Swiss National Science Foundation

RoRI RESEARCH ON RESEARCH INSTITUTE

EXPERIMENT, TRANSLATE AND TRANSFORM:

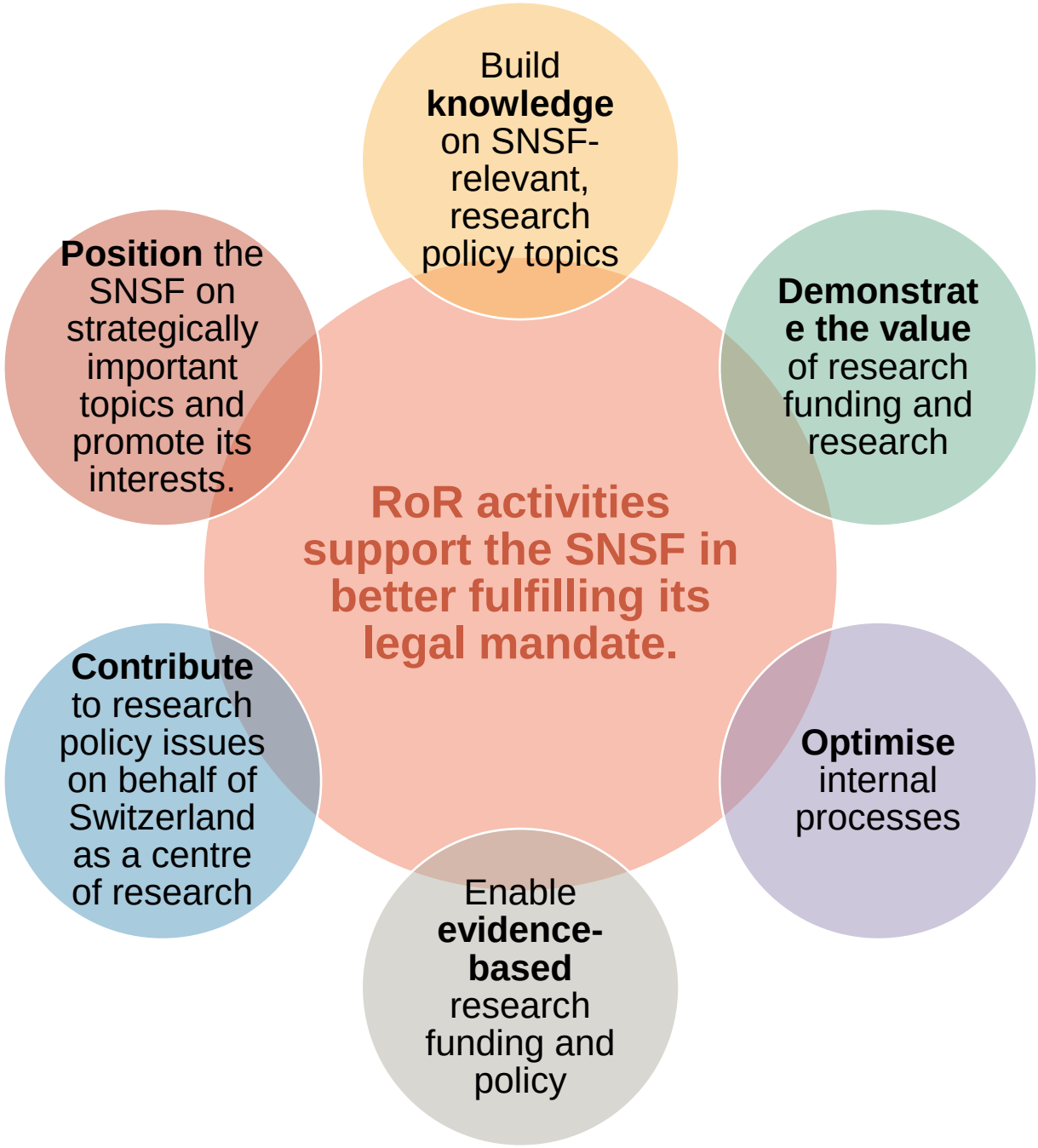
PRIORITIES FOR THE NEXT DECADE OF RESEARCH ON RESEARCH

Launch event of RoRI's second phase

20 June 2022, 3-6 pm CEST

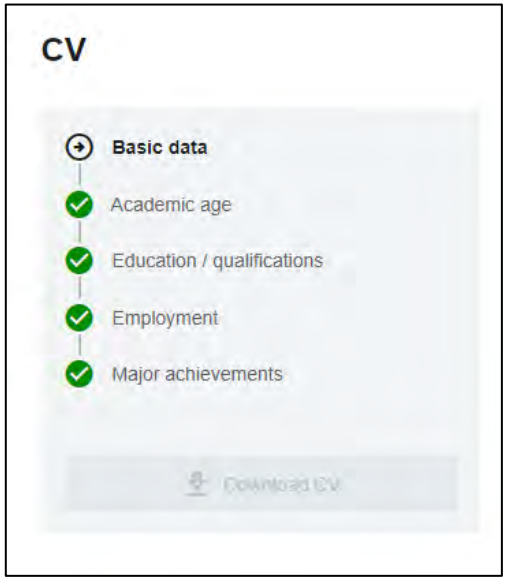
#ResearchOnResearch

Why the SNSF engages in RoR

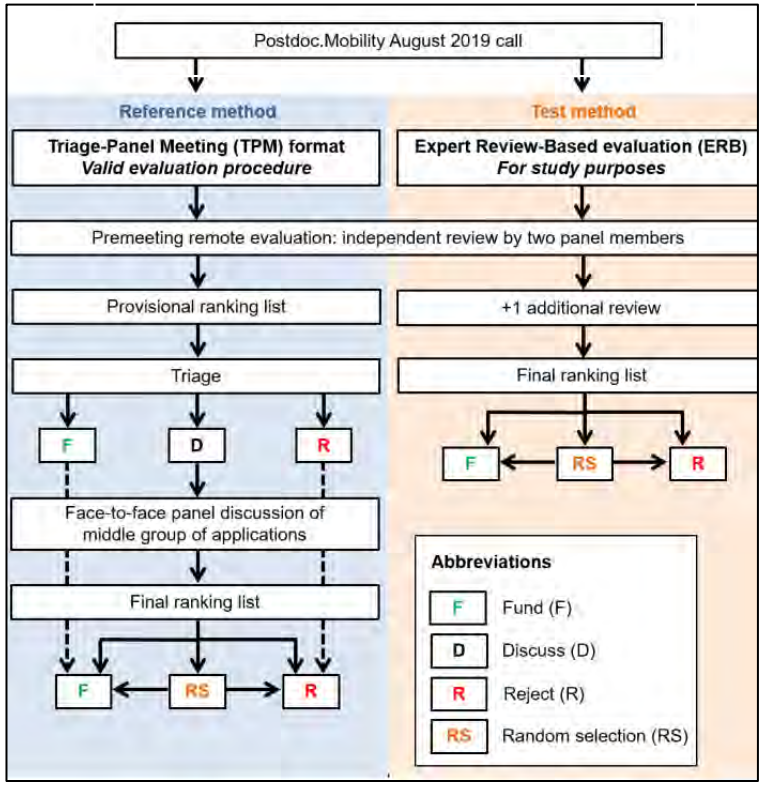


Outcomes of RoR at the SNSF

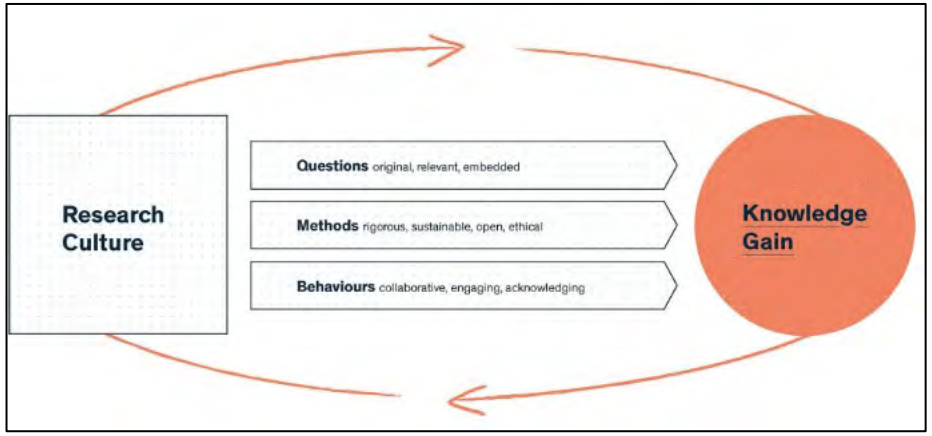
A narrative CV



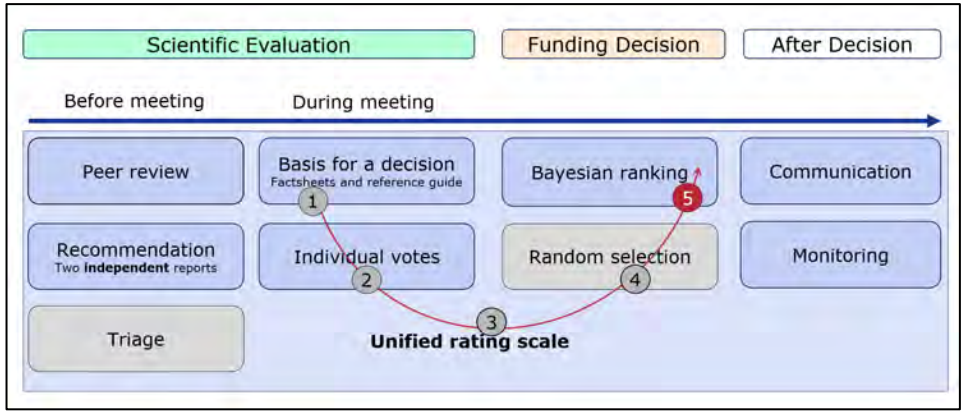
Particial Randomisation



Model of Excellence

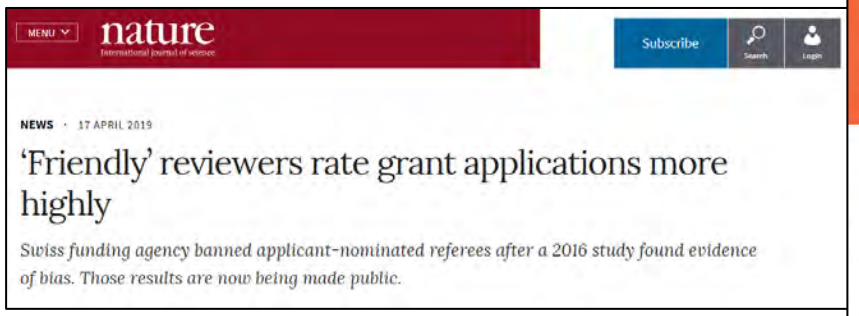


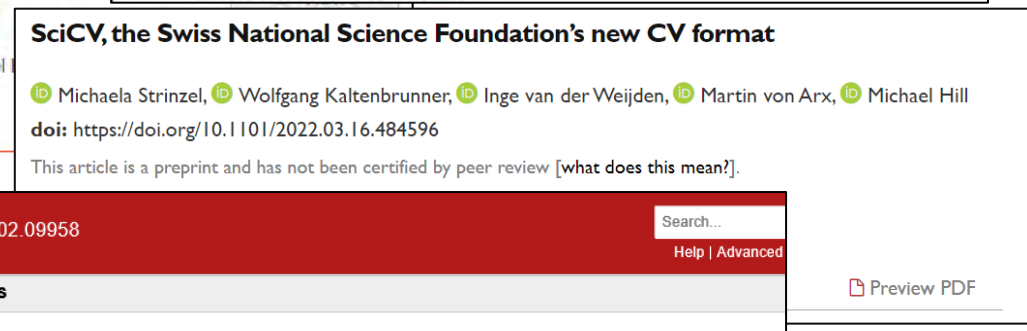
Unified Evaluation Procedure

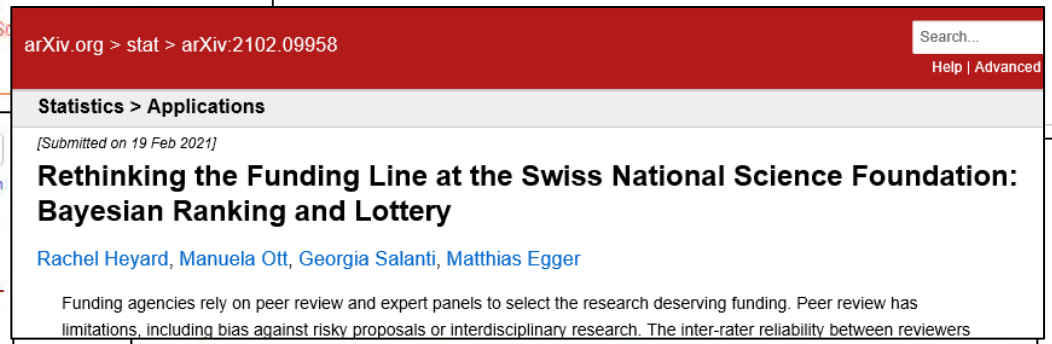


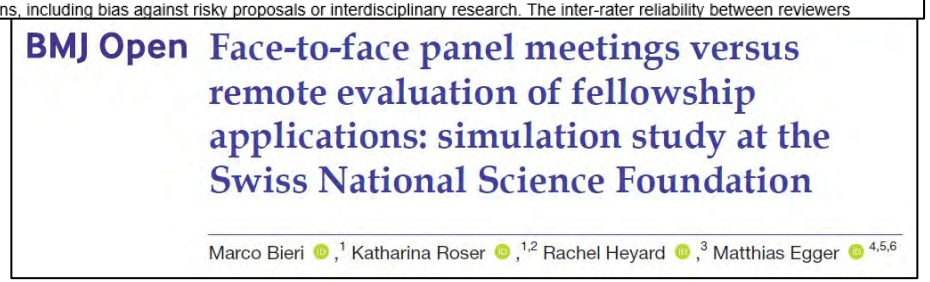
SNSF

Research on Research (RoR) at the SNSF



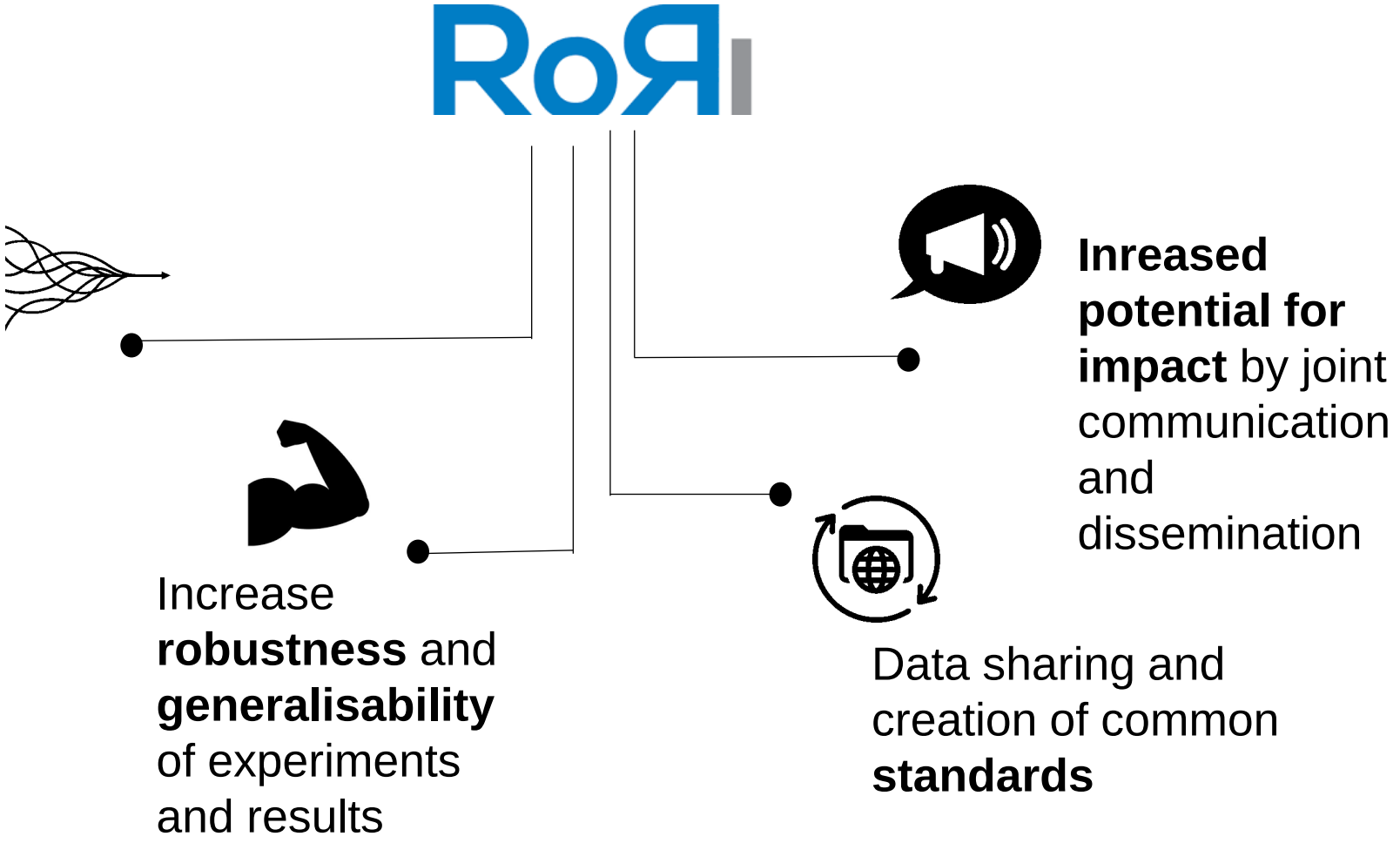






SNSF

RoR must meet the highest international quality standards



RoRI: international consortium of funders, academics & technologists

– Co-founded in 2019 by the Wellcome Trust, Digital Science, Leiden University and University of Sheffield

– To inform ‘better’ research by analysing research systems and experimenting with new tools, indicators and evaluation frameworks on a large and international scale

RoRI launch event 2019

Successful pilot phase of 2 years

Launch of 2. phase

New wave of RoR projects to come

2019 | 2020 | 2021 | 2022 | ‘23 | ‘27

See: rori.figshare.com

Programme

15:00 **Welcome & opening reflections** - Matthias Egger

15:10 **The trouble in comparing different approaches to science funding** - Michael Nielsen

16:00 Break

16:20 **RoRI's operating model: co-producing system change** - Sarah de Rijcke

16:25 **PechaKucha of RoRI projects and the next five years**

17:00 **The Partner Panel on Priorities for research on research** - chaired by Katrin Milzow

18:00 End of conference/ Apéro

Michael Nielsen

- Research Fellow at Astera Institute (NFP start-up research institute) Berkeley, CA.
- His primary current interest is in metascience as a driver of rapid change and improvement in our scientific institutions.
- He helped pioneer quantum computing, & worked for many years as advocate for open science (giving up a tenured position at Perimeter Institute)
- He co-authored one of the standard texts in quantum computing, and books about open science & neural networks.
- All his work -- in metascience, quantum computing, open science, AI, & human-computer interaction -- is united by a desire to build systems to better support human thought and discovery.

