



In Defense of Depth: Slow Science for Sustainable Progress in Ecology and Evolution

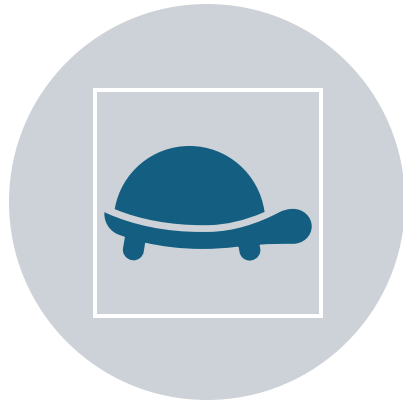
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SORTEE

Outline



SLOW SCIENCE: WHAT IT IS
AND WHAT IT ISN'T



RELEVANCE TO THE FIELDS OF
EVOLUTION AND ECOLOGY



HOW DO WE CHALLENGE THE
CURRENT SYSTEM?

How do I situate myself?

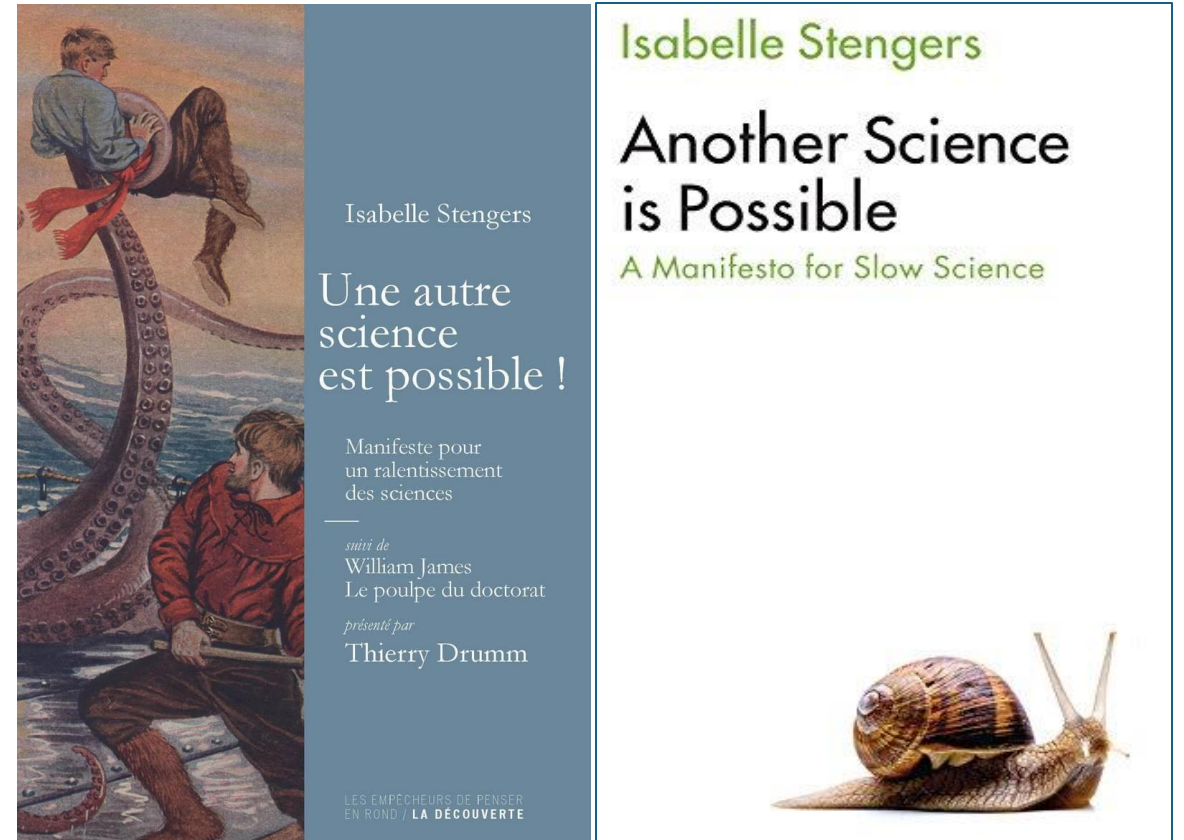
- Early-career researcher
- Intersections between disciplines
- Into open and sustainable ways of doing science
- Big fan of Isabelle Stengers



