

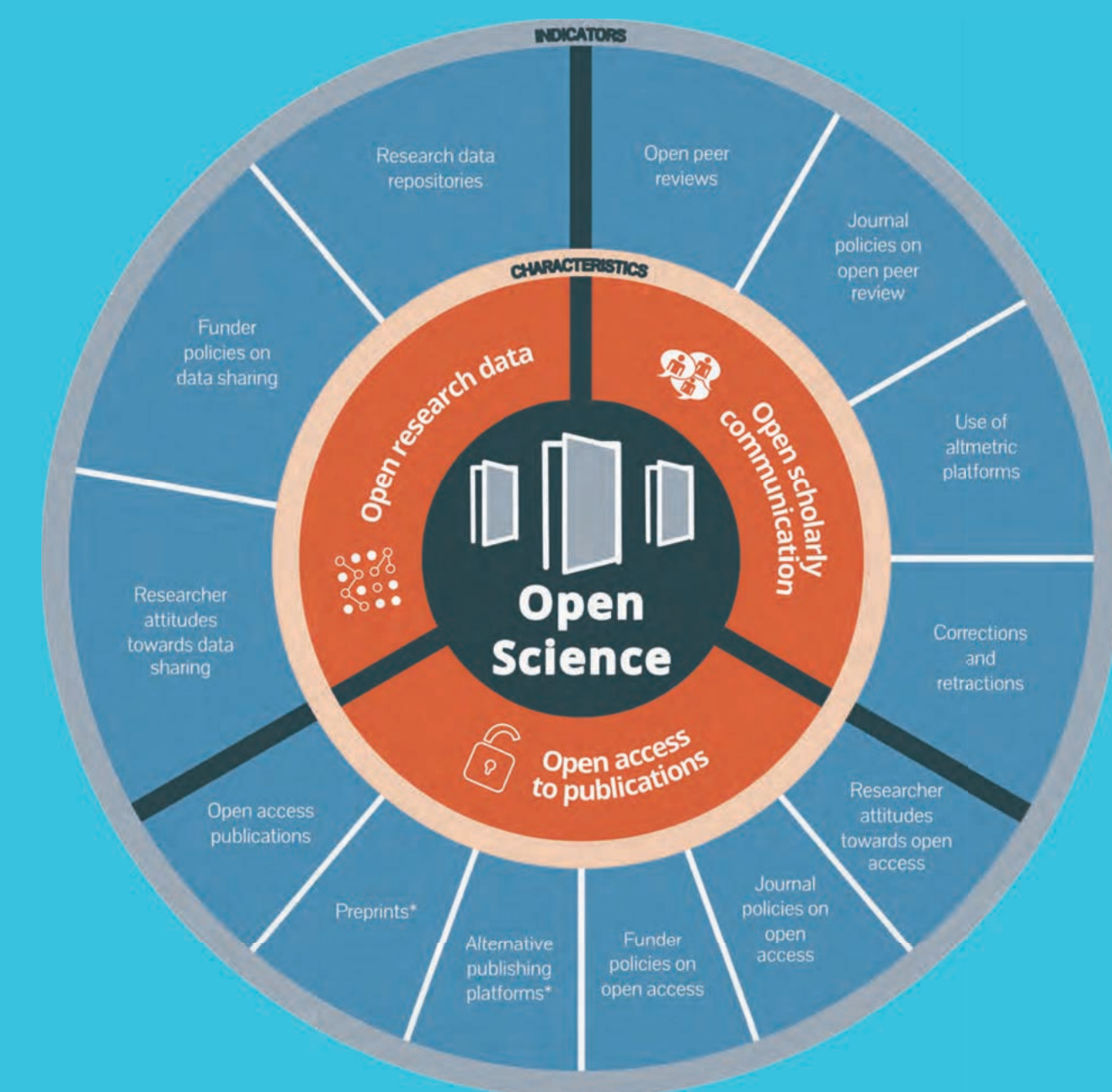


# A Philosophy of Open Science for Diverse Research Environments

Sabina Leonelli, Rose Trappes, Paola Castaño, Emma Cavazzoni, Joyce Koranteng-Acquah, Nathanael Sheehan, Fotis Tsiroukis, & Michel Durinx @ Egenis, University of Exeter



## What constitutes 'best research practice', and do open science policies help achieve it?



Source: The EU Commission Open Science Monitor

### Promise of open science:

More openness  
= better research

#### For example:

- ▶ reproducibility
- ▶ preregistration
- ▶ open source
- ▶ open access
- ▶ open data
- ▶ ...