The trouble with comparing different approaches to science funding

Michael Nielsen, Astera Institute, at the Research on Research Institute's Phase 2 Launch (Bern, 2022)

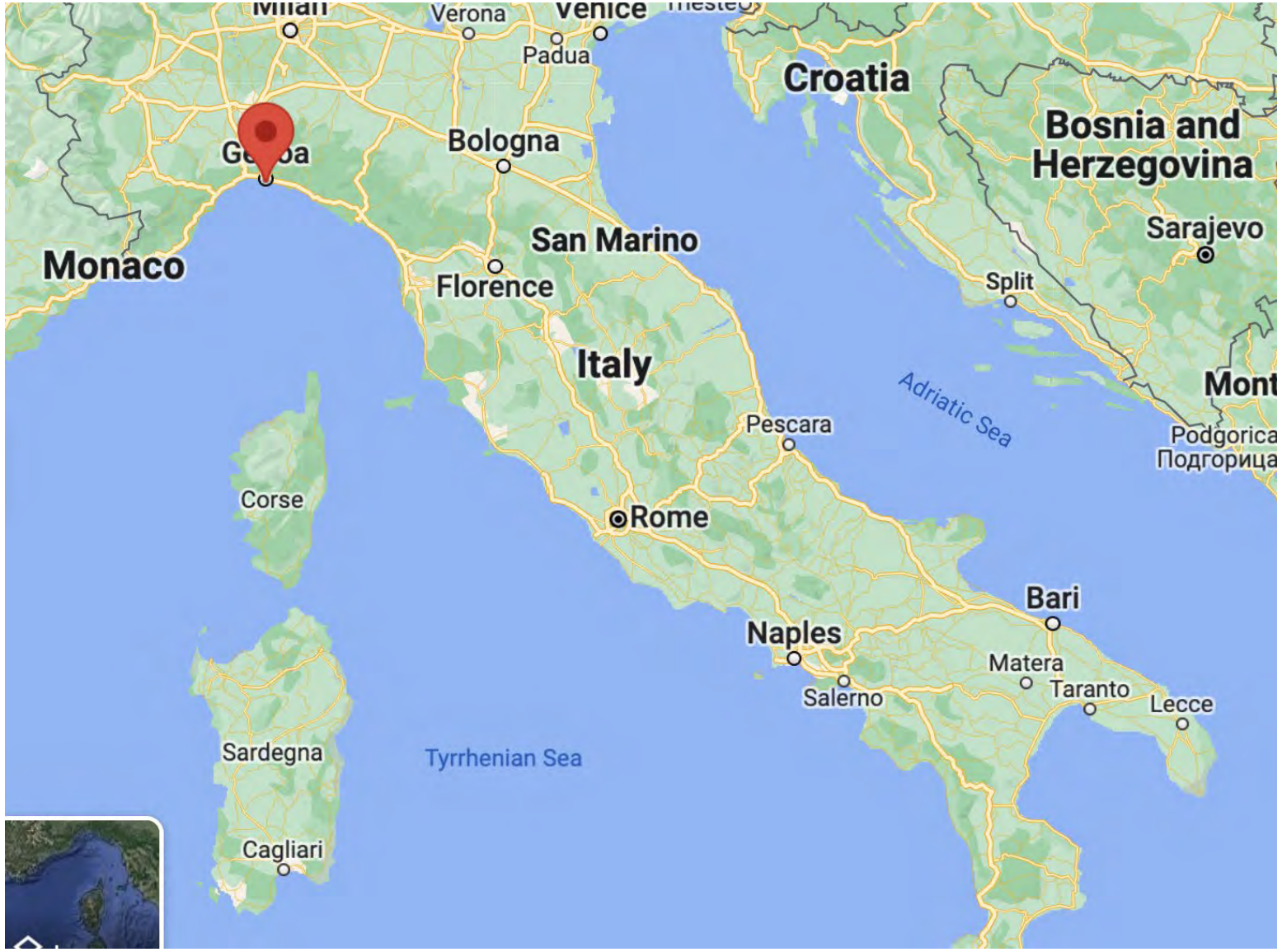
Based on (see https://scienceplusplus.org for links to full text):

Michael Nielsen and Kanjun Qiu, "Putting metascience at the core of science" (2022, forthcoming)

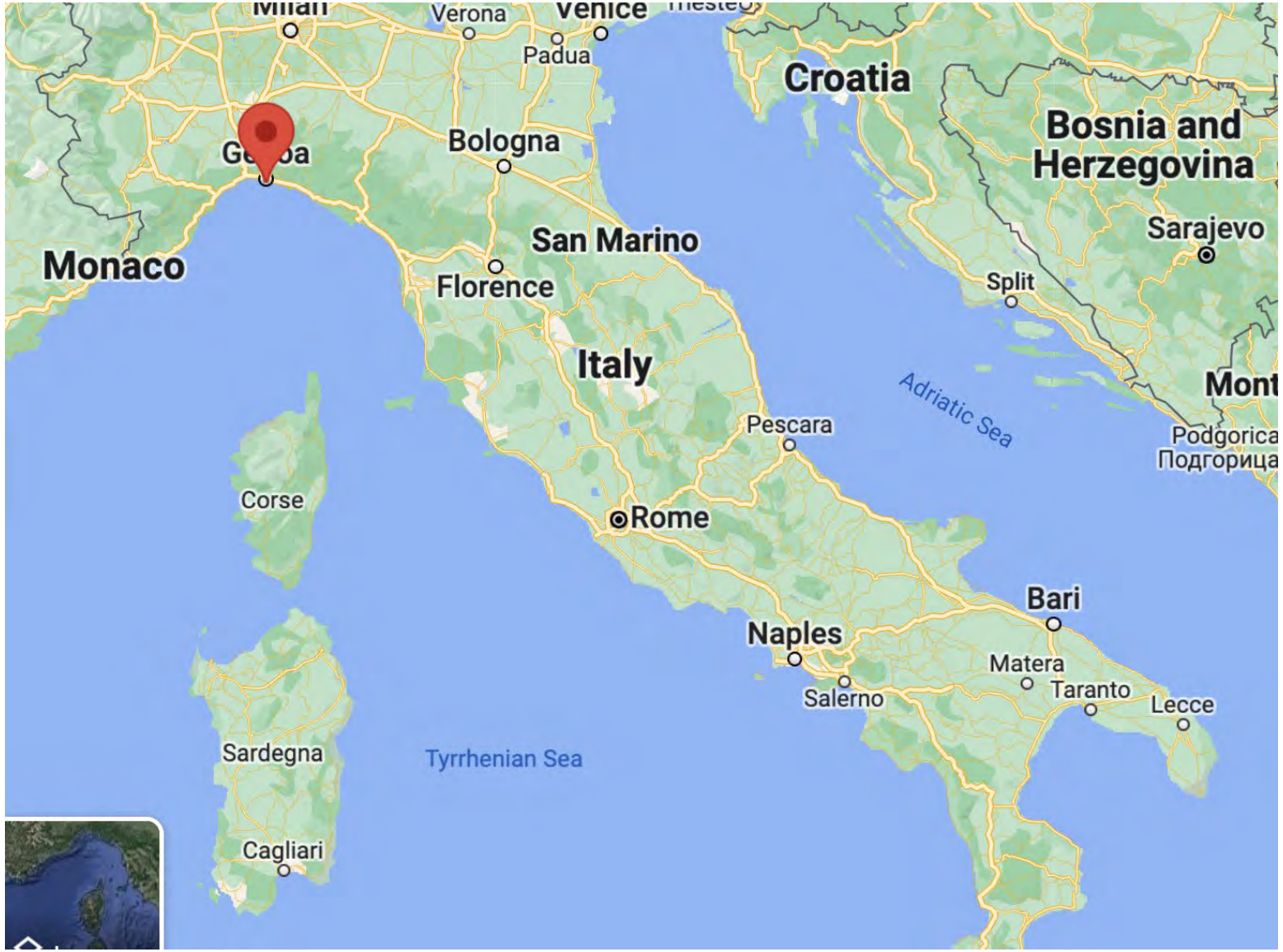
Michael Nielsen and Kanjun Qiu, "The trouble with comparing different approaches to science funding" (2022)

Michael Nielsen, "In what sense is the science of science a science?" (2022)

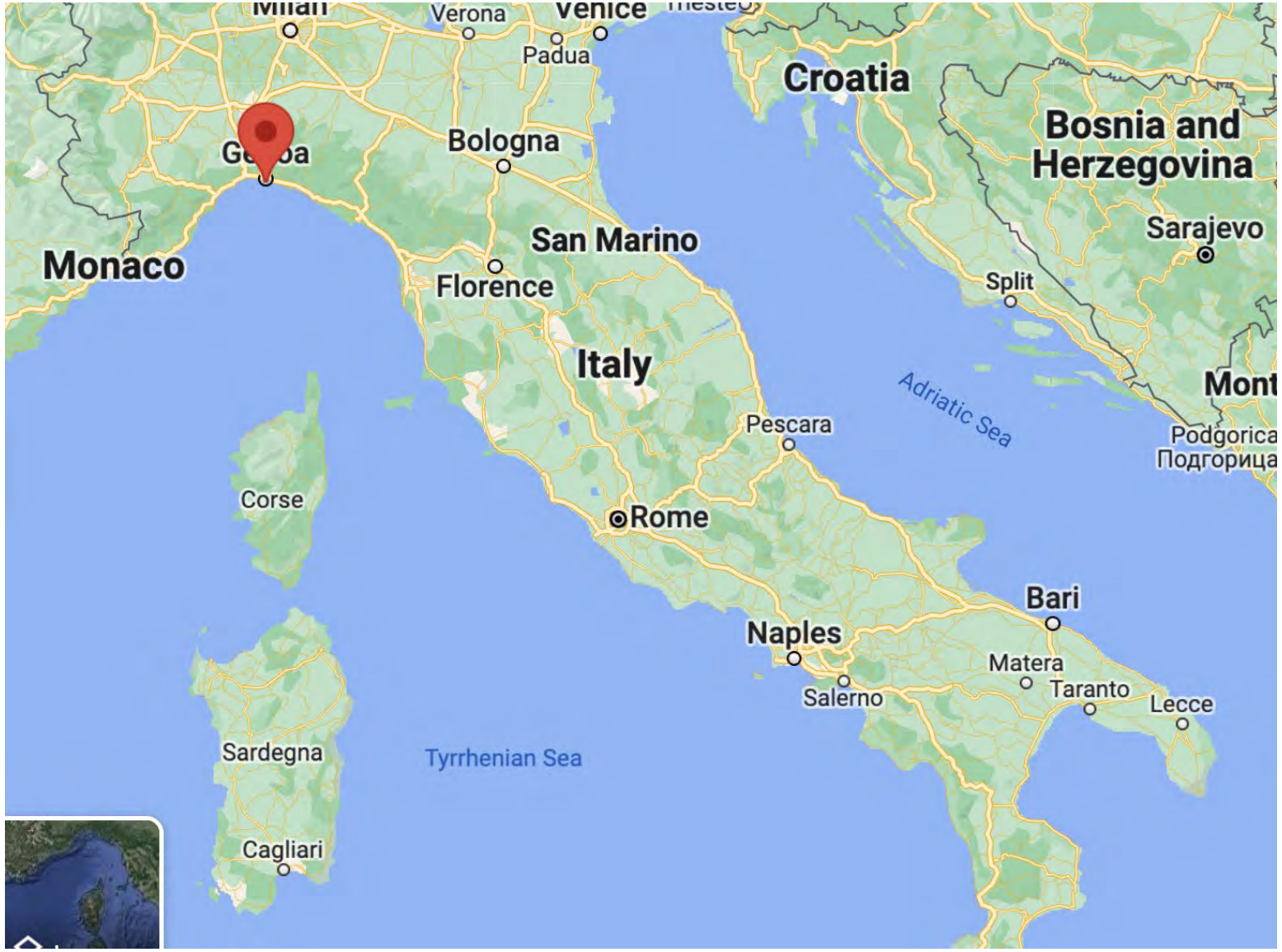
Patrick Collison and Michael Nielsen, "Science is getting less bang for its buck" (2018).



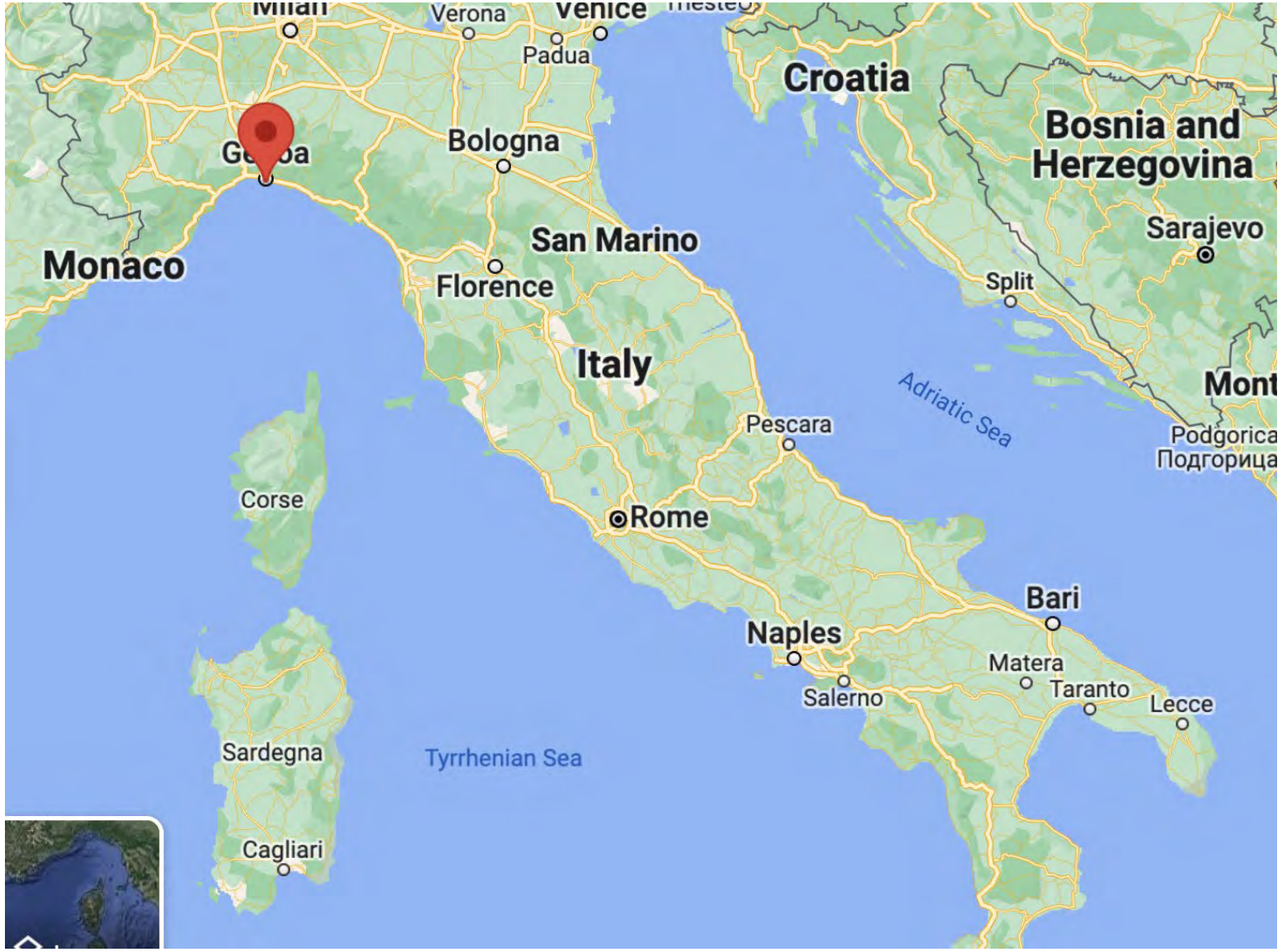
Genoa is a port city on the Mediterranean



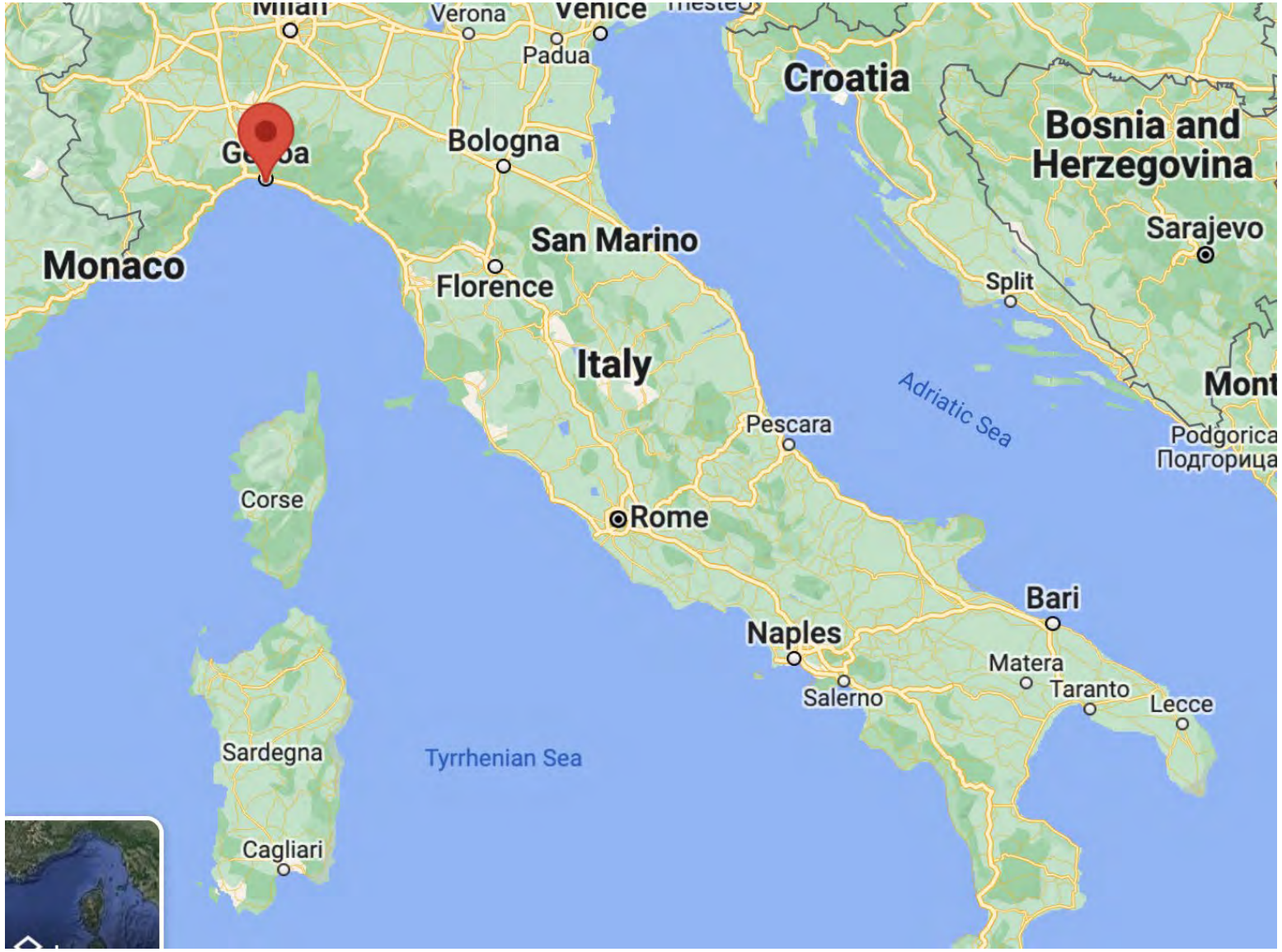
although Genoa is an excellent port, for a long time shipping was a risky business



