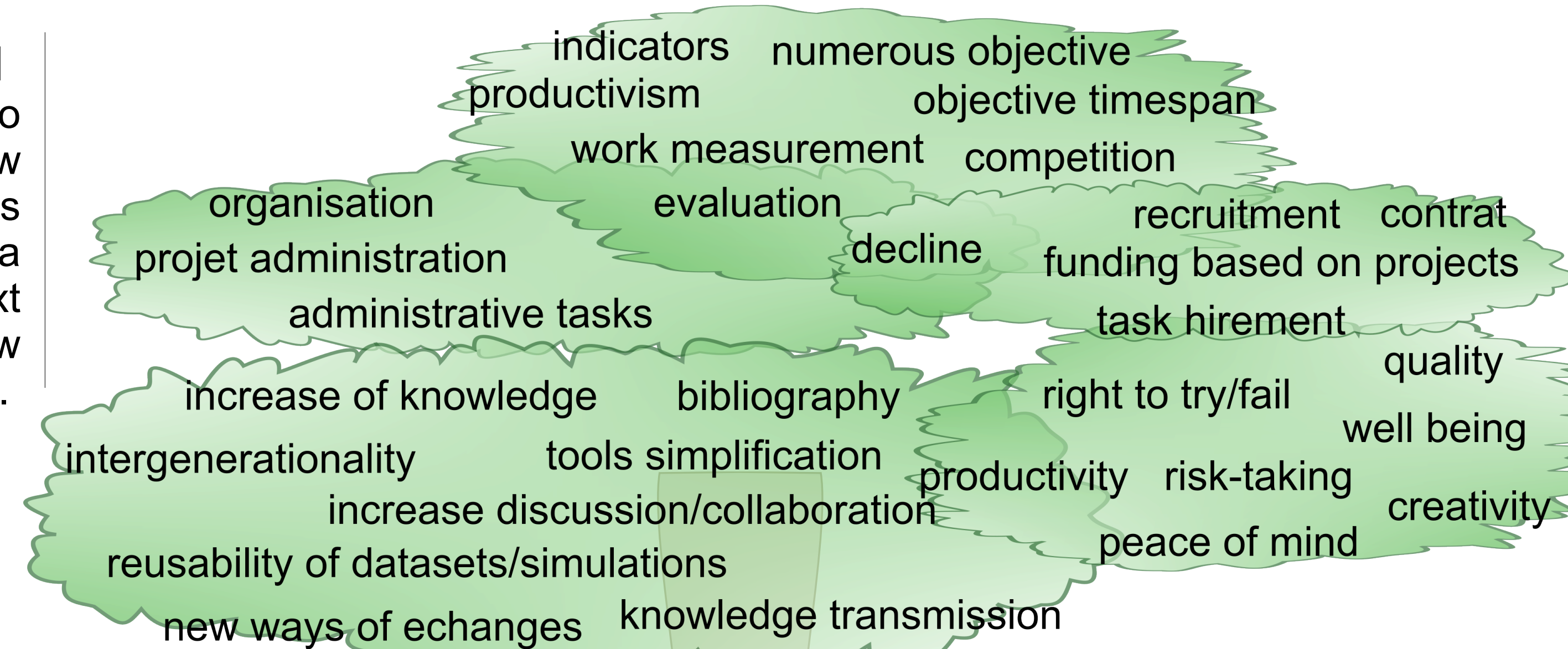
- Surprising excitement
- No stigmatization for such questioning (no taboo anymore)
- Stimulating ambiance that raise a lot discussions
- Free speaking of everyone

➤ Reconsideration of the environmental scientist's roles and duties

- « **Disruptive index** » of papers and patents (Park *et al.*, 2023)
 - becoming less disruptive over time
- Amount of material and energy throughput (e.g. computational resources, observational systems)
 - Need to increase to achieve new scientific results over time.
- Alike several dynamical systems, the return-on-investment drop when the complexity of the system increases.

Thus, such as falling return-on-investment trap should be an additional motivation to rethink the quality, more than the quantity, of the research organization. The second law of thermodynamics should motivate us to bifurcate to another research system based on a different rhythm and efficiency.