## But open science is **not** always good for research!

### Problem 1 - Epistemic diversity

- ▶ One size does not fit all
- ▶ Open science practices need to adapt to different research methods, settings and questions

### Problem 2 - Epistemic injustice

- ▶ Open science tools produced by well-resourced institutions are not necessarily usable by researchers working under different conditions
- ▶ Resources developed and circulated by researchers in low-resourced institutions can be easily exploited with little if any recognition

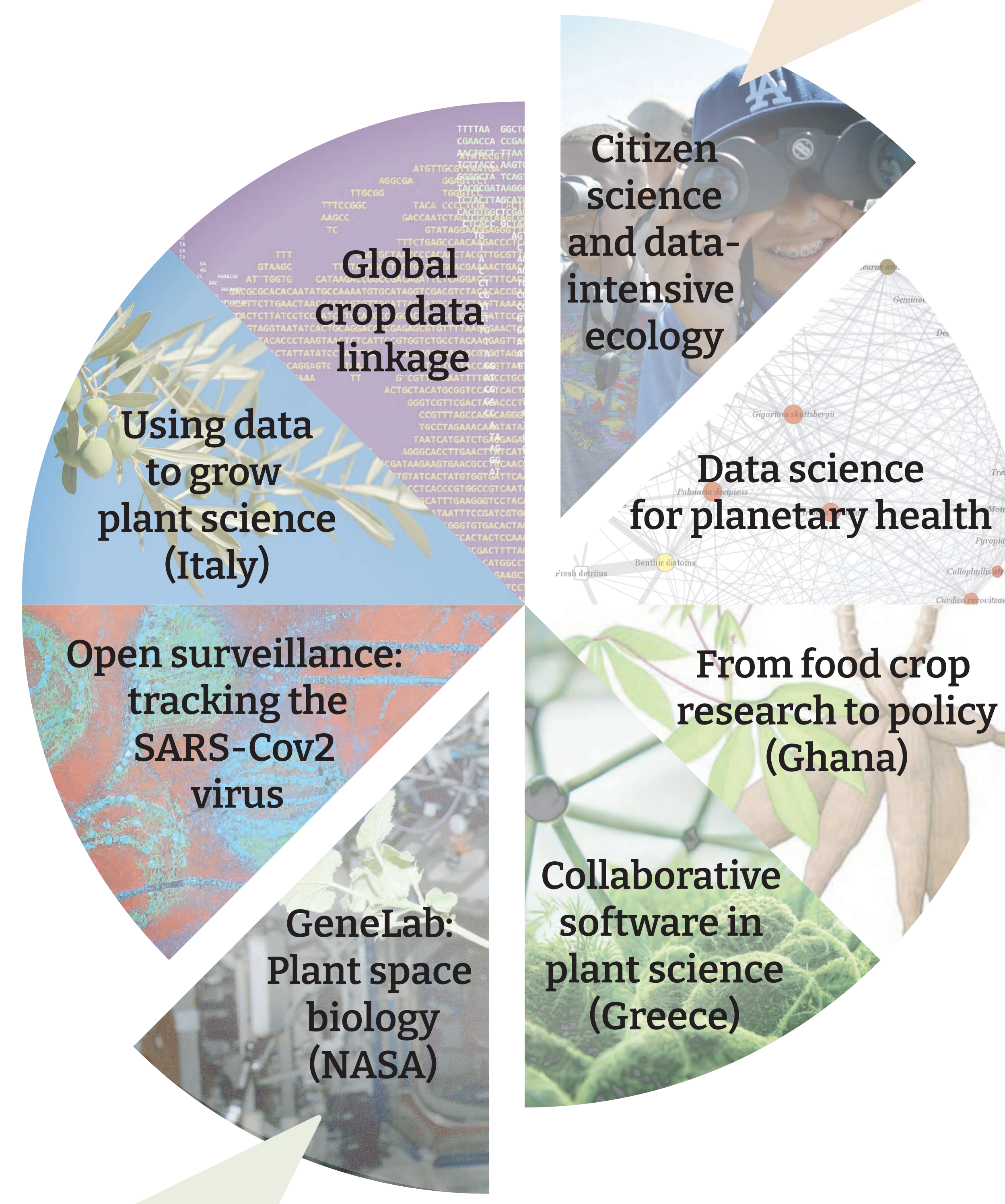
## Methods: Philosophy of science in practice (PSP) informed by qualitative social science

- ▶ Detailed case studies
- ▶ Ethnographic fieldwork
- ▶ Interviews with practitioners
- ▶ Partnerships with key institutions
- ▶ Participation in open science policy formulation

## How to study these problems? Empirical research

Ecology is increasingly data-centric. What does it mean to open up the collection, curation, and use of ecological data? How will open science affect ecology and conservation biology? With a focus on animal ecology, we examine:

- ▶ The role of open data for addressing 'big questions': sharing and synthesising animal tracking data.
- ▶ Coordination of local expertise in global citizen science: implementing the *eBird* birdwatching data platform in India.