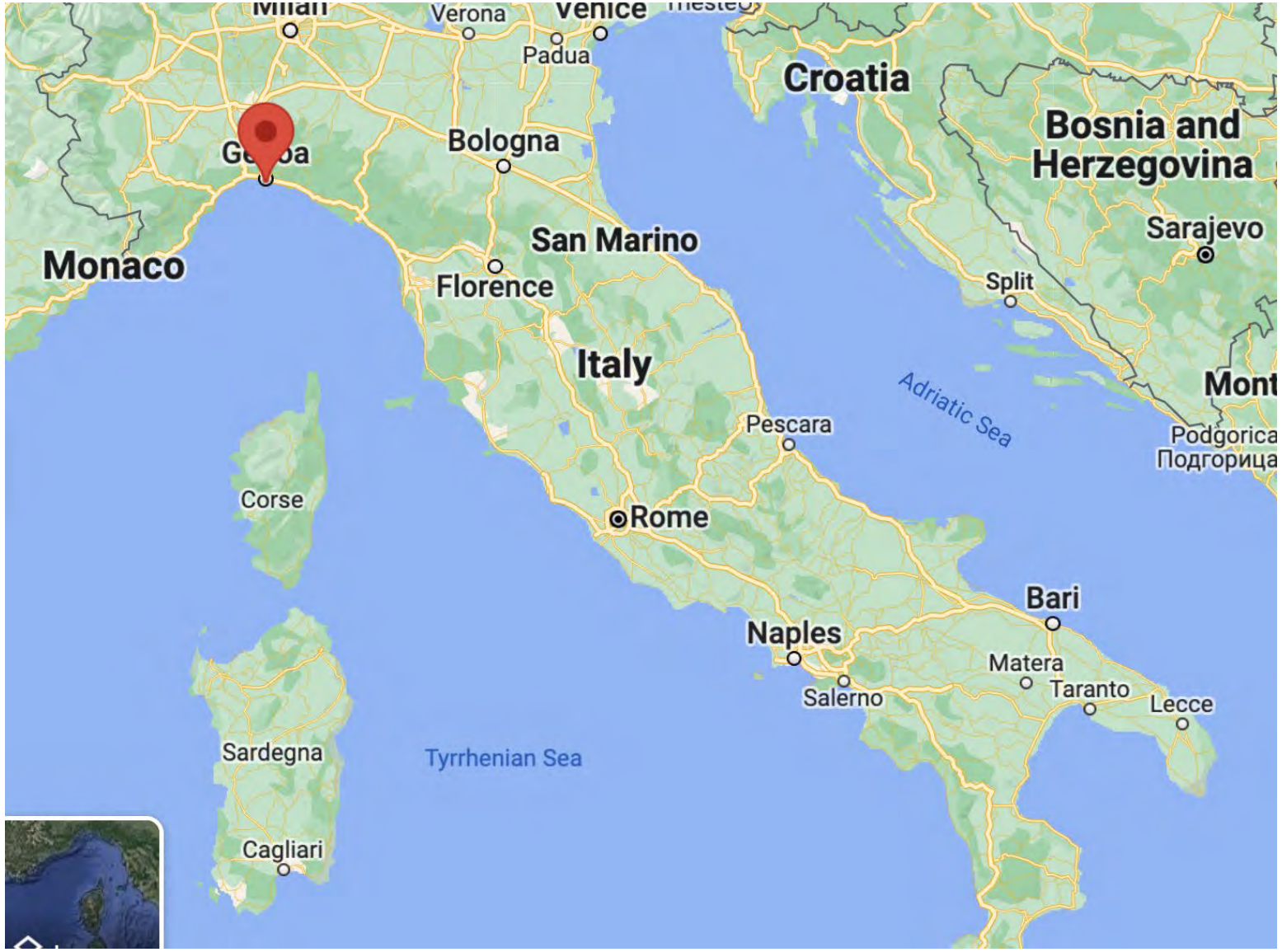
ships were flimsy, and were often lost in storms



in the 14th century, Genovese merchants invented maritime insurance



for a small premium, even if a cargo or ship was lost,
the financial losses would be recouped



Nick Szabo argues: this derisking meant far more capital was made available, more ambitious voyages undertaken, enabling an explosion of commerce and discovery

this story is not directly related to science funding

an early case where an imaginative change in the mechanism of funding (perhaps!) caused a change in how humanity ventures into the unknown

built upon an insightful design idea, that of maritime insurance, and improved ways of thinking about risk

an example closer to science, though still not (quite) of science

in 2004, the $10 million Ansari X-Prize was won by SpaceShipOne (Paul Allen, Bert Rutan), flying a reusable, crewed spacecraft into space twice in two weeks

the founder of the X-Prize, Peter Diamandis, had only been able to raise $3 million.
He wanted a $10 million prize

he approached many insurance companies, until he found one that was willing to accept a $3 million premium against a $10 million prize

he was selling the risk to the insurance company, paying a fixed premium rather than the uncertainty of a $0 or $10 mill payout

he estimated the 26 entrants invested more than $100 million

the point of these stories is not to venerate
(or even, except accidentally, to highlight)
insurance or prizes

funding is an *imaginative design discipline*

new ideas for *how* to fund can plausibly radically shift humanity’s capacity for discovery

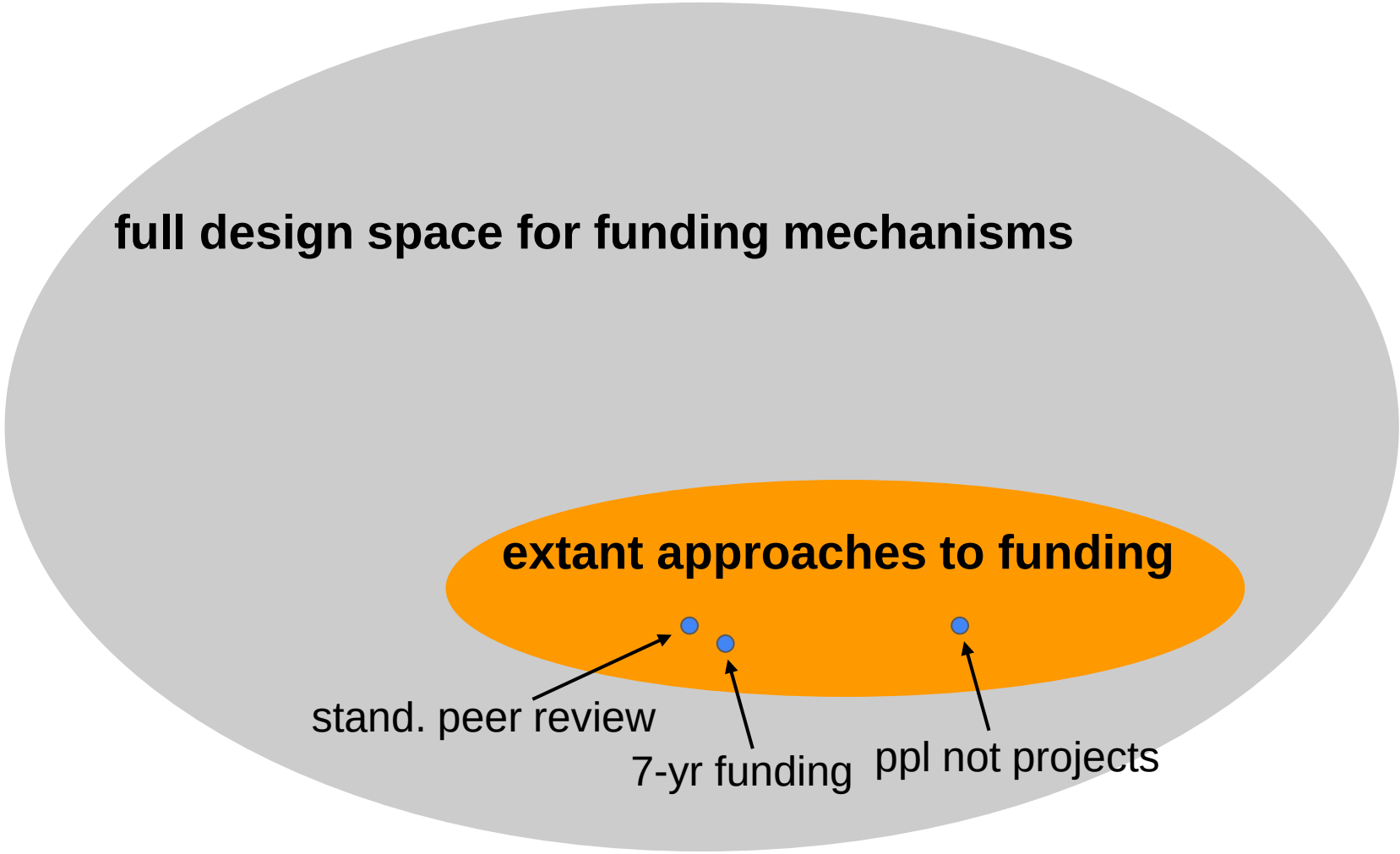
So I am fascinated by the questions:

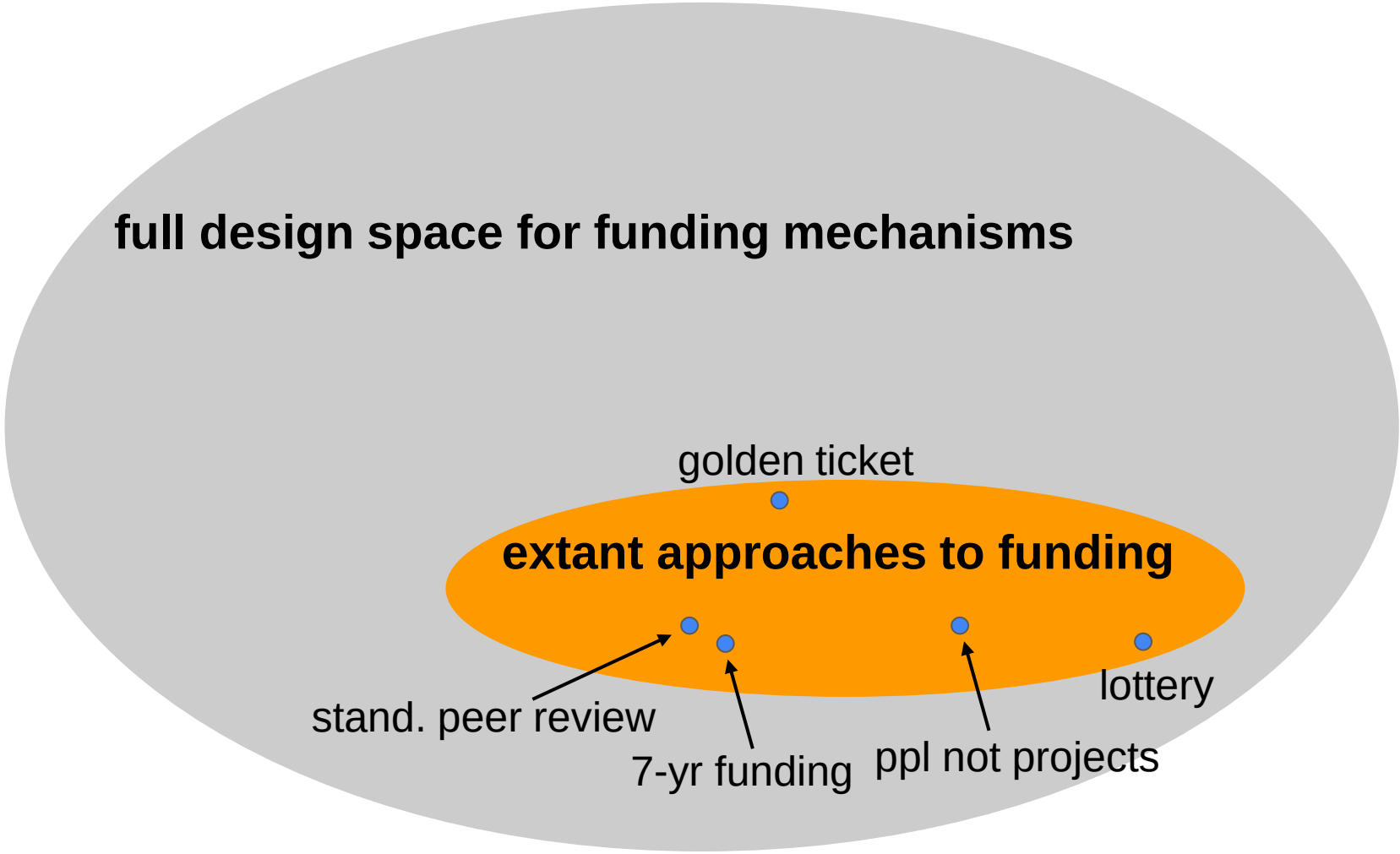
- Are there new funding strategies which would transform basic science?
- How can we invent them, if so?
- How can we avoid fooling ourselves, confusing flashy or fashionable ideas with genuine improvements?
- How can we reliably compare the marginal impact of different funding strategies?

I had (much) more trouble than usual preparing this talk

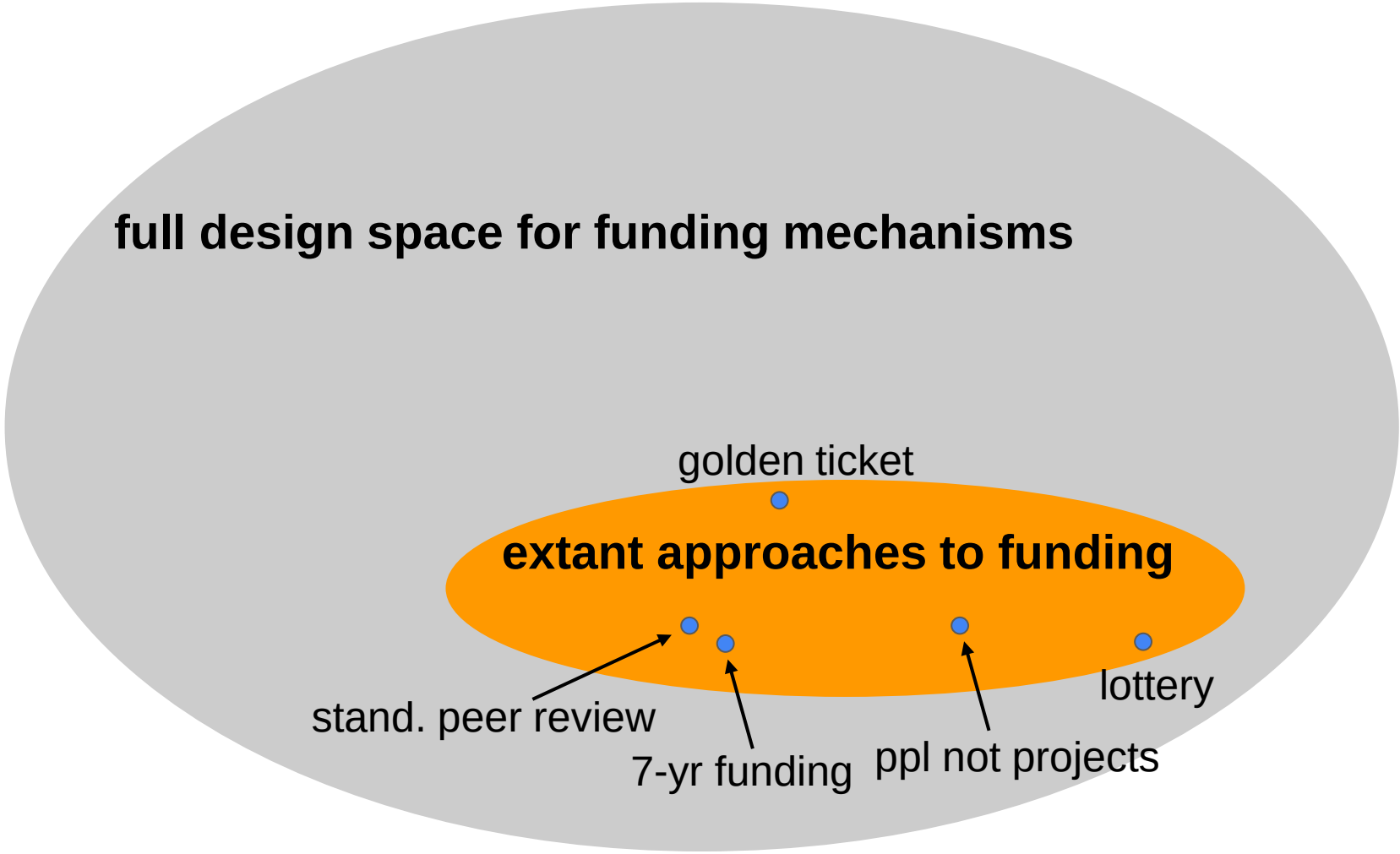
I’m a theoretical physicist by training, not a professional science funder

I hope you'll be willing to explore with me some outsider's thoughts, and a brief sketch of the role metascience / research on research might one day play in funding, and some of the problems it must overcome