Word map of inspiration to « slow science » term. Below general idea is reworked as the science selection criteria following the actual context and following the slow science idea.



current standards

- Emphasis on individuals
- Productivism (# of articles)
- Great mobility
- High indexes
- # of citation (publicity)
- Attractive results
- Funding amount
- Large community
- Prices

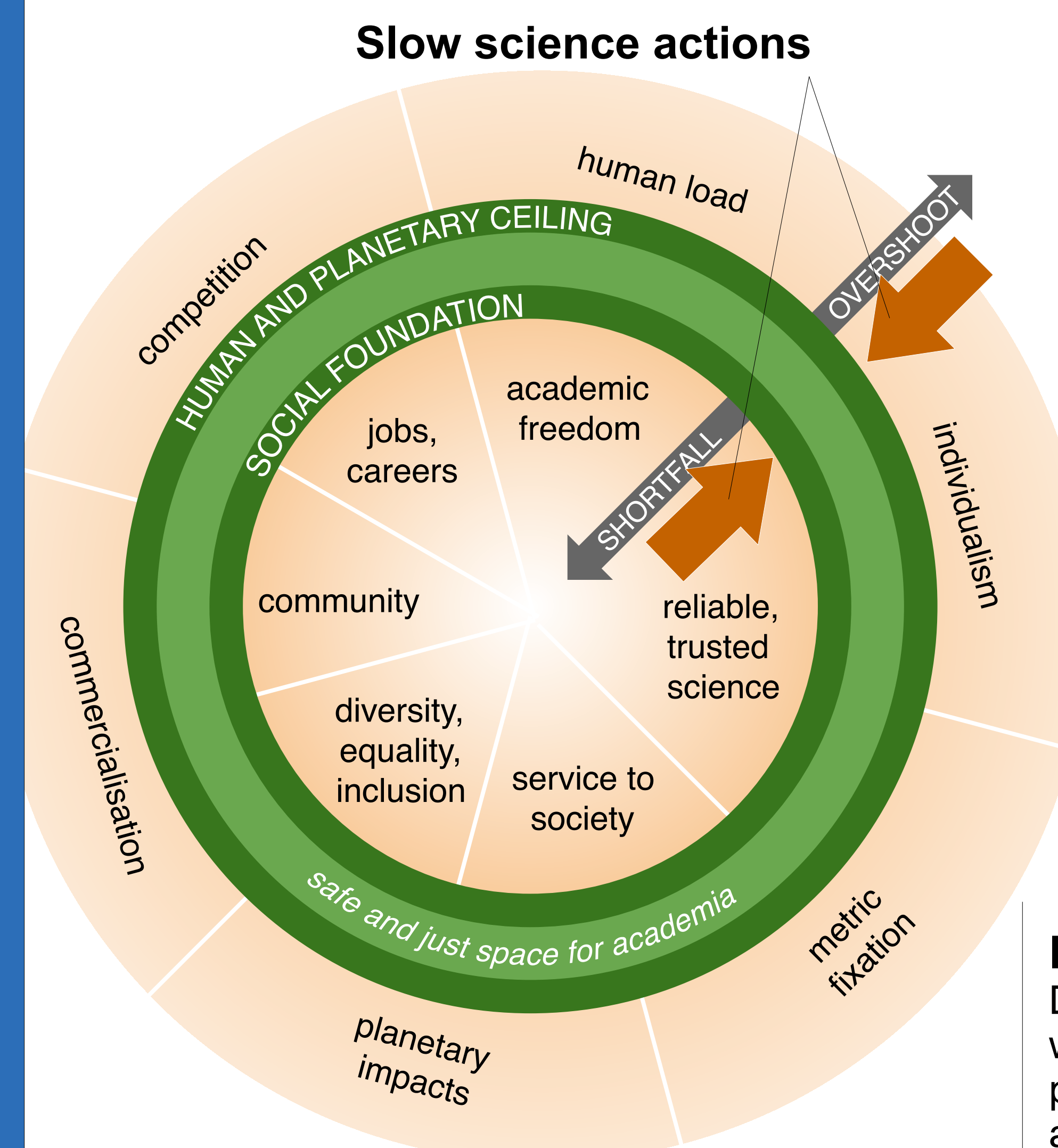


- Emphasis on teams
- Productivity (quality enhancement)
- Questions relevance
- Community tasks (peer-review, transmissions, ...)
- Scientific watch
- Outreach
- Reduced ecological footprint



- Current academic system pushes too much on the limits
 - ecological (e.g. CO₂, plastic, computers)
 - social (e.g. overwork, competition, stress, reporting)
- Proposed changes:
 - Individual
Change our mindset. What is a successful carrier? Promote quality over quantity, slowness over speed. More care on our educational mission on ecological crisis and prepare the students for action and adaptation.
 - Collective: funding, hiring.