Philosophy of Slow Science



Isabelle Stengers

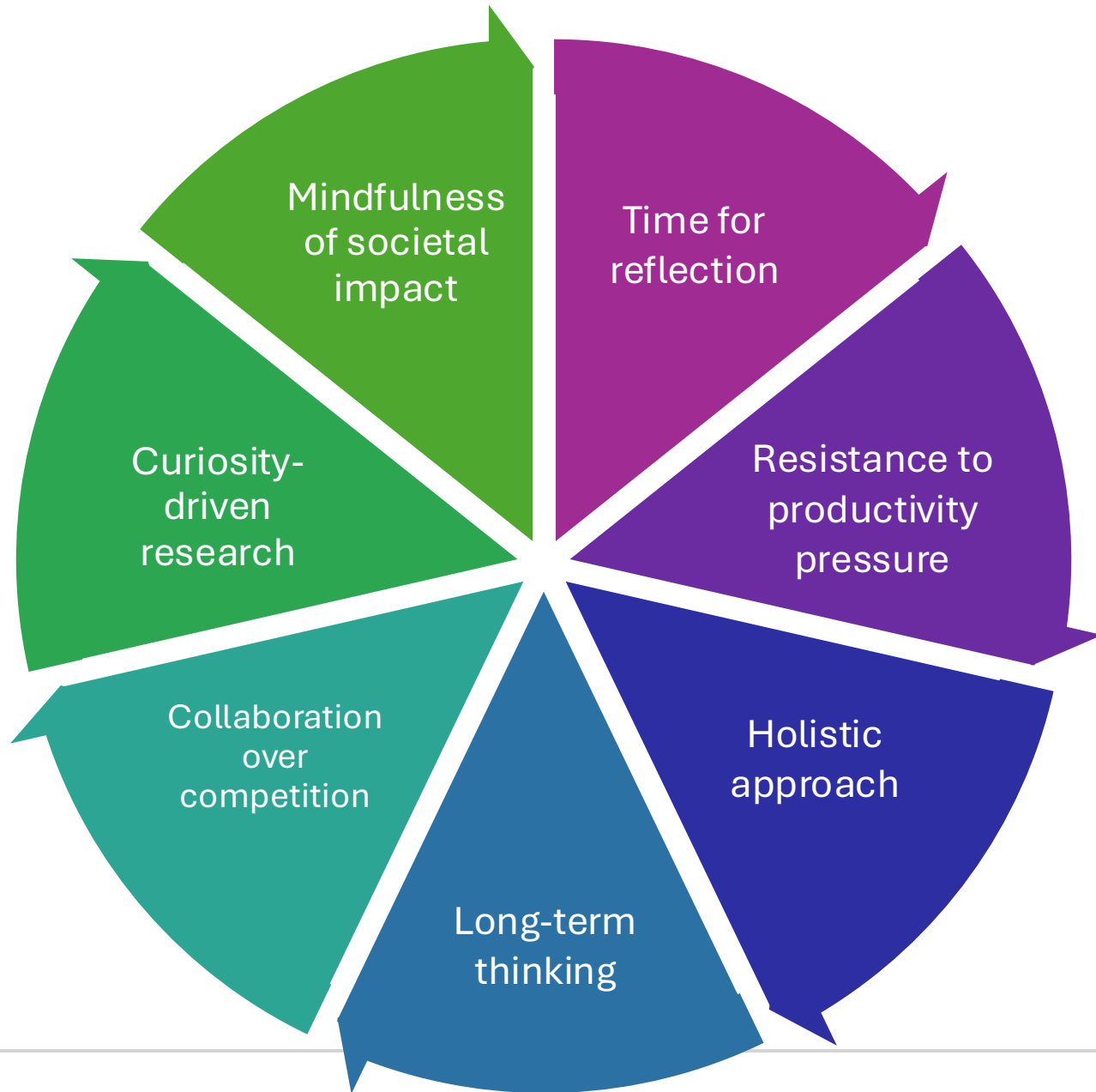


2013/2018

Slow Science: What it is and what it isn't



What is slow science all about?



A matter of balance

Vita activa

Vita contemplativa

A rebalancing of the active and contemplative lives for a scientific culture where depth and reflection are not sacrificed for productivity



Increasing the quality of research

how do we judge quality science?

how to improve quality in science?

who would benefit?

what about the competitive nature of science?