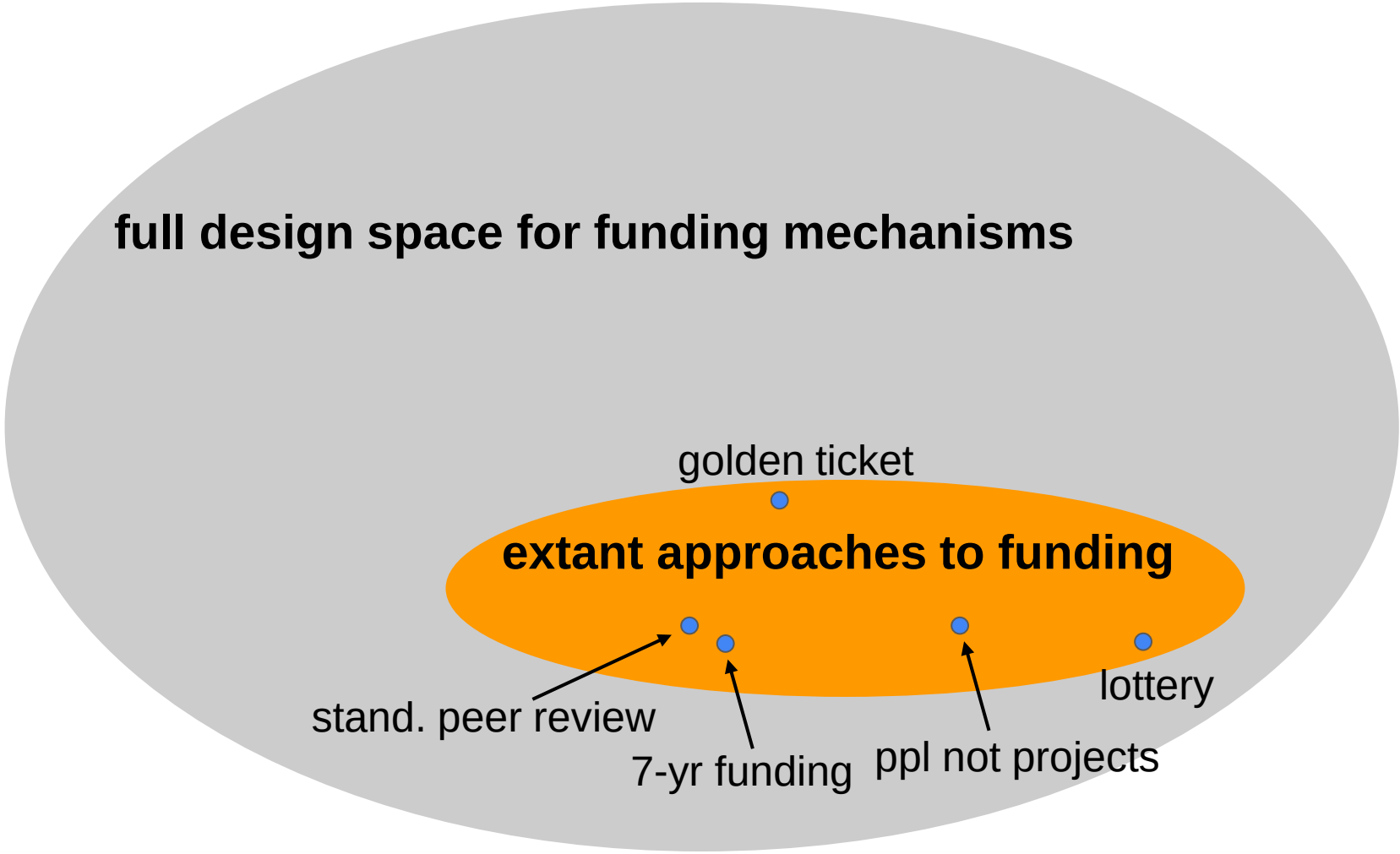

full design space for funding mechanisms
extant approaches to funding
stand. peer review
7-yr funding
ppl not projects



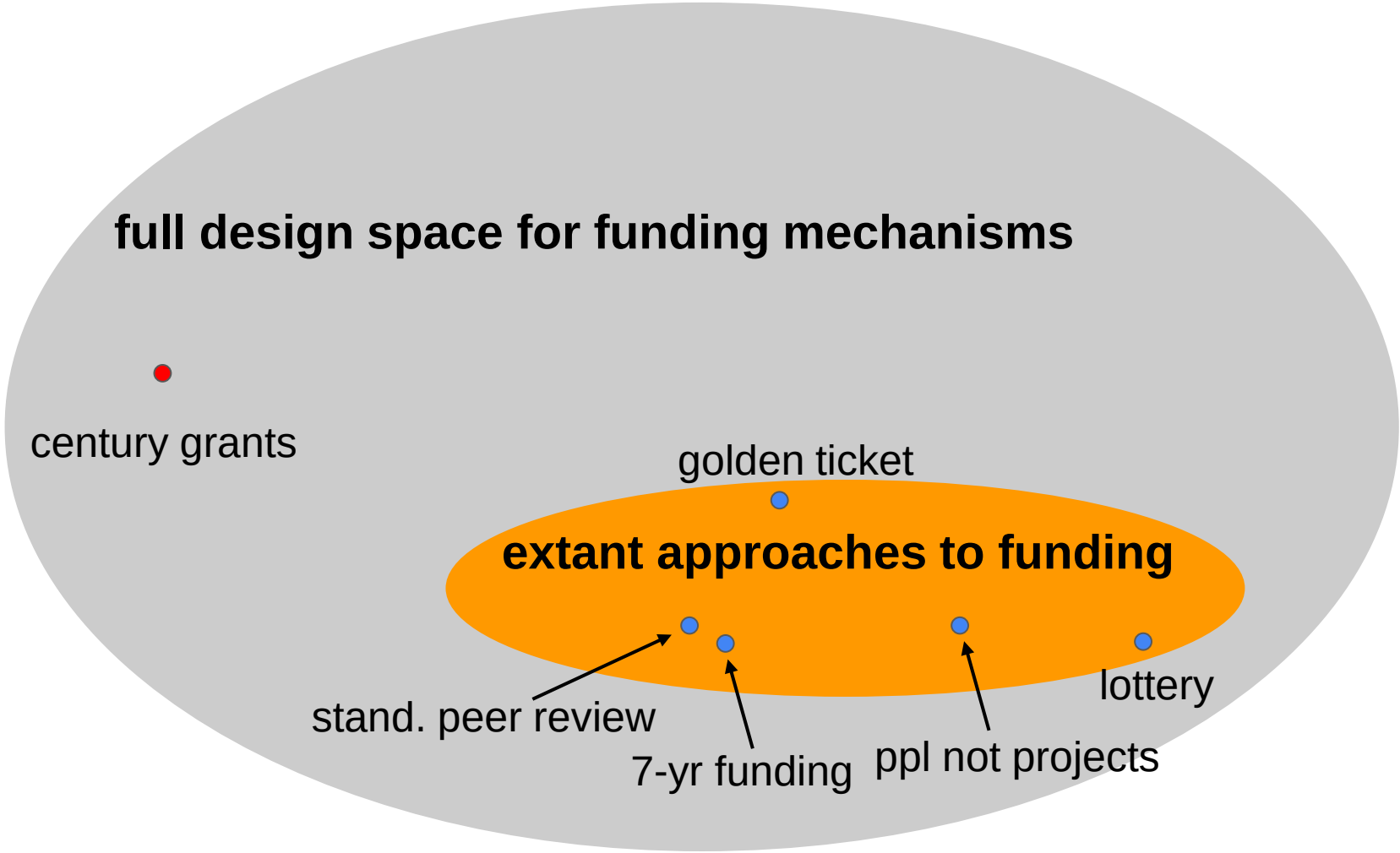
more adventurous ideas



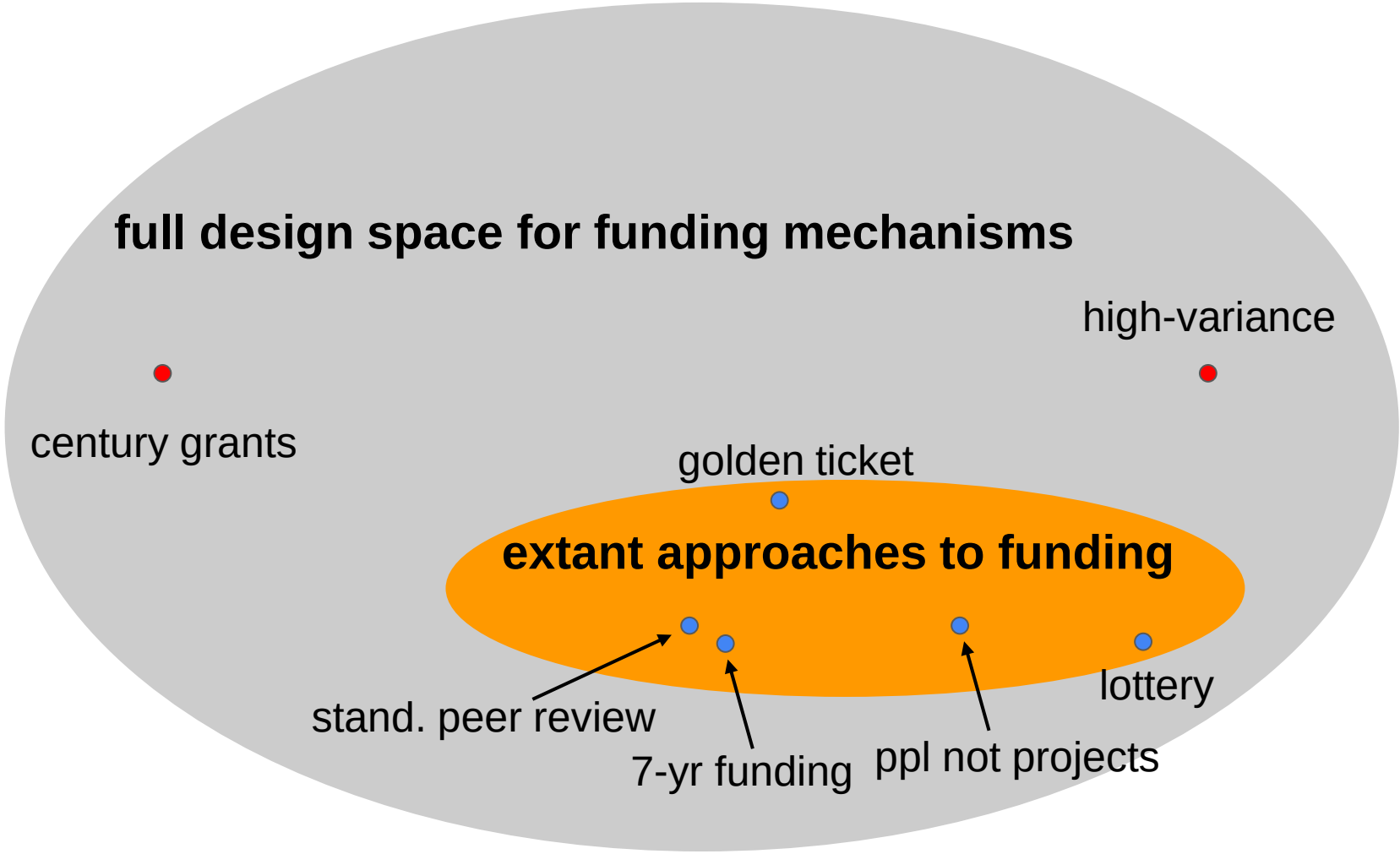
far larger space to explore



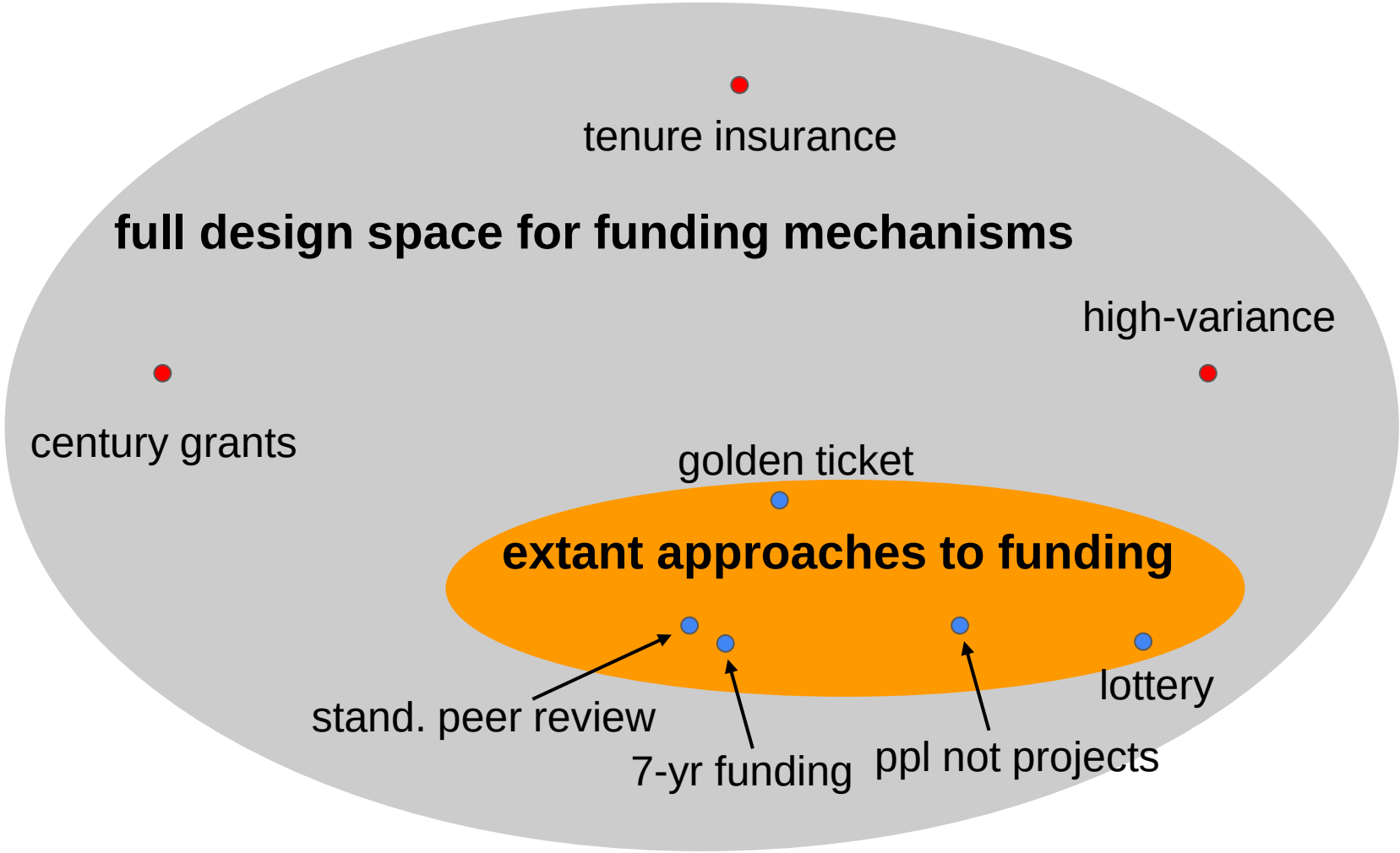
that’s a subject for another talk, but just for concreteness…



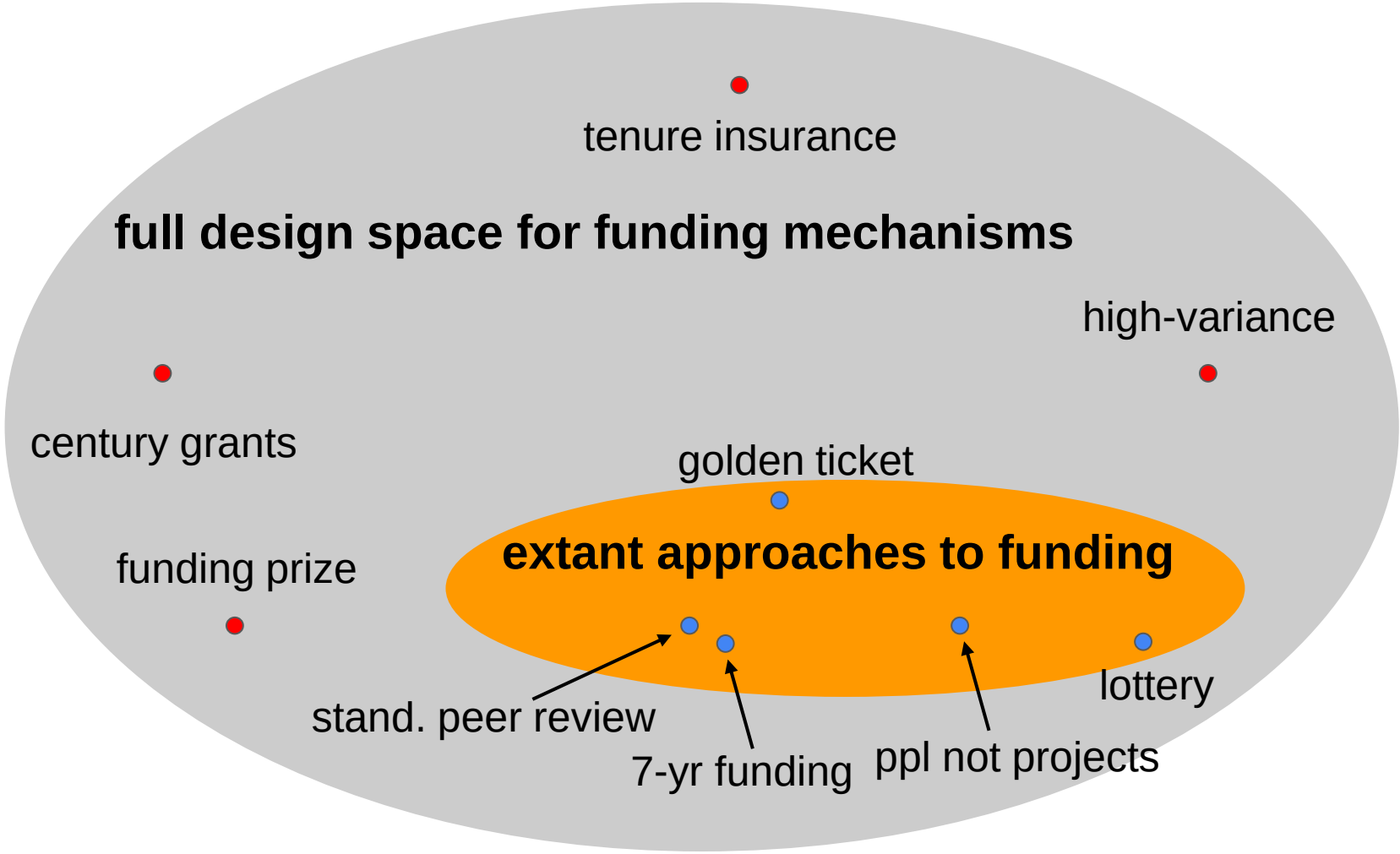
century grants: soliciting a kind of intellectual dark matter, problems requiring a century of work (at a small multiple of 5-year funding)



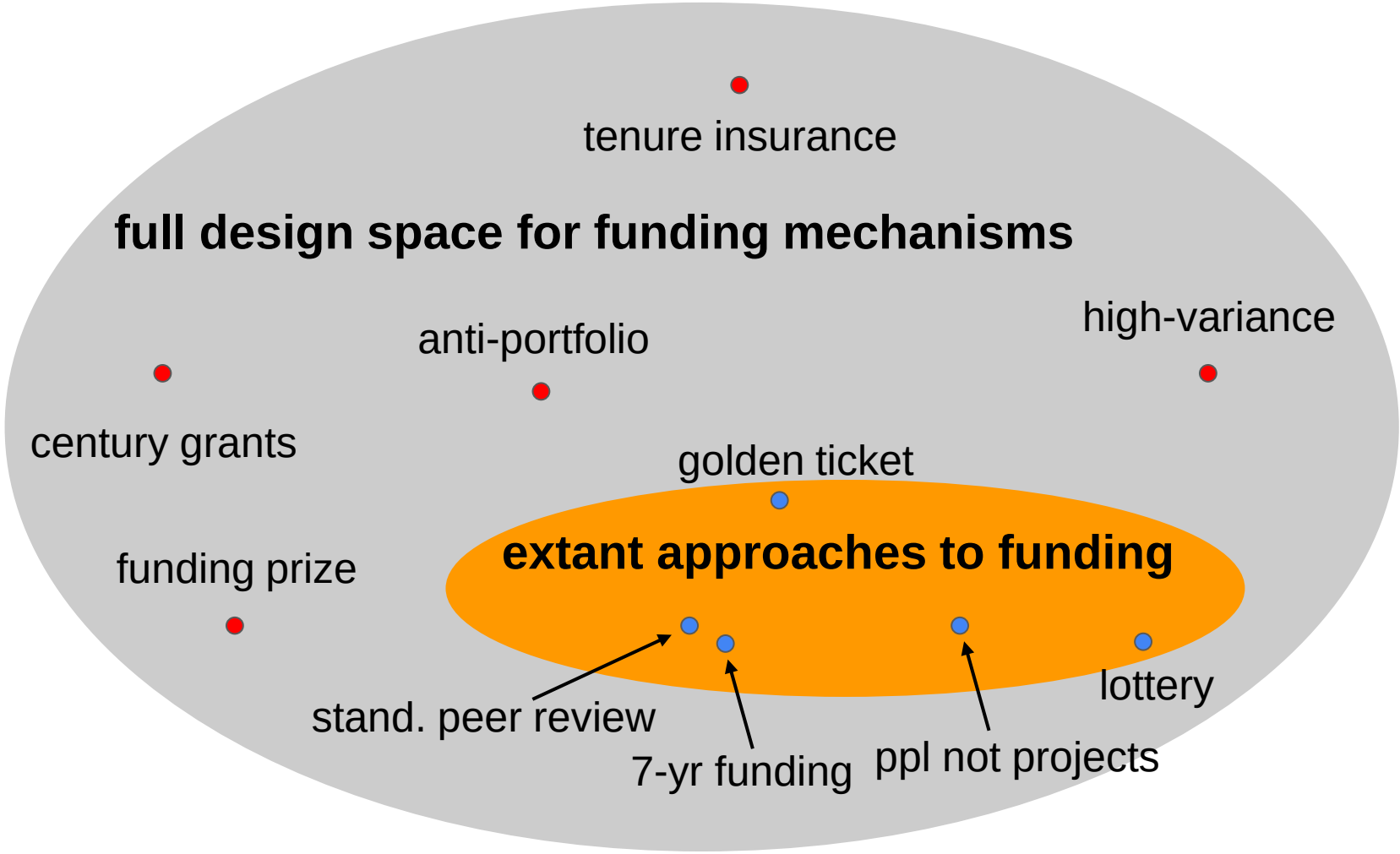
high-variance grant program: looking for disagreement, between people who absolutely love an idea, and who hate it



tenure insurance: encourage tenure-track scientists to swing for the fences, by providing a large payout in the event they fail to achieve tenure



“Nobel prize for funders”: to reward very early stage funding for work



anti-portfolio: search for and publicly report errors of omission

Bessemer Venture Partners

The Anti-Portfolio.