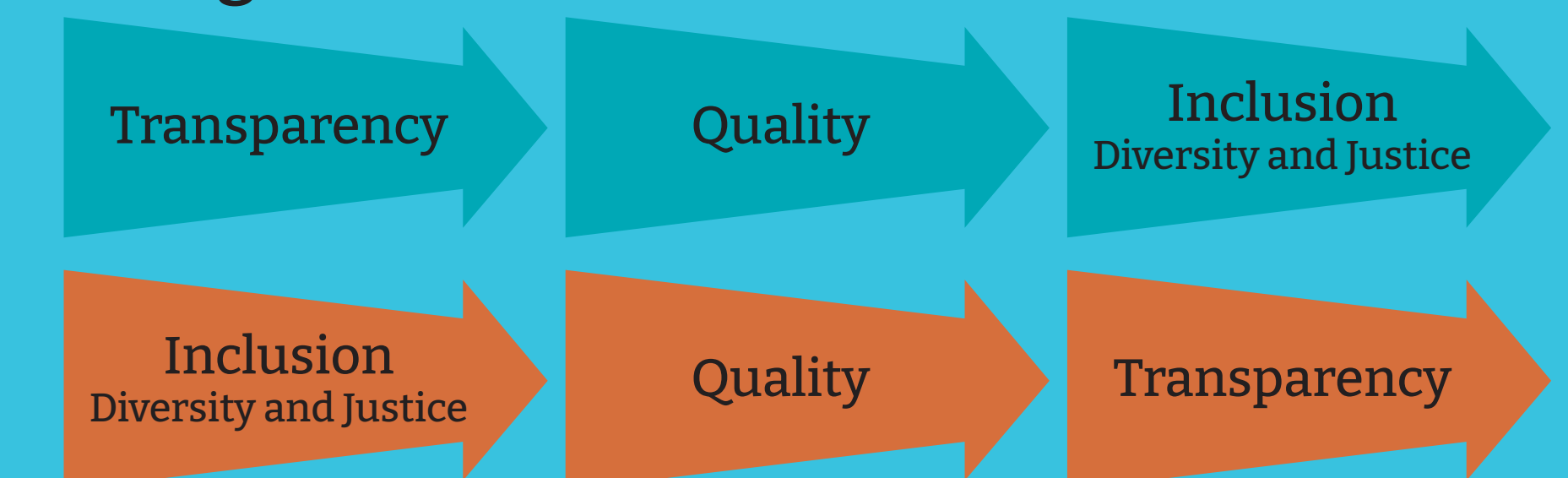
GeneLab hosts omics data from spaceflight experiments. What is the impact of open science practices in this field? What is the relationship between the goals of 'maximising discovery' and 'democratising access'? With a focus on plant biology, we examine:

- ▶ Data processing and sharing practices reshaping scientific communities and experiments.
- ▶ Biological insights resulting from comparing datasets and probing experimental designs.

## Outcomes: What are we finding?

### Articulating a philosophy of open science:

#### ▶ Shifting the direction of travel:



#### ▶ How to make open science more diverse and just

### Components of 'best research practice':

1. Conceptualisation of research environments
2. Impact of open data on experimental design
3. Meanings of reproducibility
4. Usefulness and modes of sharing
5. Limits and advantages of standardisation
6. Trade-offs in modelling open data
7. Role of 'closed' data and software
8. Community science and transdisciplinary engagement

## Selected publications

- Bezuidenhout, L, Leonelli, S, Kelly, A and Rappert, B (2017) Beyond the Digital Divide: Towards a Situated Approach to Open Data. *Science and Public Policy* 44(4): 464–475.
- Castaño, P (forthcoming) Plant Biologists and the International Space Station: Institutionalising a Scientific Community. In: Salazar, JF and Gorman, A (Eds) *Routledge Handbook of Social Studies of Outer Space*.
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- Leonelli, S (under review) *Philosophy of Open Science*. Elements, Cambridge University Press.
- Leonelli, S (2022) Open Science and Epistemic Pluralism: Friends or Foes? *Philosophy of Science* 1–21. doi:10.1017/psa.2022.45.
- Staunton C et al. (2021) Open science, data sharing and solidarity: Who benefits? *History and Philosophy of the Life Sciences* 43:115.
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