Goodhart's Law: when a measure becomes a target, it ceases to be a good measure

TABLE 1. GROWING PERVERSE INCENTIVES IN ACADEMIA

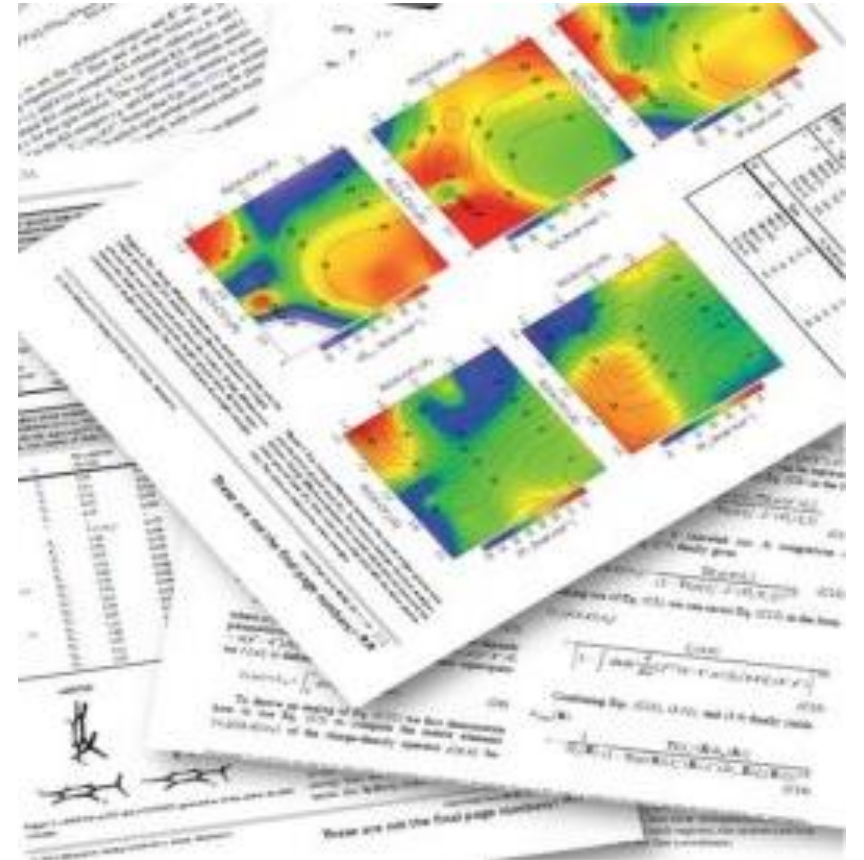
<i>Incentive</i>	<i>Intended effect</i>	<i>Actual effect</i>
“Researchers rewarded for increased number of publications.”	“Improve research productivity,” provide a means of evaluating performance.	“Avalanche of” substandard, “incremental papers”; poor methods and increase in false discovery rates leading to a “natural selection of bad science” (Smaldino and McElreath, 2016); reduced quality of peer review
“Researchers rewarded for increased number of citations.”	Reward quality work that influences others.	Extended reference lists to inflate citations; reviewers request citation of their work through peer review
“Researchers rewarded for increased grant funding.”	“Ensure that research programs are funded, promote growth, generate overhead.”	Increased time writing proposals and less time gathering and thinking about data. Overselling positive results and downplay of negative results.
Increase PhD student productivity	Higher school ranking and more prestige of program.	Lower standards and create oversupply of PhDs. Postdocs often required for entry-level academic positions, and PhDs hired for work MS students used to do.
Reduced teaching load for research-active faculty	Necessary to pursue additional competitive grants.	Increased demand for untenured, adjunct faculty to teach classes.
“Teachers rewarded for increased student evaluation scores.”	“Improved accountability; ensure customer satisfaction.”	Reduced course work, grade inflation.
“Teachers rewarded for increased student test scores.”	“Improve teacher effectiveness.”	“Teaching to the tests; emphasis on short-term learning.”
“Departments rewarded for increasing U.S. News ranking.”	“Stronger departments.”	Extensive efforts to reverse engineer, game, and cheat rankings.
“Departments rewarded for increasing numbers of BS, MS, and PhD degrees granted.”	“Promote efficiency; stop students from being trapped in degree programs; impress the state legislature.”	“Class sizes increase; entrance requirements” decrease; reduce graduation requirements.
“Departments rewarded for increasing student credit/contact hours (SCH).”	“The university’s teaching mission is fulfilled.”	“SCH-maximization games are played”: duplication of classes, competition for service courses.

The strain on scientific publishing

- So many publications > impacts on quality?

Rogue ESR survey (2500 resp., 2020 May):

- 50% of the respondents admit to publishing episodically or regularly **unfinished works**. 14% also declare having done so "once".
- 68% say they do **not have the time to follow the state of research** in their field.

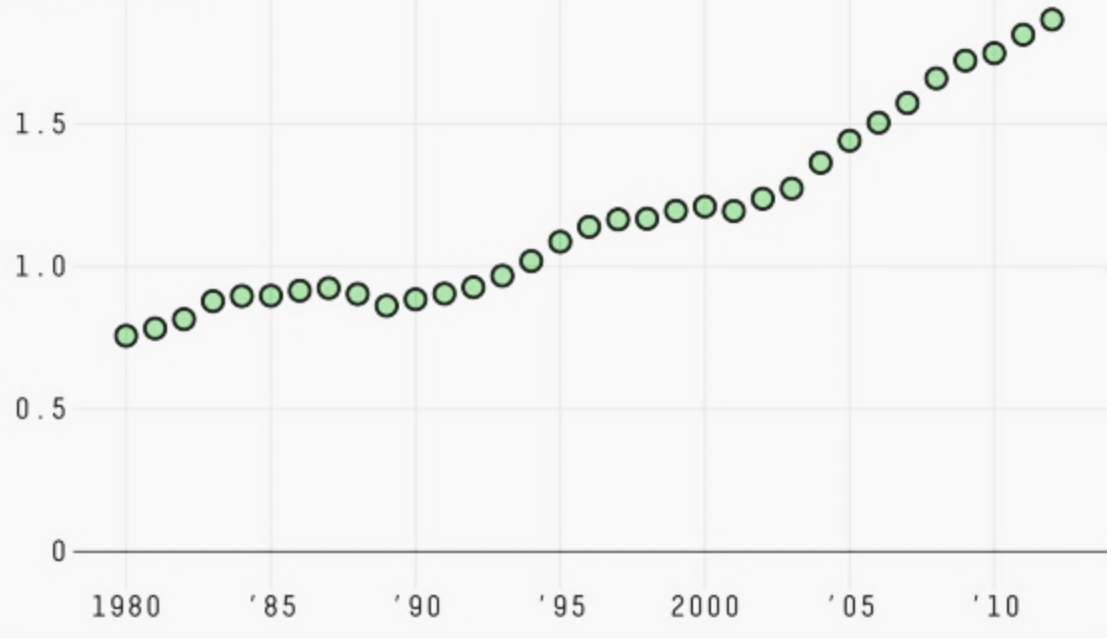


The strain on scientific publishing

The Pace Of Publishing

Number of scientific papers in Max Planck Digital Library's database, by year of publication