Honoring the companies we missed.

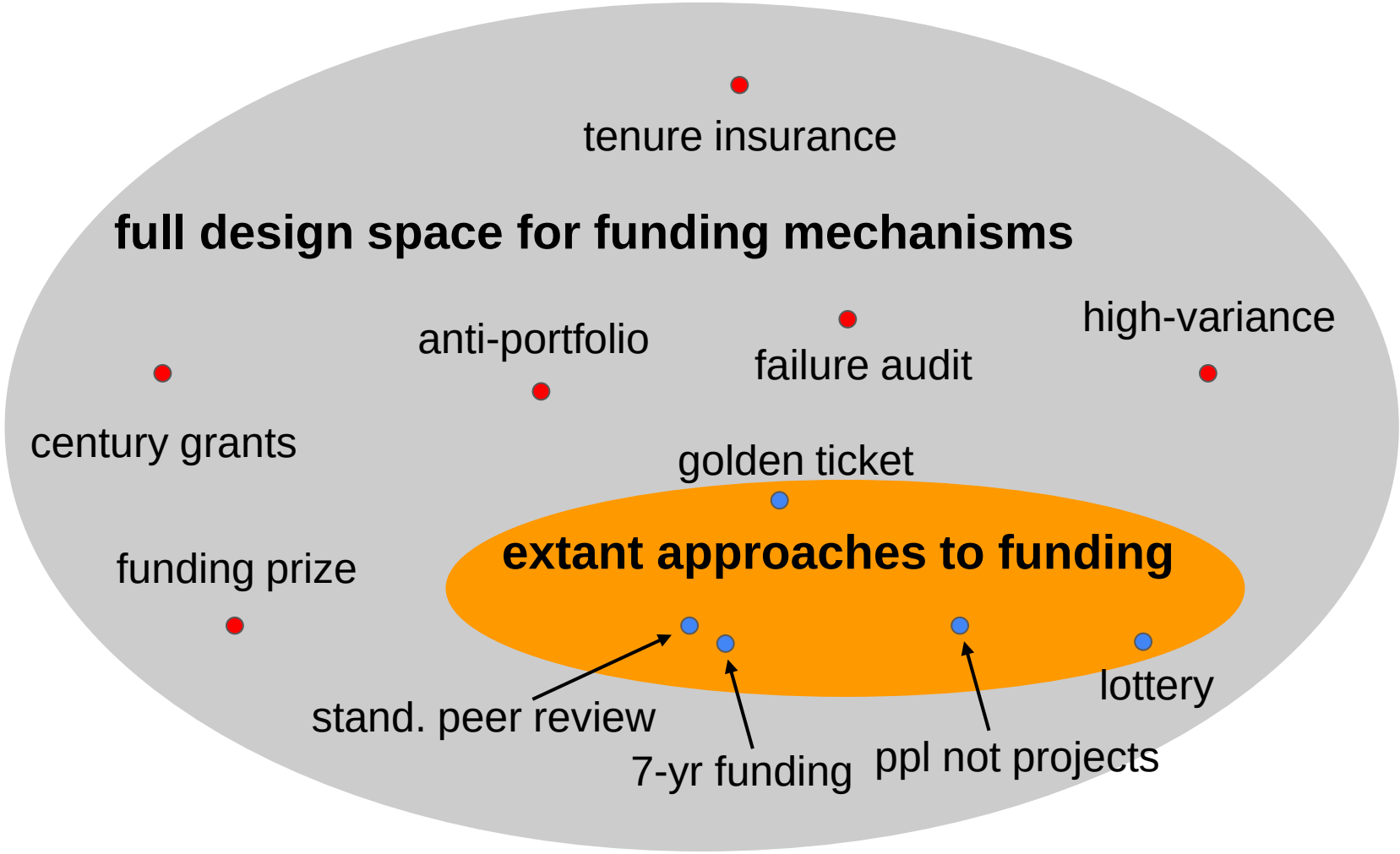
Bessemer Venture Partners is perhaps the nation's oldest venture capital firm, tracing our roots back to the Carnegie Steel empire. This long and storied history has afforded our firm an unparalleled number of opportunities to completely screw up.

Throughout our history, we did invest in a wig company, a french-fry company, and the Lahaina, Ka'anapali & Pacific Railroad. However, we chose to decline these investments, each of which we had the opportunity to invest in, and each of which later blossomed into a tremendously successful company.

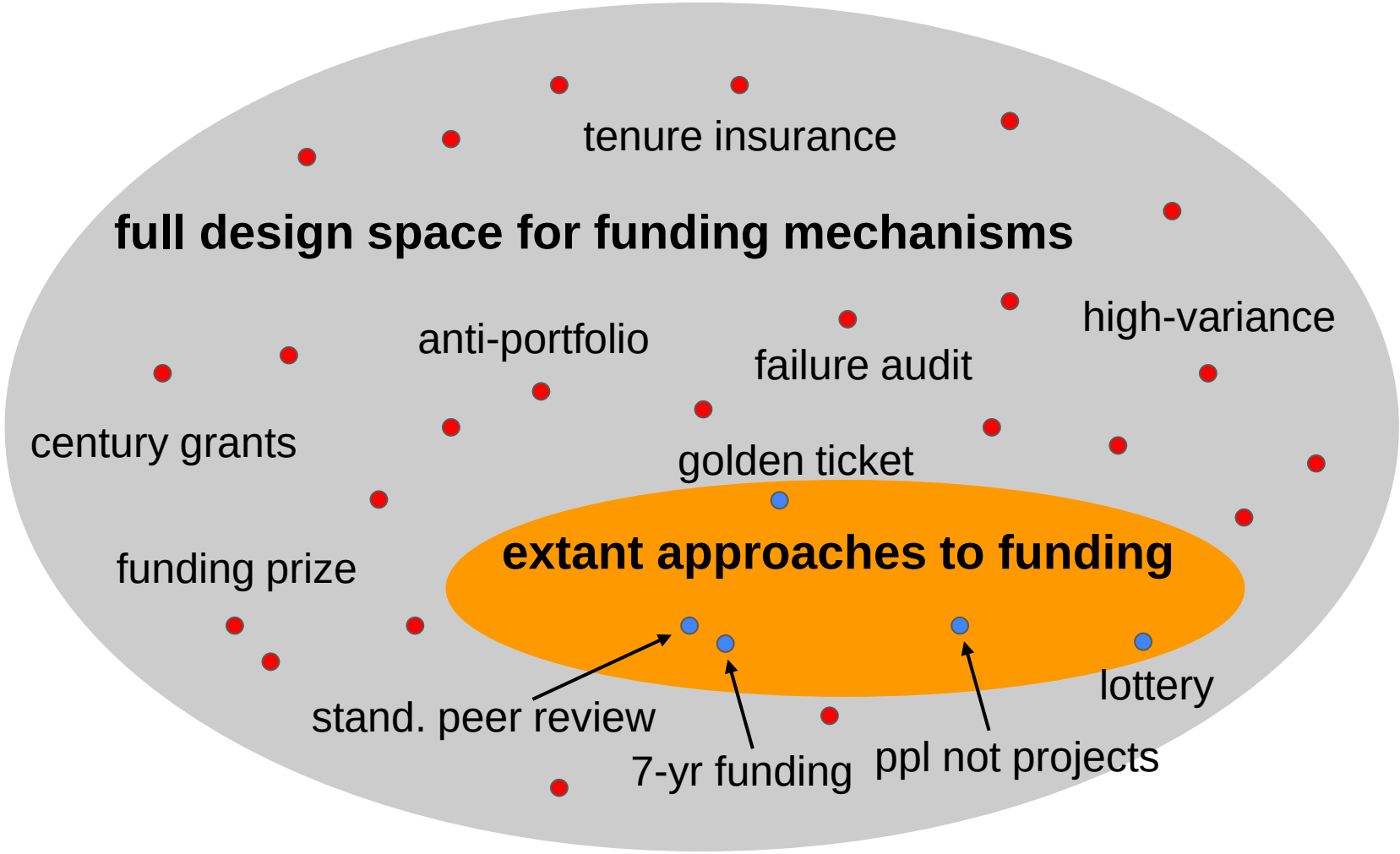
Our reasons for passing on these investments varied. In some cases, we were making a conscious act of generosity to another, younger venture firm, down on their luck, who we felt could really use a billion dollars in gains. In other cases, our partners had already run out of spaces on the year's Schedule D and feared that another entry would require them to attach a separate sheet.

Google

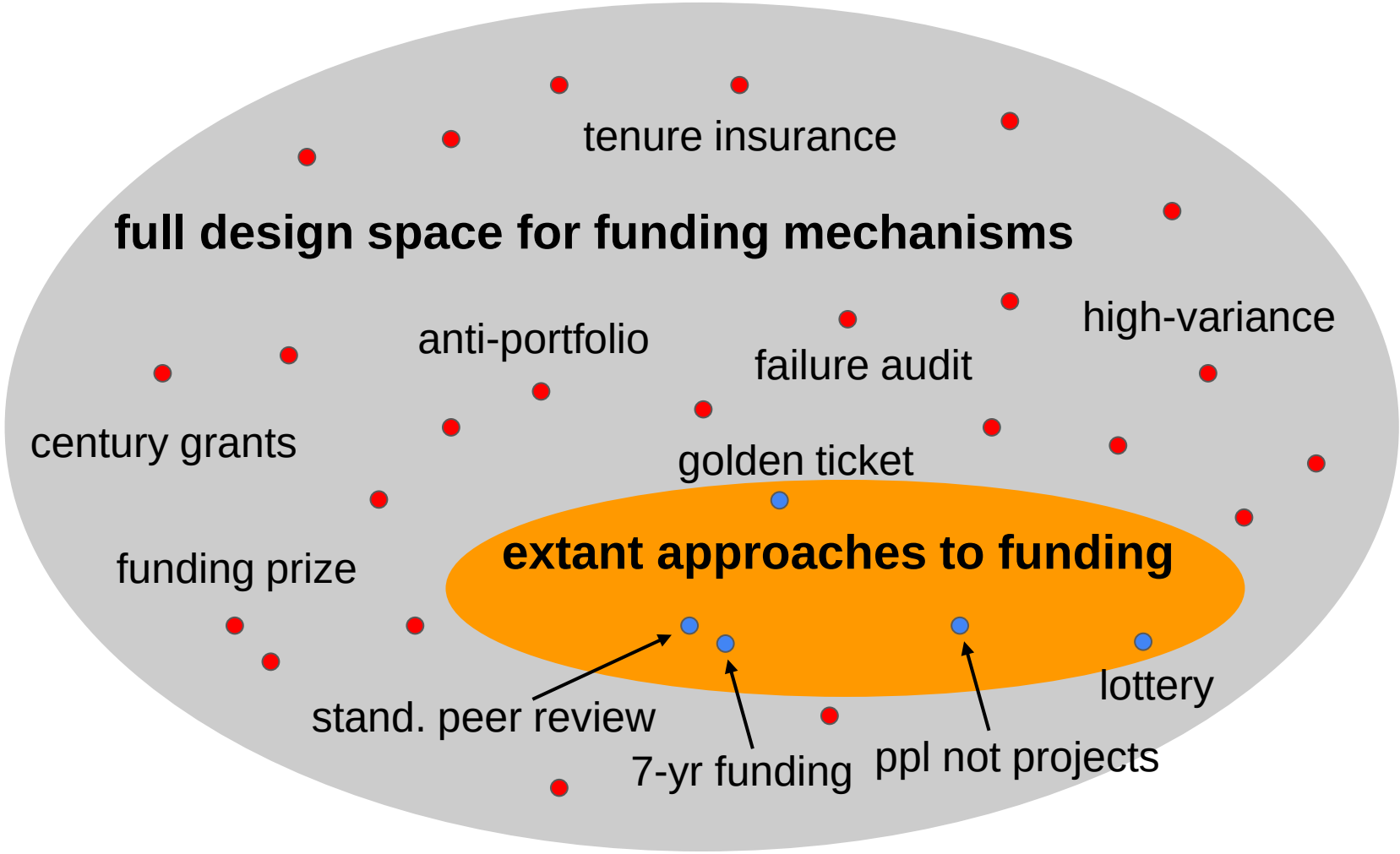
David Cowan's college friend rented her garage to Sergey and Larry for their first year. In 1999 and 2000 she tried to introduce Cowan to "these two really smart Stanford students writing a search engine." Students? A new search engine? In the most important moment ever for Bessemer's anti-portfolio, Cowan asked her, "How can I get out of this house without going anywhere near your garage?"



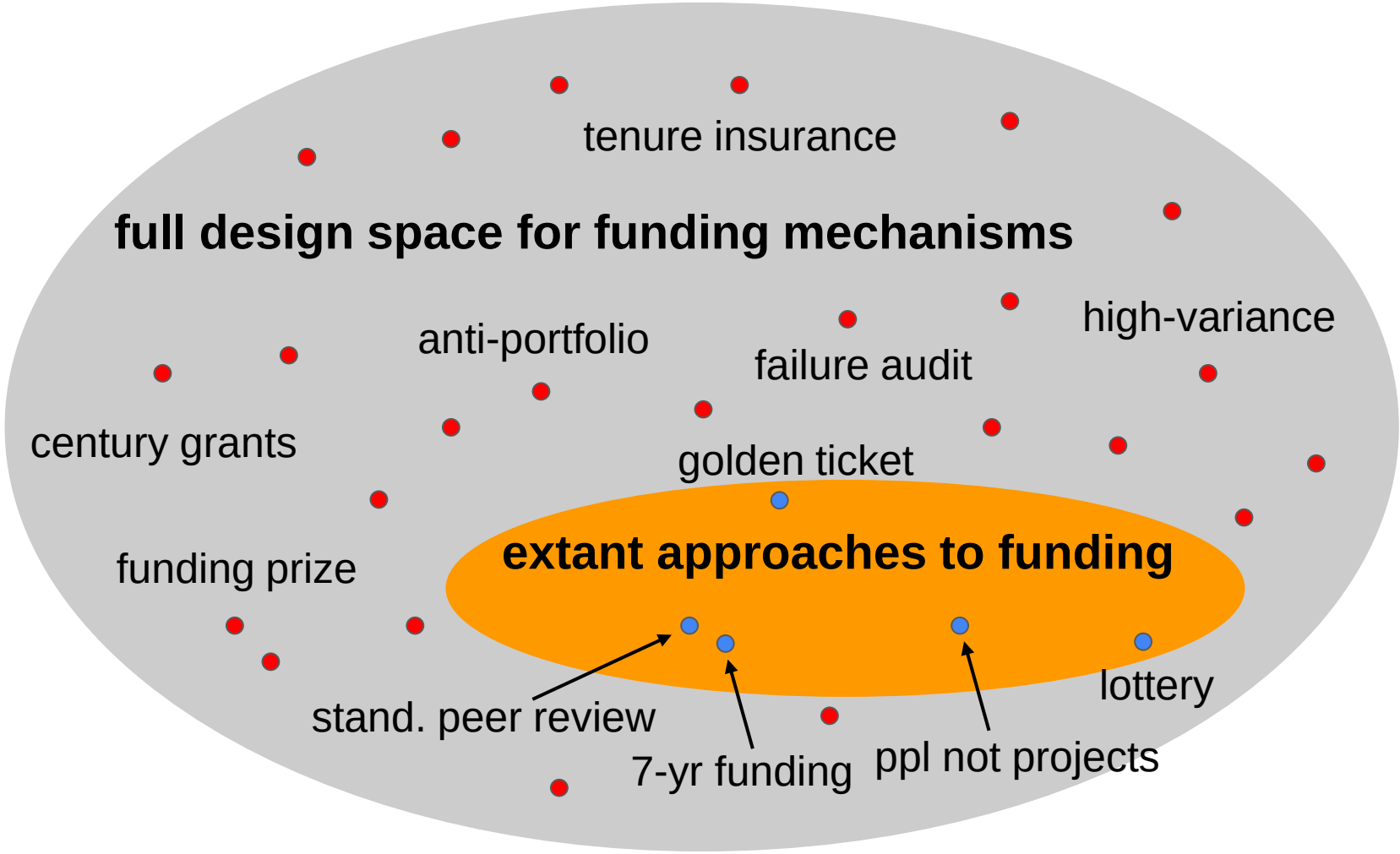
failure audit: ensure that the failure rate is above a given percentage