Researchers must go beyond alerting and monitoring: *"Addressing the climate and biodiversity crisis demands transformative changes in our economies and societies. Academics, both as inhabitants of planet Earth and in their professional roles, should take a leading role in this transformation"*.



Decisions:

- Institution
- Individual/Communal

lab funding without requirements

changing the mindsets

- hirements
- evaluation
- ...

new indicators:

- happiness
- GES
- outreach
- ...

do not split on multiple projects

funding/hirement separated from projects

bigger projects that federate

less search for funding

promote all scientific contribution (article/dataset/codes/per-review,...)

self-discipline

communal subject selection

new ways of collaboration

reuse datasets and simulations

retire the status objectives (PhD students \neq short-term employee)

days without phone/mail/agenda/meeting

changing work pace

more review presentations from in-place scientists

"working" differently/less:

- thinking time
- review time

Fig. 2
Collective proposals made to slow the science habits of the community (sorted by difficulty).

Flourishing propositions, many already feasible.
 ➤ You want to act ? Initiate the discussions in your own department/university as well !

Your call ! Add your propositions on a sticky note !

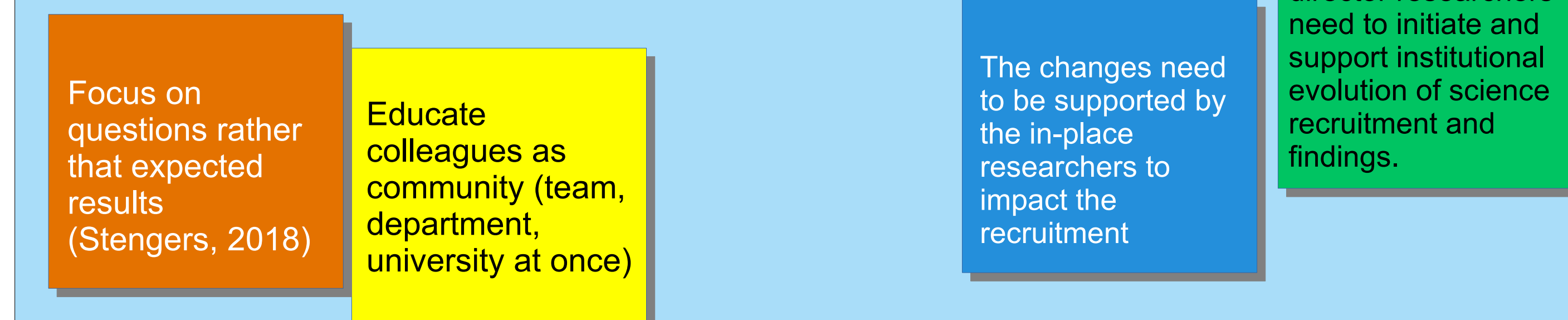


Fig. 3
Doughnut academia. Adapting the “doughnut” model of economics to the academic world enables us to visualize the inner social foundations that universities should provide, and the outer human and planetary boundaries that universities need to avoid overshooting. Note that the ordering of elements within the inner and outer rings is random; there is no direct pairing between foundations and ceilings.
From Urai & Kelly (2023), adapted from Raworth (2017), under a CC-BY-SA license.

References :

Park, M., Leahey, E. & Funk, R.J. (2023) Papers and patents are becoming less disruptive over time. *Nature* 613, 138–144. <https://doi.org/10.1038/s41586-022-05543-x>

Raworth K. (2017) Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist. Chelsea Green Publishing.

Stengers, I. (2018) Another Science is Possible: A Manifesto for Slow Science

Urai, A.E., Kelly, C. (2023) Point of View: Rethinking academia in a time of climate crisis. *eLife*. <https://doi.org/10.7554/eLife.84991>

Van Valen, L. (1973) A new evolutionary law. *Evol Theory* 1:1–30

Wilson, L. (1995) *The Academic Man: A Study in the Sociology of a Profession* (1st ed.). Routledge. <https://doi.org/10.4324/9781315130804>