2.0M PAPERS

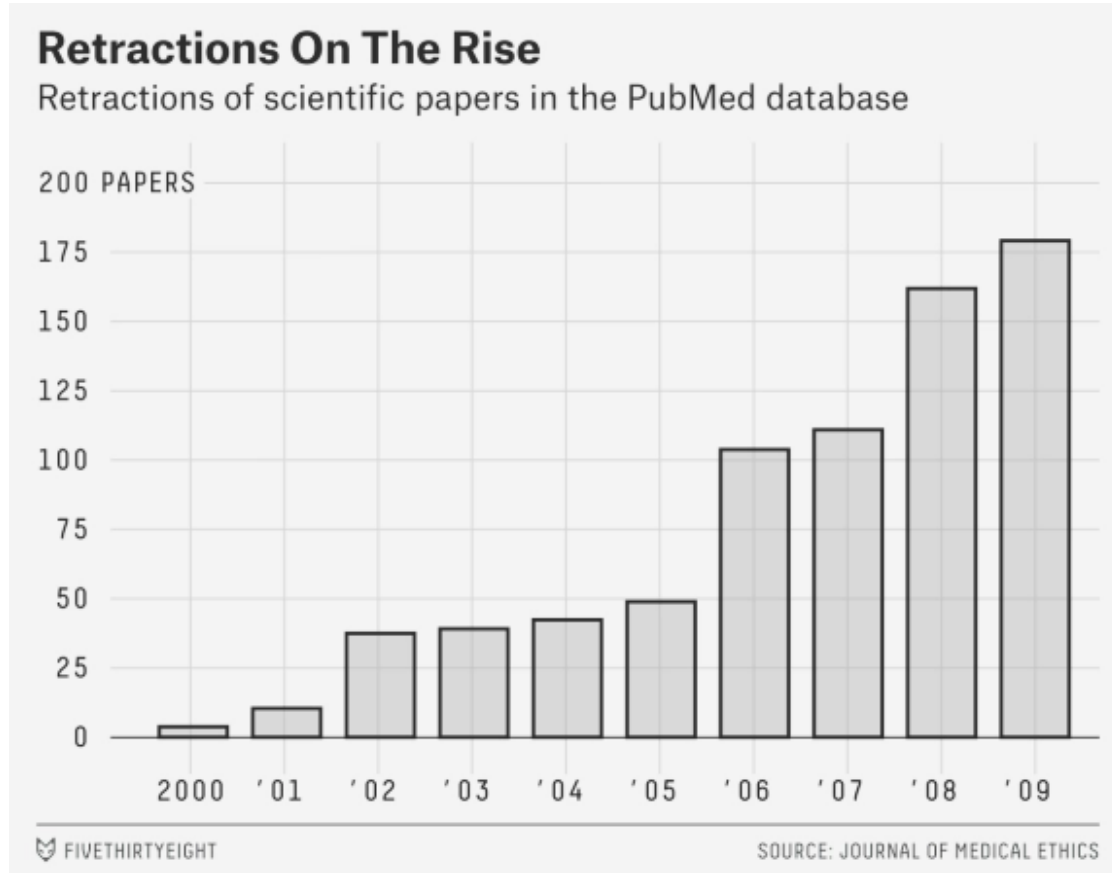


Bornmann & Mutz (2015)

more papers = more knowledge?

→ Cumulation of knowledge
What do we do with that knowledge?

The strain on scientific publishing



more papers = more knowledge?



Amitangshu Acharya
@amitangshu

How is this going to work? So many manuscripts being submitted to journals on a daily basis. Who has time to review & give each the time needed? Large volumes of low quality papers keeps getting published without thorough scrutiny. This is a serious disservice to science.

[Traduire le Tweet](#)