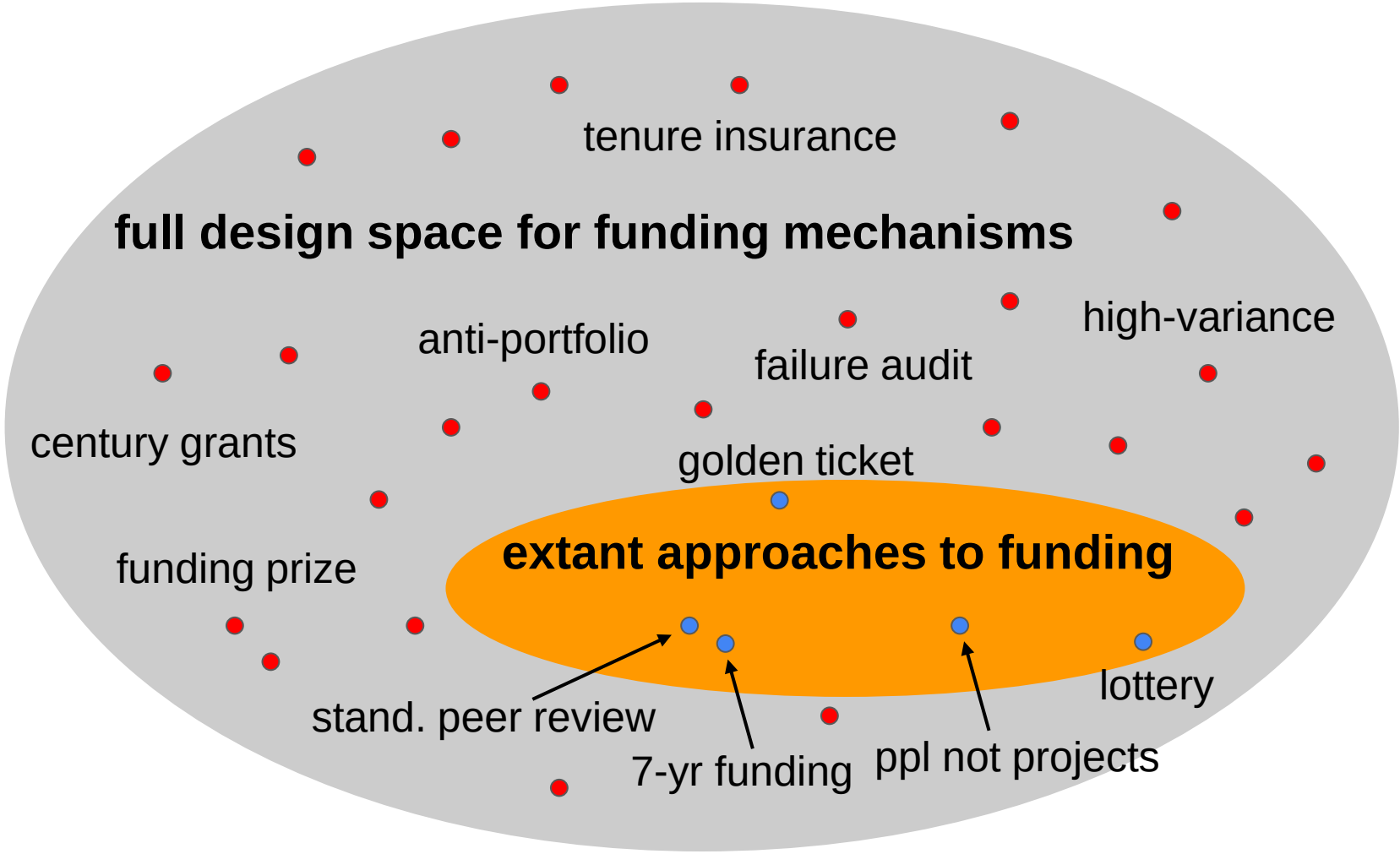
or an infinity of other ideas



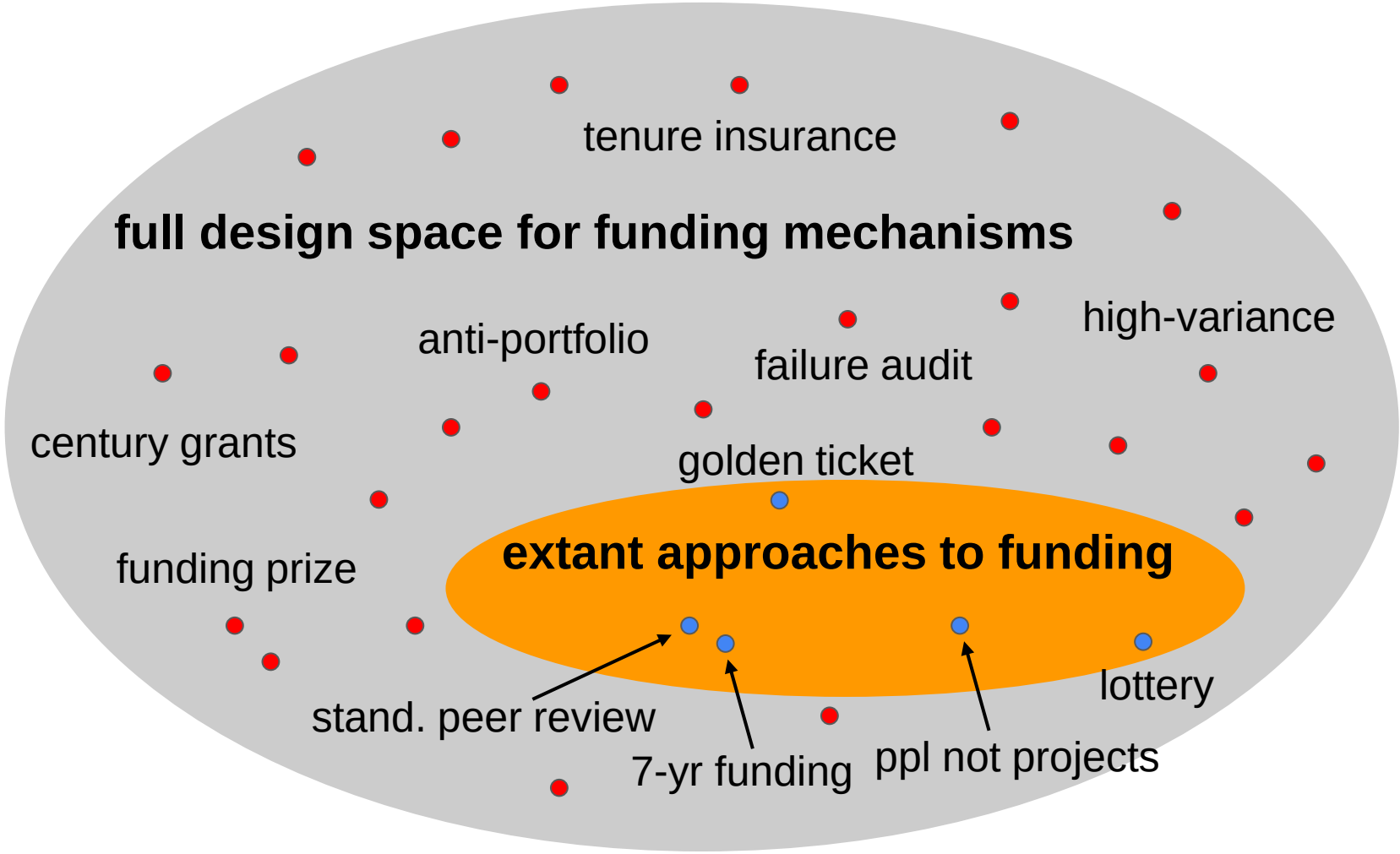
in each case, you're attempting to identify some latent *potential for discovery,* and then design and implement a mechanism (or mechanisms) to activate it



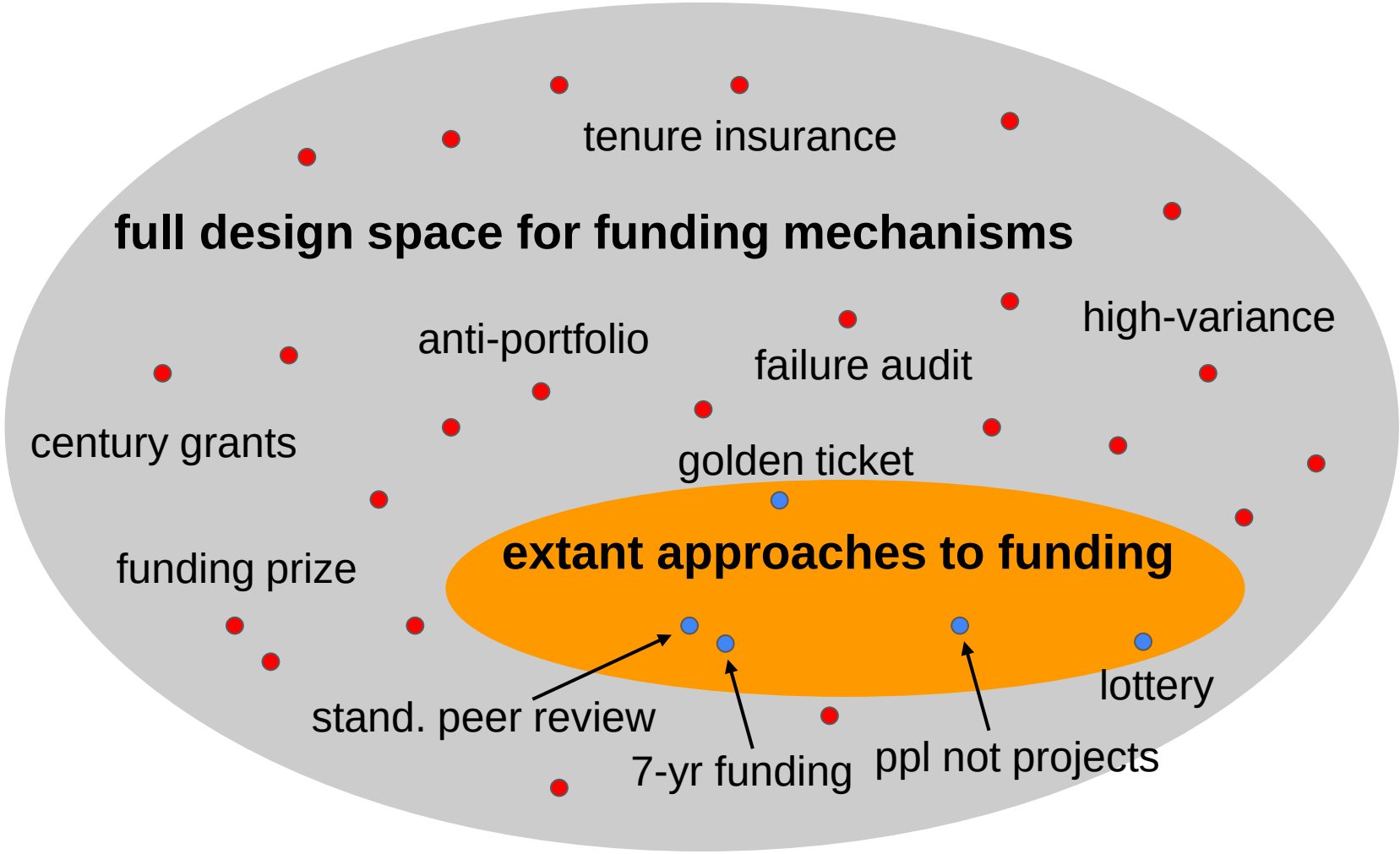
some ideas may work extremely well



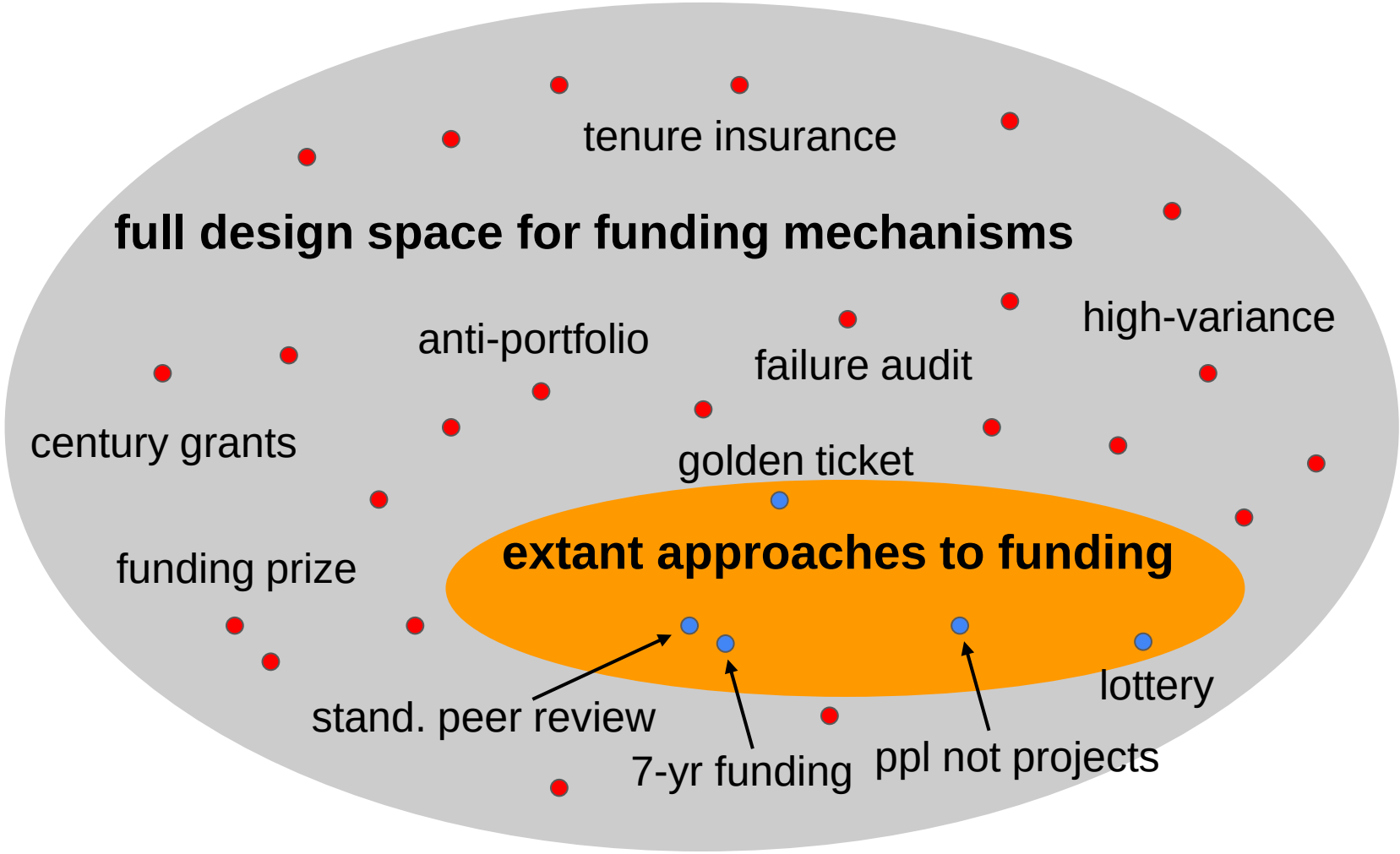
others may be worse than the status quo



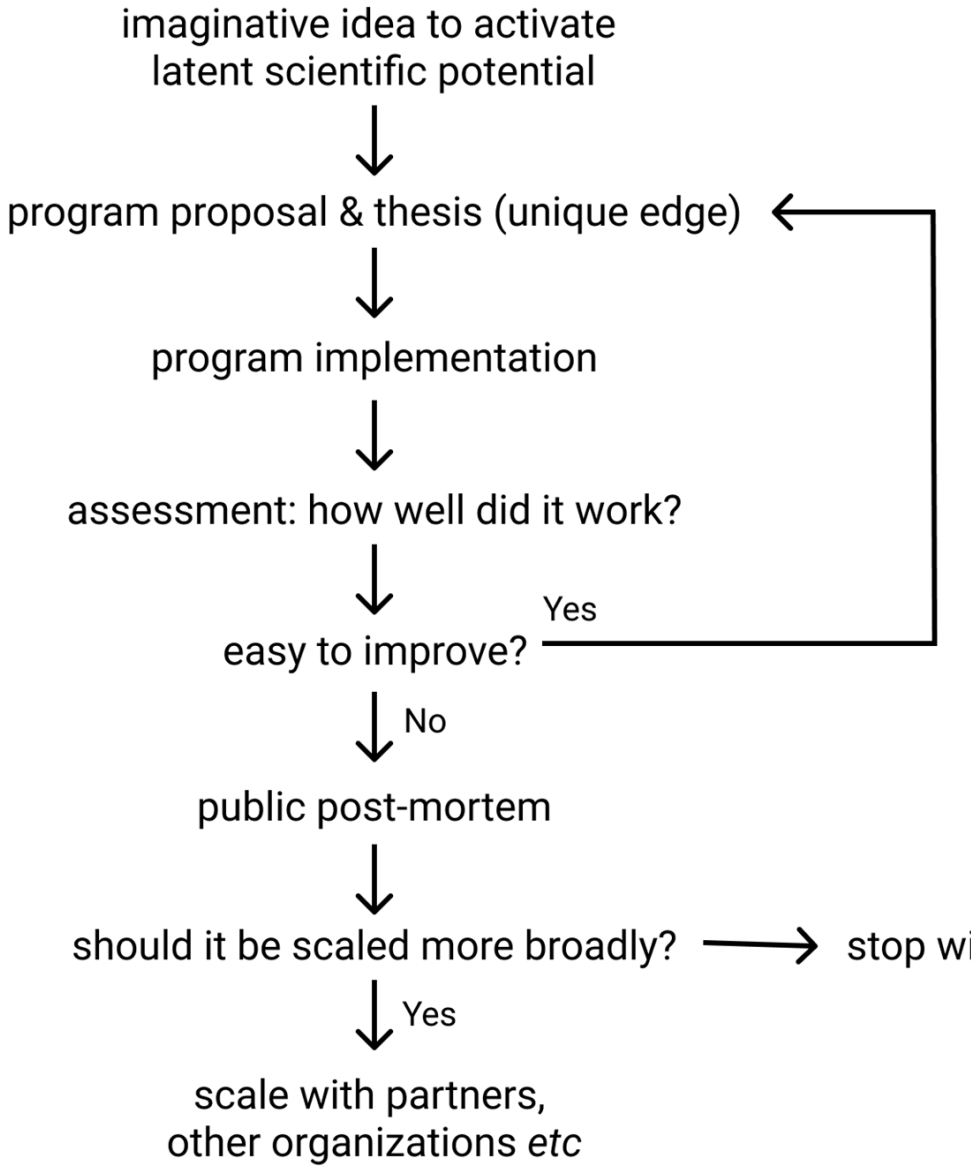
what you'd like is to trial many, many, many such ideas, and then to understand in detail the impact on discovery



not based on what sounds good to politicians or journalists (or even scientists), but to build up an understanding of what actually benefits humanity and science



to do that you need to be able to understand the marginal impact of different funding schemes



you want to be able to go rapidly through this “metascience loop”, for many ideas in parallel

it’s a kind of “J-PAL for science” model. Rather similar to the way top athletes spend some fraction of their time not just playing or practicing the way they play, but developing entirely new skills that can ultimately transform their game

can be used to drive improvement in science funding and (perhaps) science. I think of it as applied metascience, “putting metascience at the core of science”

but you need to honestly and reliably understand what works and what does not. How can we do that?

Incentives and creativity: evidence from the academic life sciences

Pierre Azoulay, Joshua S. Graff Zivin, Gustavo Manso

First published: 12 September 2011 |
https://doi.org/10.1111/j.1756-2171.2011.00140.x | Citations: 260

an attempt to do this kind of careful study and comparison of funding schemes

compares the “people-not-projects” approach of the HHMI Investigator program to the more project-focused approach of the NIH

Incentives and creativity: evidence from the academic life sciences

Pierre Azoulay, Joshua S. Graff Zivin, Gustavo Manso

First published: 12 September 2011 |
https://doi.org/10.1111/j.1756-2171.2011.00140.x | Citations: 260

not an RCT - there is (currently) no way to randomize people into NIH or HHMI Investigator

but it's RCT-like: they work very hard to make a fair like-to-like comparison, so HHMI can be considered an intervention, and NIH a control

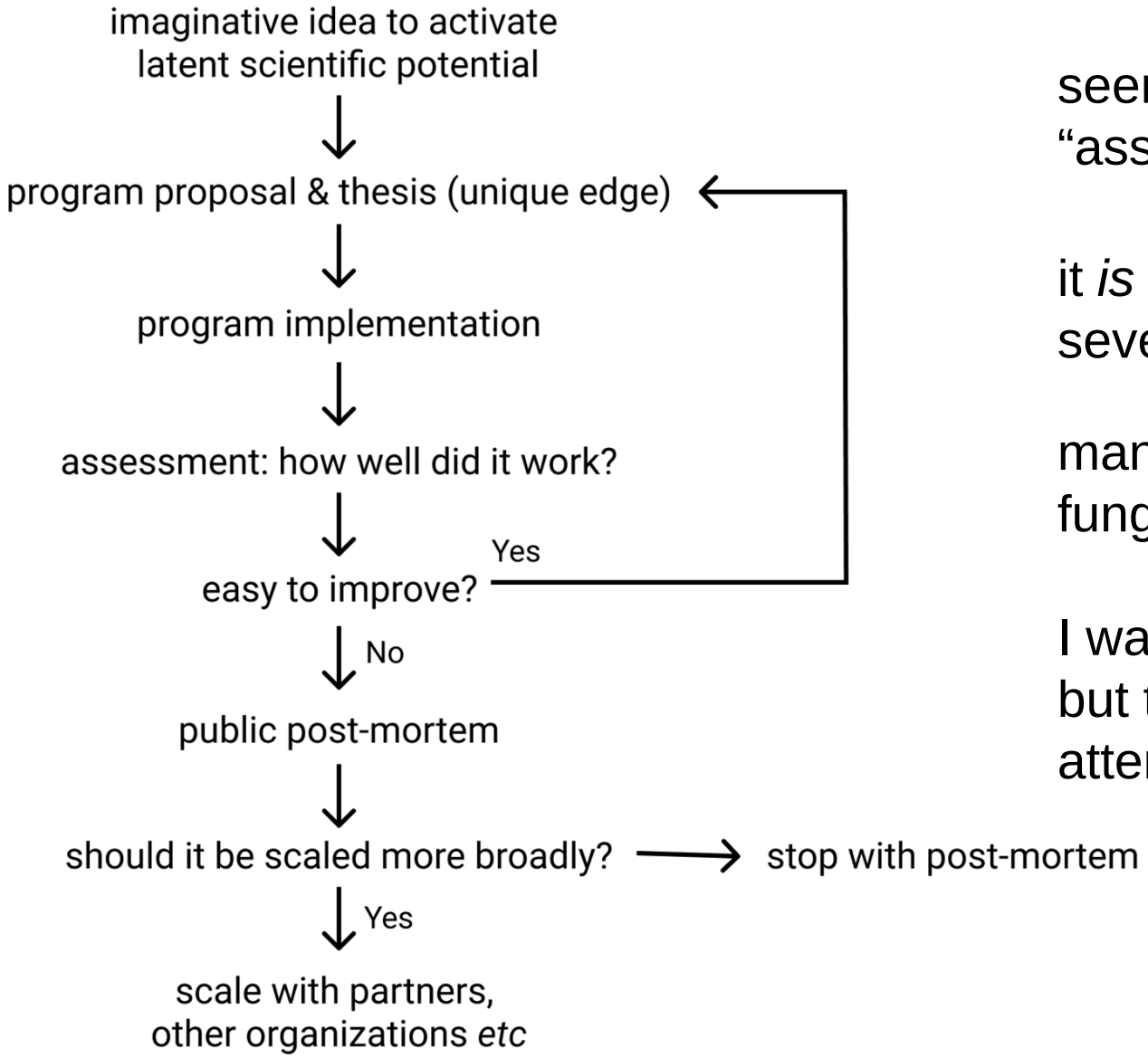
Incentives and creativity: evidence from the academic life sciences

Pierre Azoulay, Joshua S. Graff Zivin, Gustavo Manso

First published: 12 September 2011 |
https://doi.org/10.1111/j.1756-2171.2011.00140.x | Citations: 260

find a 39% increase in publication rate for HHMI

becomes 96% when focused on papers in the top 1% of the citation distribution



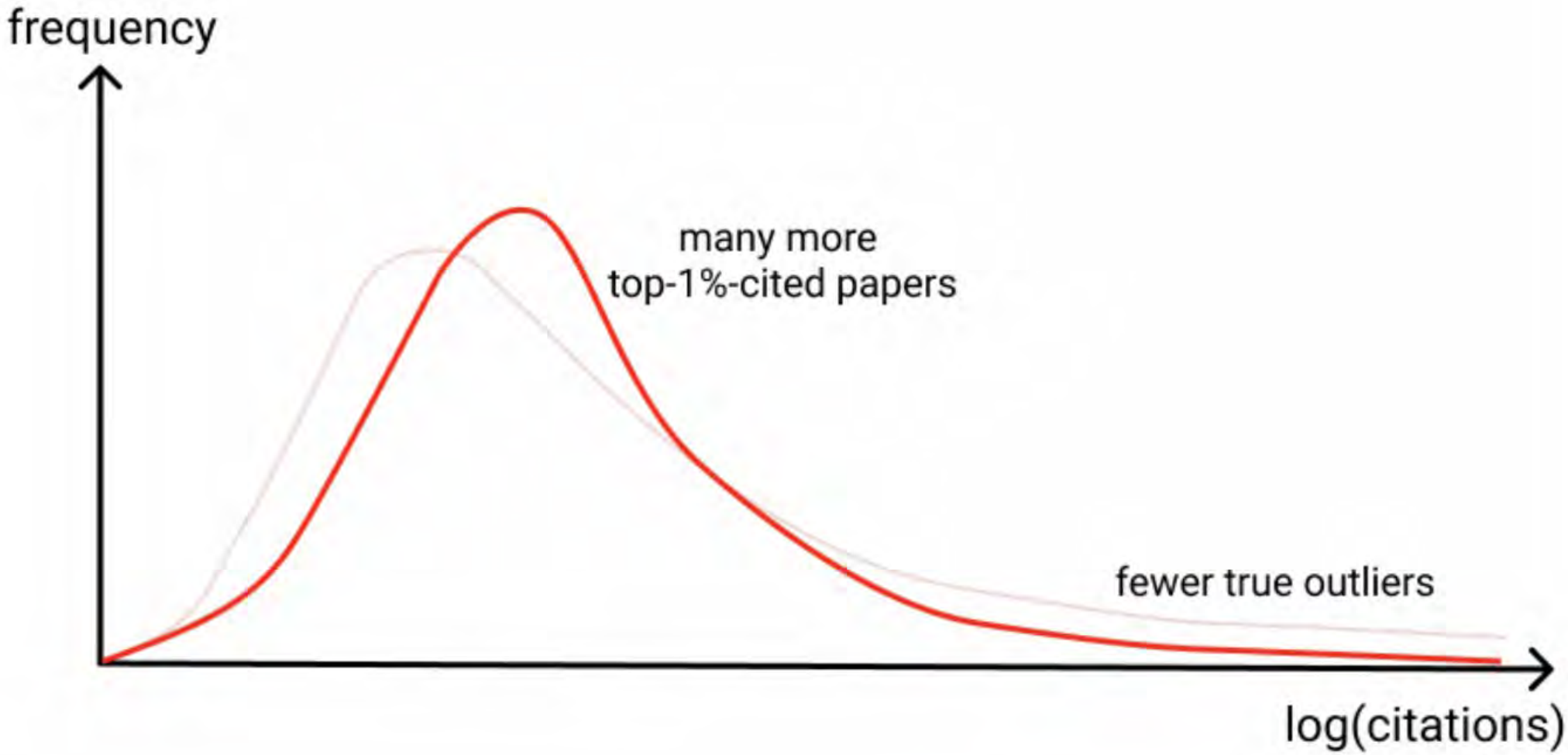
seems like a good prototype for the crucial "assess" step

it *is* a beautiful paper… but worth subjecting to severe scrutiny

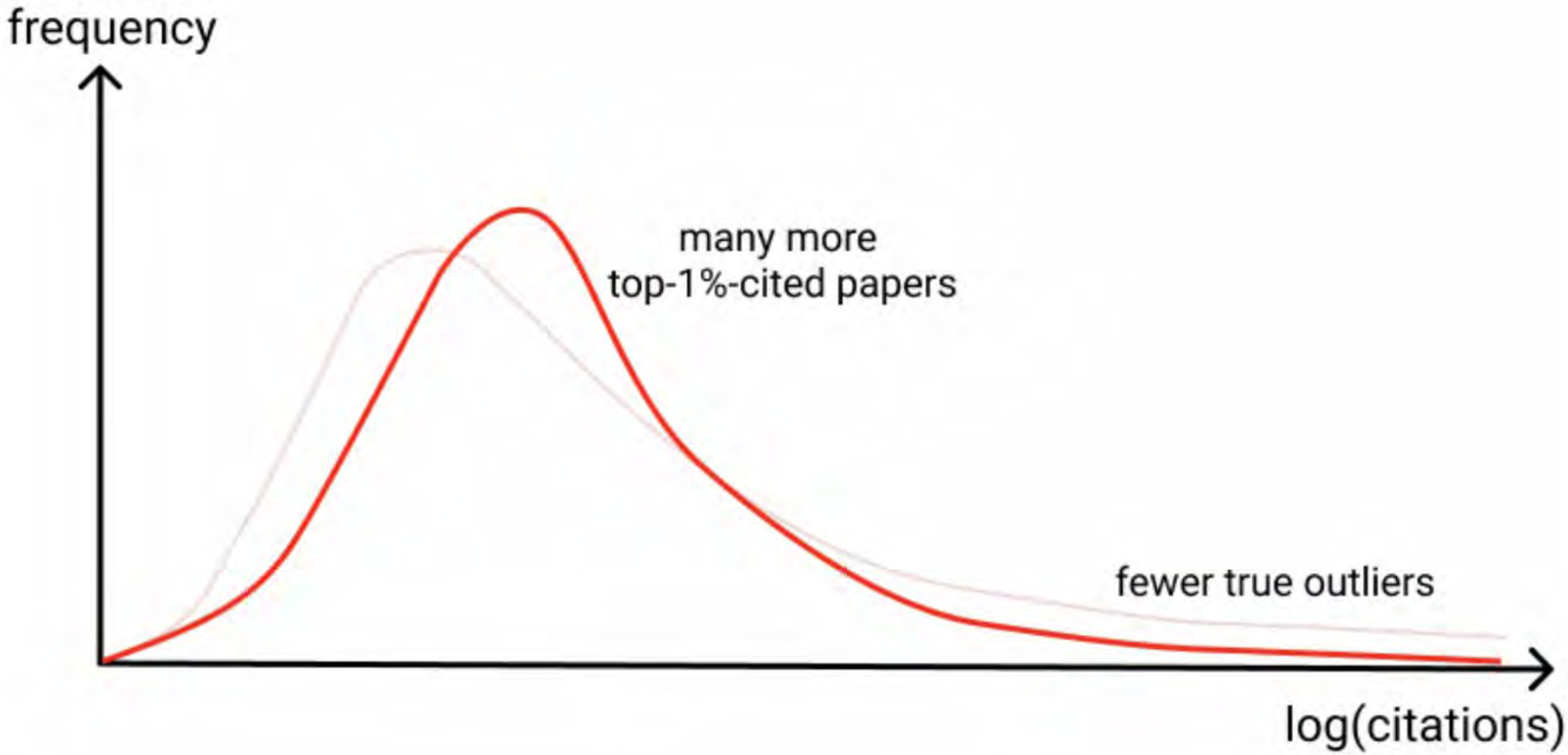
many critiques have been made (citations???, fungibility and quantification???, *etc*).

I want to focus on one that has rarely been made, but that seems fundamental to this or any other attempt to compare funding schemes

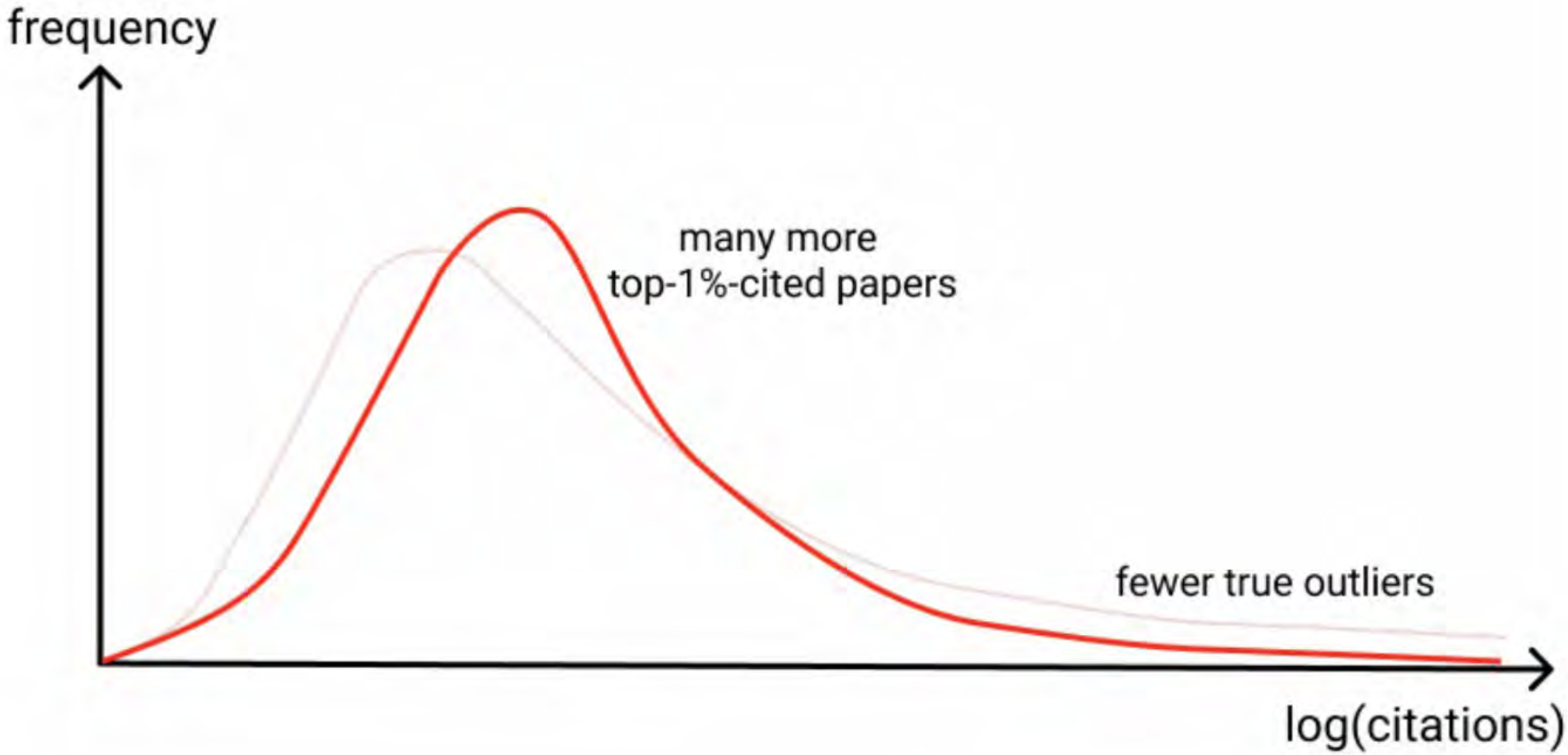
consider that 96% increase in top-1% cited papers.
It sounds very striking, almost dispositive



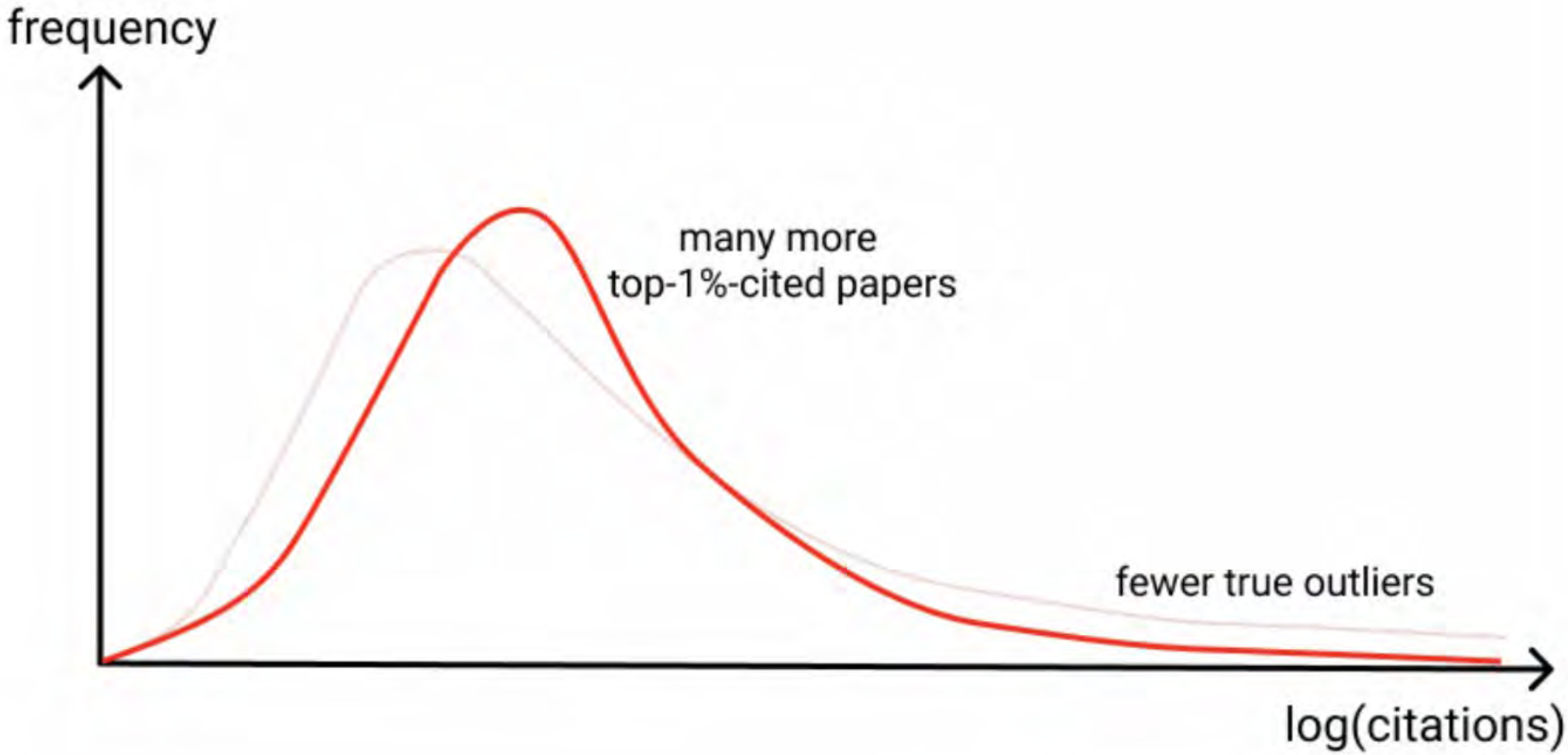
but perhaps it’s due to an improvement in typical behavior, combined with more control, narrowing the curve, and reducing the impact of true outliers