4:13 PM · 17 juil. 2020 · Twitter Web App

The publish-or-perish culture, a prisoner's dilemma

Slow

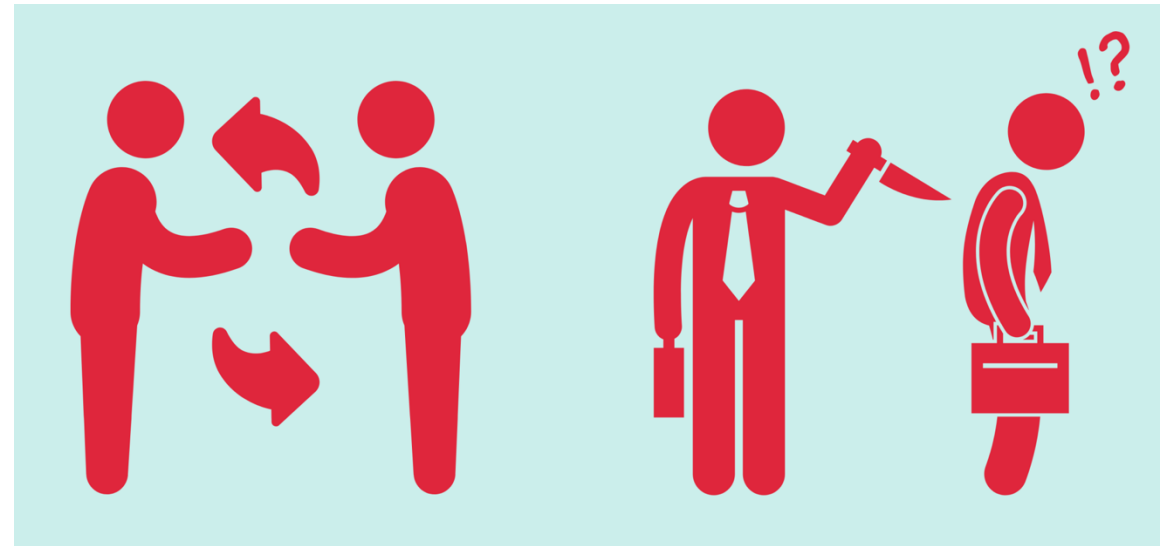
Quality, Collaboration, Long-term perspectives

Required to have more complete results

Fast

Quantity, Competition, Short-term perspectives

Required to get funding and a TT position



Relevance to the fields of evolution and ecology



Eco/Evo: at a crossroads

- Fields where long-term studies are crucial but often funding cycles and publication pressures push for quicker, shorter-term studies
- Fundamentally transdisciplinary with the integration of natural and social sciences
e.g.: human dimensions in global change projects



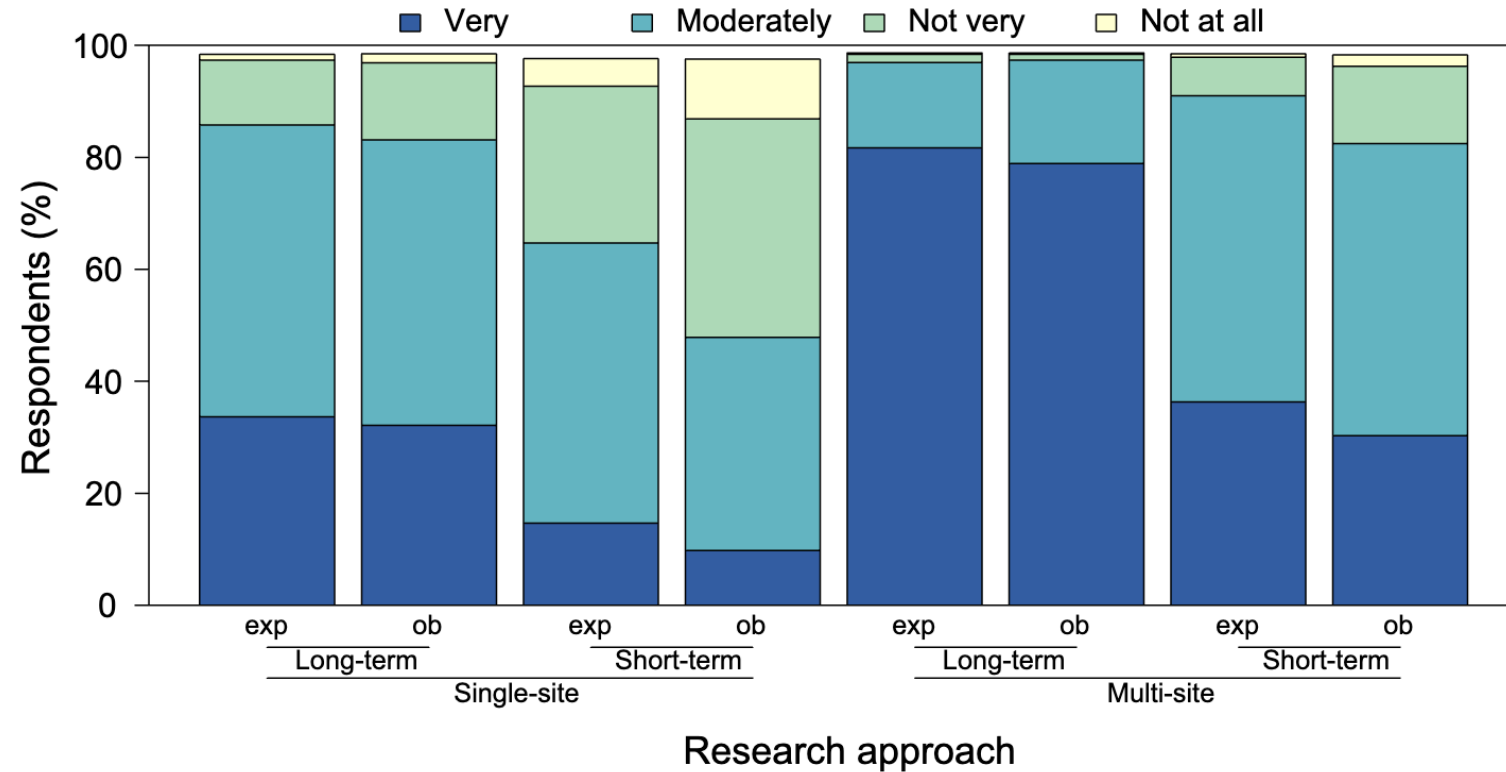
Long-term research, an example of slow science?

- Crucial to address questions where patterns are only revealed through longer periods and extended observations are needed
- Critical role in understanding broader ecological and evolutionary dynamics
- However, the foresight to start such data collection and the resourcefulness to maintain them over decades are rare

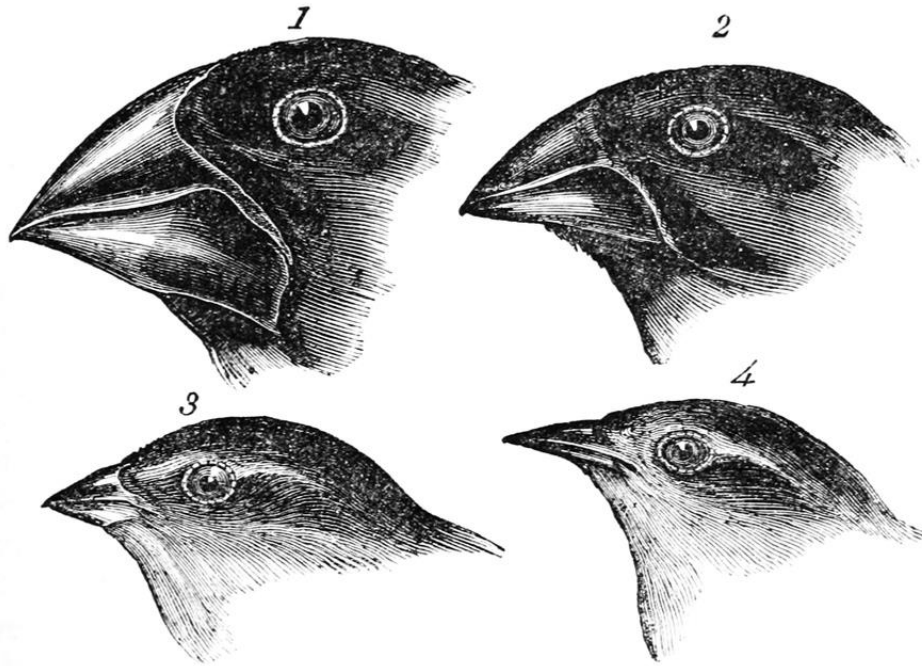


LTR to develop new theories

To what extent are the following research approaches important to developing general theories in ecology and evolutionary biology?



LTR to document natural selection



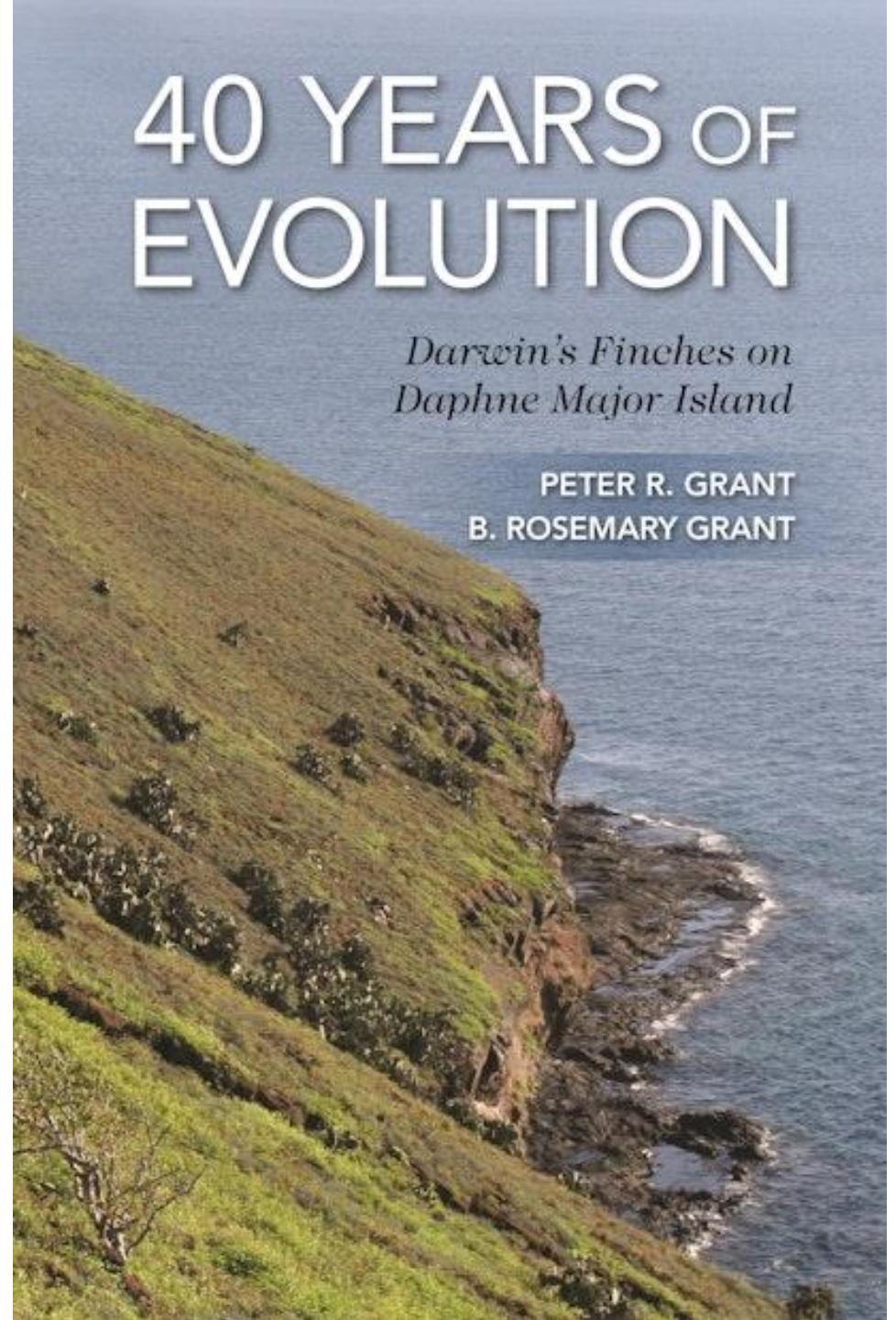
1. *Geospiza magnirostris*.
3. *Geospiza parvula*.

2. *Geospiza fortis*.
4. *Certhidea olivacea*.

40 YEARS OF EVOLUTION

*Darwin's Finches on
Daphne Major Island*

PETER R. GRANT
B. ROSEMARY GRANT



A sustained interest

Regional Environmental Change (2019) 19:309–311
<https://doi.org/10.1007/s10113-018-1445-0>

EDITORIAL

Contemporary International Long-Term Ecological Research (ILTER)
—from biogeosciences to socio-ecology and biodiversity research

Thomas Dirnböck¹ · Peter Haase^{2,3} · Michael Mirtl^{1,4} · Johan Pauw⁵ · Pamela H. Templer⁶

Received: 29 October 2018 / Accepted: 20 November 2018 / Published online: 7 January 2019

ECBB 2024 ZÜRICH

ECBB 2024 - LONG-TERM STUDIES IN ANIMAL BEHAVIOUR

European Conference on Behavioural Biology July 16th – 19th 2024, Zurich, Switzerland

nature ecology & evolution

Perspective

<https://doi.org/10.1038/s41559-024-02464-y>

The value of long-term ecological research for evolutionary insights

Received: 8 January 2024

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Published online: 2 August 2024

 Check for updates

Jennifer M. Cocciardi^{1,28}, Ava M. Hoffman², Diego F. Alvarado-Serrano³, Jill Anderson⁴, Meghan Blumstein⁵, Emma L. Boehm⁶, Lana G. Bolin⁶, Israel T. Borokini⁷, Gideon S. Bradburd⁸, Haley A. Branch⁹, Lars A. Brudvig¹⁰, Yanni Chen¹¹, Scott L. Collins¹², David L. Des Marais⁵, Diana Gamba¹³, Niall P. Hanan¹⁴, Mia M. Howard⁸, Joseph Jaros¹⁵, Thomas E. Juenger¹⁶, Nicholas J. Kooyers¹⁷, Ezra J. Kottler¹⁸, Jennifer A. Lau⁶, Mitra Menon¹⁹, David A. Moeller²⁰, Thomas J. Mozdzer²¹, Seema N. Sheth²², Melinda Smith²³, Katherine Toll^{10,29}, Mark C. Ungerer²⁴, Megan L. Vahsen²⁵, Susana M. Wadgyman²⁶, Amy Waananen²⁷, Kenneth D. Whitney¹² & Meghan L. Avolio¹

Comment

<https://doi.org/10.1038/s41559-022-01940-7>

The expanding value of long-term studies of individuals in the wild

Ben C. Sheldon, Loeske E. B. Kruuk & Susan C. Alberts

 Check for updates

Review

Cell
PRESS

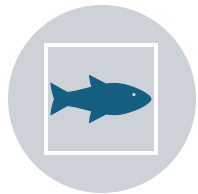
Special Issue: Long-term ecological research

Feature Review

Individuals and populations: the role of long-term, individual-based studies of animals in ecology and evolutionary biology

Tim Clutton-Brock¹ and Ben C Sheldon²

... with many challenges



Biases towards
some species



Single-site
studies



Limited genetic
material



Geographic
biases



Require a huge
involvement



Lack of funding



- Established in 1980 to address ecological questions that cannot be resolved with short-term observations or experiments
- Expected to contribute to developing and testing fundamental ecological theories and advance understanding of long-term dynamics of populations, communities, and ecosystems
- Integrates multiple disciplines and examines patterns or processes over broad spatial scales
- Data collected by all LTER sites must be made publicly accessible

How do we
challenge
the current
system?



Slow Science: Reimagining Academia

- No ready-to-implement solution
- No one-size-fits-all solution
- No simple fixing

- Experiment!



Where to begin?



- Organise discussions within your team/lab and start the conversation! *
- Be curious about other disciplines, broaden your perspectives
- If you are an Editor, use your power to challenge top-tier journal publication criteria!
- Check the Declaration on Research Assessment ([DORA](#))
- Explore and imagine alternative ways of doing science
 - E.g.: Independent institutes, independent scholars, part-time researchers



* You can check this Wellcome initiative for some inspiration:

<https://reimagine-research-wellcome.uk.engagementhq.com/Reimagine-Research>

Interpretation of Stengers as actions for making a slow science

Action	Commentary
1. Acts of disobedience	Reflecting wider ideas regarding the value of controversy in scientific research, the role that controversies can play, notably where they allow a scientist to disobey conventional wisdom, and to raise other kinds of questions. Stengers uses the example of GM crops where environmental safety concerns open up wider questions regarding global food security, spatial justice, and dominant accounts of biotechnical solutions to food shortage.
2. Repositioning of the scientist	A refocusing of the scientist: away from their normal communities of practice (as scientists) and the abstraction of investigation out of the milieu of which it is normally apart; and towards those who ask different questions or bring other kinds of understanding, normally excluded from scientific enquiry.
3. Readmission of consequence	The readmission into scientific enquiry of those for whom scientific research has consequence, ones normally removed via scientific abstraction.
4. New ways of working	Dismantling of the normal ways of working that strive to exclude judgement from scientific practice.
5. The “art of consultation”	The need to be able to engage with the subjects of our research that gives them the power to make us think differently about them. . .
6. The “right of reply”	. . . and to evaluate what it is we think we need to know about them, that is, to give them a “right of reply” to the definition of the questions that we pursue.

Finding your own balance

- You can design a large project in a way that makes a good blend of slow science and faster science
- One partial way out of the quality-quantity dilemma is to have a mix of studies. Some high-risk, long-term, most likely to pay off, but still somewhat interesting.



Act at your level

- **Early-career researchers:** pressures of job markets, tenure tracks, need for publications > balance career demands with slow science principles, like building strong collaborations and focusing on quality
- **Mid-career researchers:** promote slow science values in labs and institutions, and mentor younger scientists to appreciate long-term research
- **Senior researchers:** advocate for funding policies and institutional changes that support long-term, in-depth research projects

Open suggestions



Against the one PI model
> more interactions between
researchers at different career
stages, from different backgrounds



MSc/PhD students: two
supervisors with different
perspectives



Protect/value your thinking
time > turn off notifications
for deep focus periods



Addressing Biases in the Field of Animal Behaviour

ASAB Winter Meeting 2024

12th and 13th December, Edinburgh

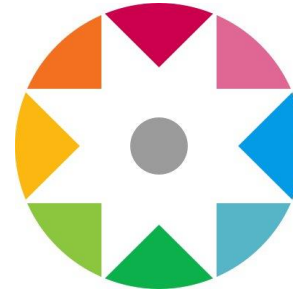
<https://asabwinter2024.github.io/>

Free and hybrid format with hublets

Some initiatives



<https://betterscience.ch/>



DORA

<https://sfdora.org/>



The Ronin Institute

<https://ronininstitute.org/>



<https://researchcooperative.org/>



Slow science in Belgium

<https://slowscience.be/>



<https://igdore.org>



<https://picomps.org/>



<https://hibar-research.org/>

chi va piano,
va sano
e va lontano.

A few words
on mental
health



Thank you for your attention!

References

- Stengers, Isabelle. *Une autre science est possible ! Manifeste pour un ralentissement des sciences*, Paris, Les Empêcheurs de penser en rond/La Découverte, 2013.
- Stengers, Isabelle. *Another Science is Possible: A Manifesto for Slow Science*, Muecke, S. (trans.), Polity Press, 2018.
- Edwards, M.A. and Roy, S. (2017). Academic Research in the 21st Century: Maintaining Scientific Integrity in a Climate of Perverse Incentives and Hypercompetition. *Environmental Engineering Science*, 34, 1. <https://doi.org/10.1089/ees.2016.0223>
- Bornmann, L. and Mutz, R. (2015), Growth rates of modern science: A bibliometric analysis based on the number of publications and cited references. *Journal of the Association for Information Science and Technology*, 66, 2215-2222. <https://doi.org/10.1002/asi.23329>
- Kuebbing, S.E., Reimer, A.P., Rosenthal, S.A., Feinberg, G., Leiserowitz, A., Lau, J.A. and Bradford, M.A. (2018), Long-term research in ecology and evolution: a survey of challenges and opportunities. *Ecological Monograph*, 88: 245-258. <https://doi.org/10.1002/ecm.1289>
- Lane, S.N. (2017), Slow science, the geographical expedition, and Critical Physical Geography. *The Canadian Geographer / Le Géographe canadien*, 61: 84-101. <https://doi.org/10.1111/cag.12329>