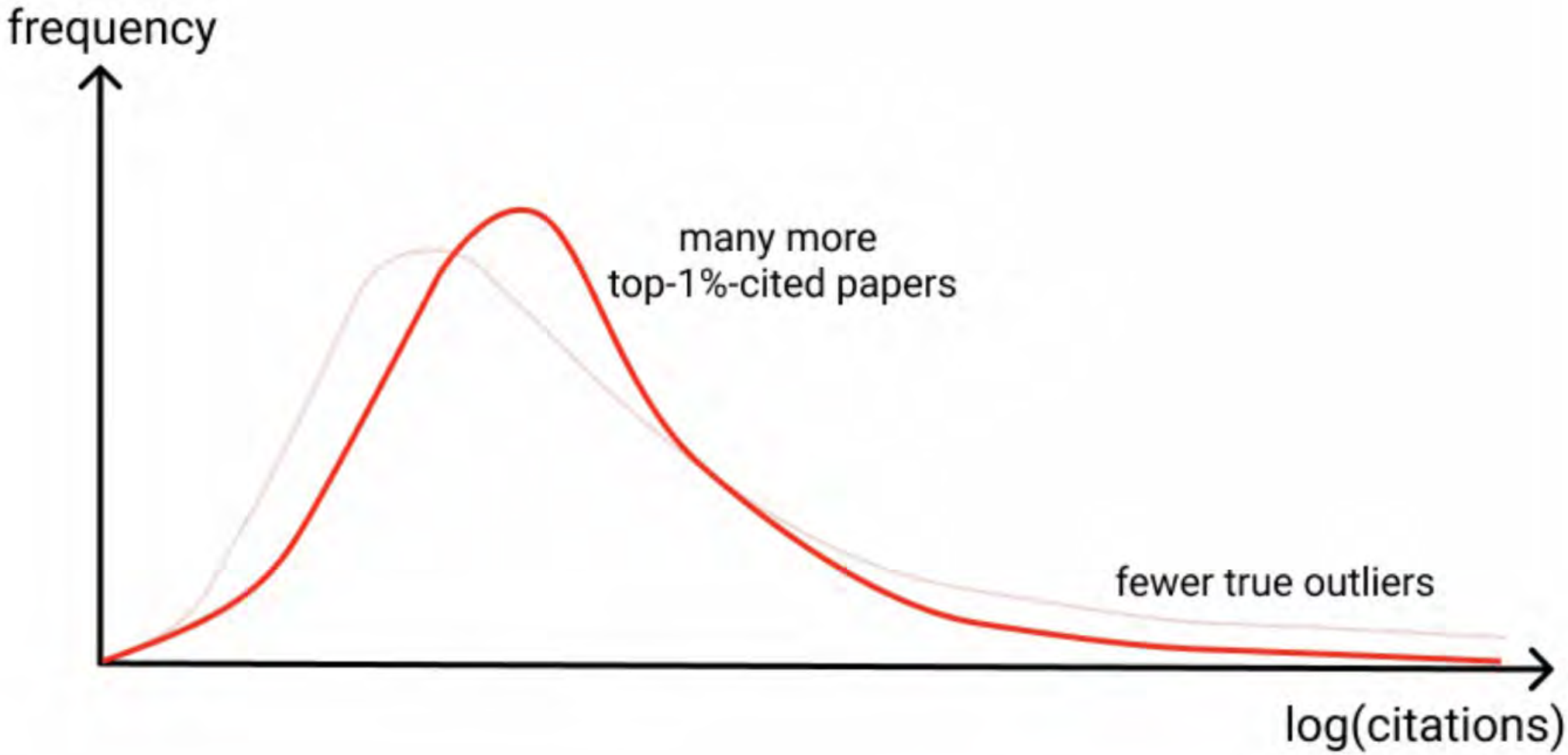
in other words, increasing quality control may improve the bulk of the curve,
but reduce the true outliers



A crucial question: do we care more about the bulk of the curve, or about the extreme outliers?



if it’s the bulk, then the Azoulay results are strong



if it’s outliers, then the Azoulay results may even mislead us badly

this perhaps seems a rather abstract question

but I believe it’s fundamental

investment faces the same outlier-versus-bulk issue, and there it’s utterly central

(Academic scientists sometimes dislike this comparison. But (a) it’s a closely-related issue; and (b) in investment it’s easier, because they have more easily quantified returns. This makes it a great toy model, to illuminate thought.)

informal folk wisdom:
late-stage investing is data focused, about understanding statistics in the bulk of the curve
early-stage venture investing is all about outliers, swing-for-the-fences

Jim Simons (RenTech): “If you trade a lot, you only need to be right 51% of the time.”

Peter Thiel (VC):

> Venture returns don't follow a normal distribution overall. Rather, they follow a power law: a small handful of companies radically outperform all others... Our results at Founders Fund [Thiel's VC firm] illustrate this skewed pattern: Facebook, the best investment in our 2005 fund, returned more than all the others combined. Palantir, the second-best investment, is set to return more than the sum of every other investment aside from Facebook. This highly uneven pattern is not unusual: we see it in all our other funds as well. The biggest secret in venture capital is that the best investment in a successful fund equals or outperforms the entire rest of the fund combined. This implies two very strange rules for VCs. First, only invest in companies that have the potential to return the value of the entire fund. This is a scary rule, because it eliminates the vast majority of possible investments. (Even quite successful companies usually succeed on a more humble scale.) This leads to rule number two: because rule number one is so restrictive, there can't be any other rules.

it’s almost an anti-inductivist approach: study the bulk of the curve in order to avoid it; you need to find non-recurring outliers that are unlike anything else, to return the value of the fund

(This is all folk wisdom. Abe Othman has used AngelList data to confirm that it’s at least plausibly correct: early-stage VC is outlier-dominated, the earlier the more outlier-dominated.)

Which is science (outlier-dominated or bulk-dominated)?

If you trust citations (!), it’s bulk-dominated.

But: investment as a whole is bulk-dominated, too.

Crucial sub-segments are outlier-dominated, and need to be treated that way.

(1) We don’t trust citations; and (2) crucial sub-segments of science may be outlier-dominated.

So what to do?

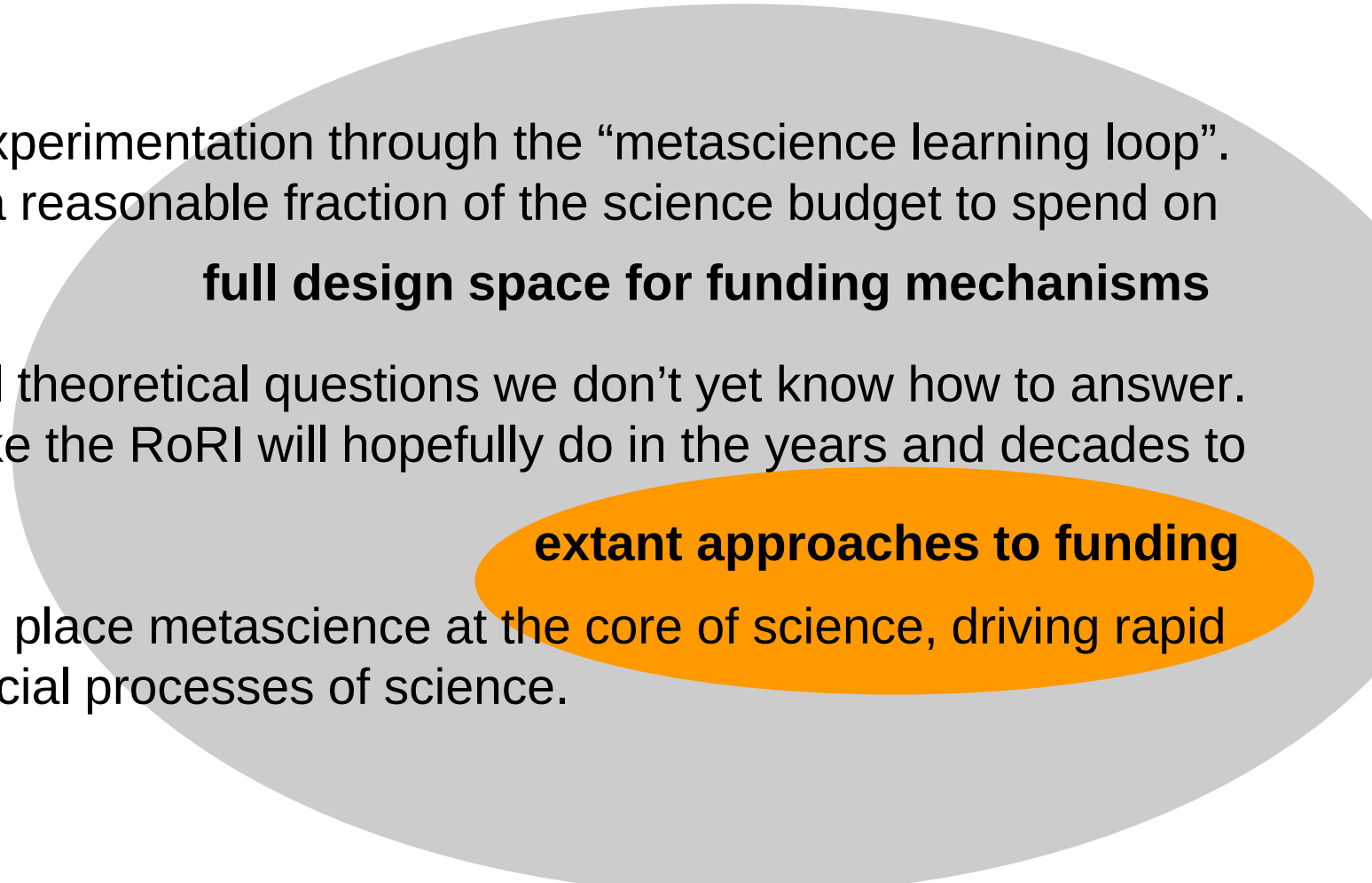
I’m not sure! Not very keynote-like! I’m reporting a fundamental problem that research on research must address, not a solution.

Provisional partial answer: you want at least: (1) careful Azoulay-style statistical comparisons of the bulk of the curve; (2) careful study of outliers; (3) to avoid over-reliance on either; (4) look for inconsistencies; (5) clear thesis on whether a funding approach is aimed at outliers or the bulk.

Summing up

Funding is an imaginative discipline. The best ideas may yet to be discovered, and require tremendous imagination to do so. What are the most imaginative ideas we can find?

We need to radically scale up experimentation through the “metascience learning loop”. Over the long run, 10% seems a reasonable fraction of the science budget to spend on improving the way we fund.



But there are many fundamental theoretical questions we don’t yet know how to answer. And that’s what organizations like the RoRI will hopefully do in the years and decades to come.

If that can be done, then we can place metascience at the core of science, driving rapid rapid improvements in all the social processes of science.

RoRI's Operating Model: Co-producing system change

Experiment, translate and transform:

priorities for the next decade of research on research; 20 & 21 June 2022

Sarah de Rijcke (CWTS & RoRI) - s.de.rijcke@cwts.leidenuniv.nl

System change

Shifting landscape, increased investments, heightened aspirations

Need to address challenges & opportunities in research system

Need to align interests and goals

Co-production

Collaborative consortium model

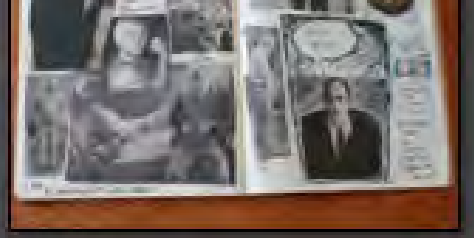
Choice of topics reflect goals and interests across partnership

Practical outcomes, based on robust research

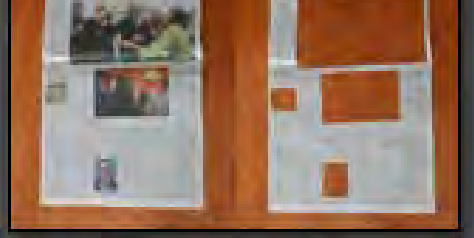
00:20 1

00:20 2

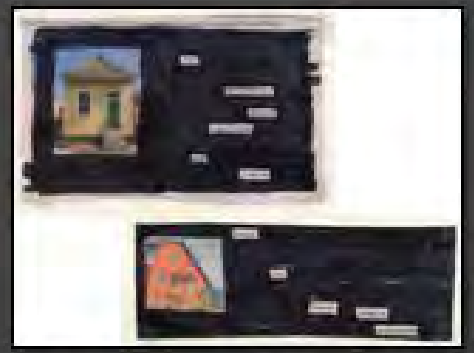
3



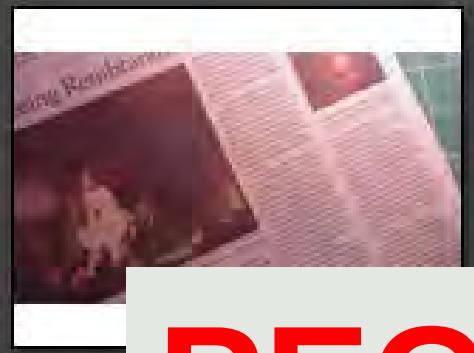
00:20 4



00:20 5

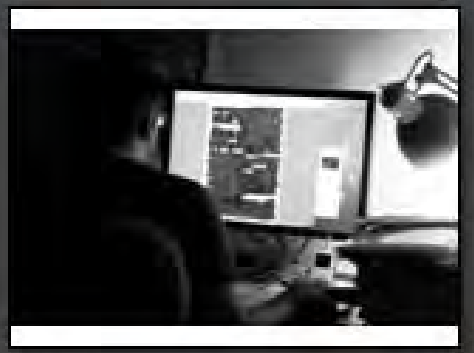


00:20 6



☆ 00:20

9

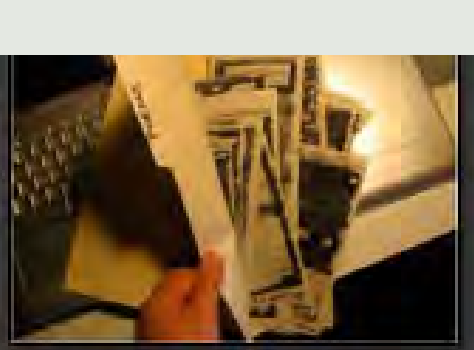


00:20 10

PECHAKUCHA

00:20 11

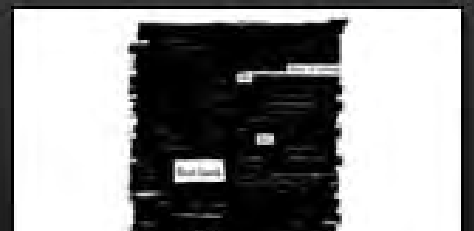
00:20 12

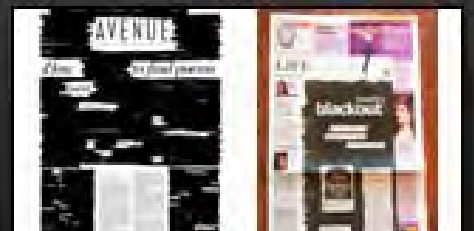


13

14

00:20 15





RESEARCH ON RESEARCH INSTITUTE

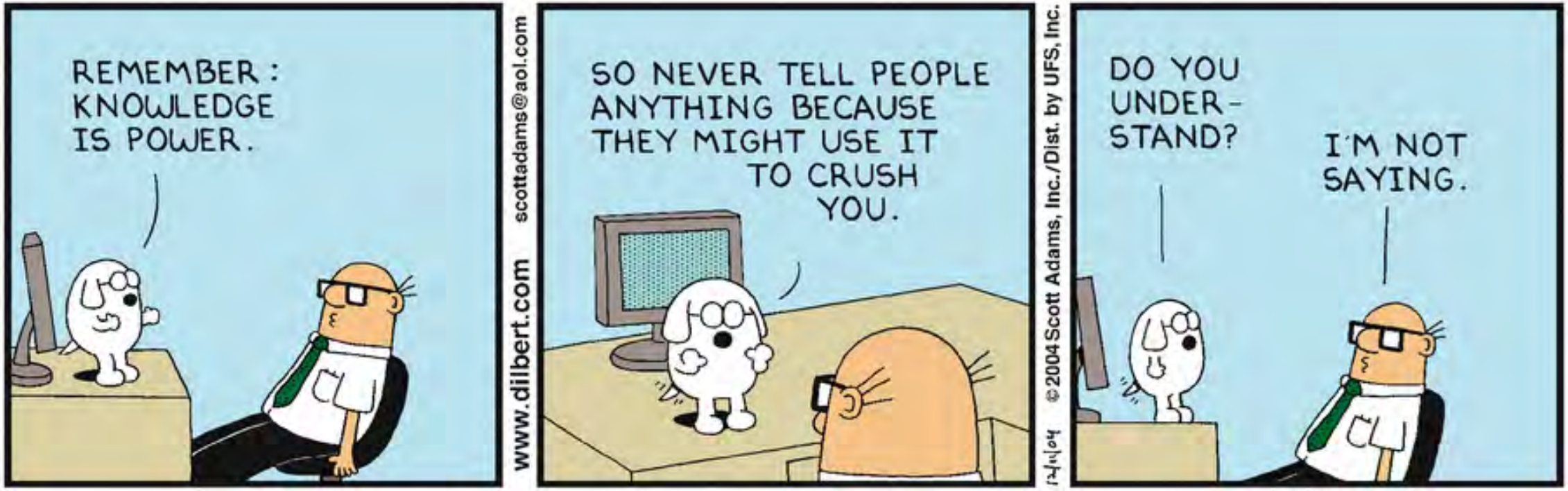
Funder Data Platform

And the first platform project: CRITERIA

Vincent Traag (CWTS, Leiden University), and Gert V. Balling (Novo Nordisk Foundation)

June 2022

Who needs data sharing?

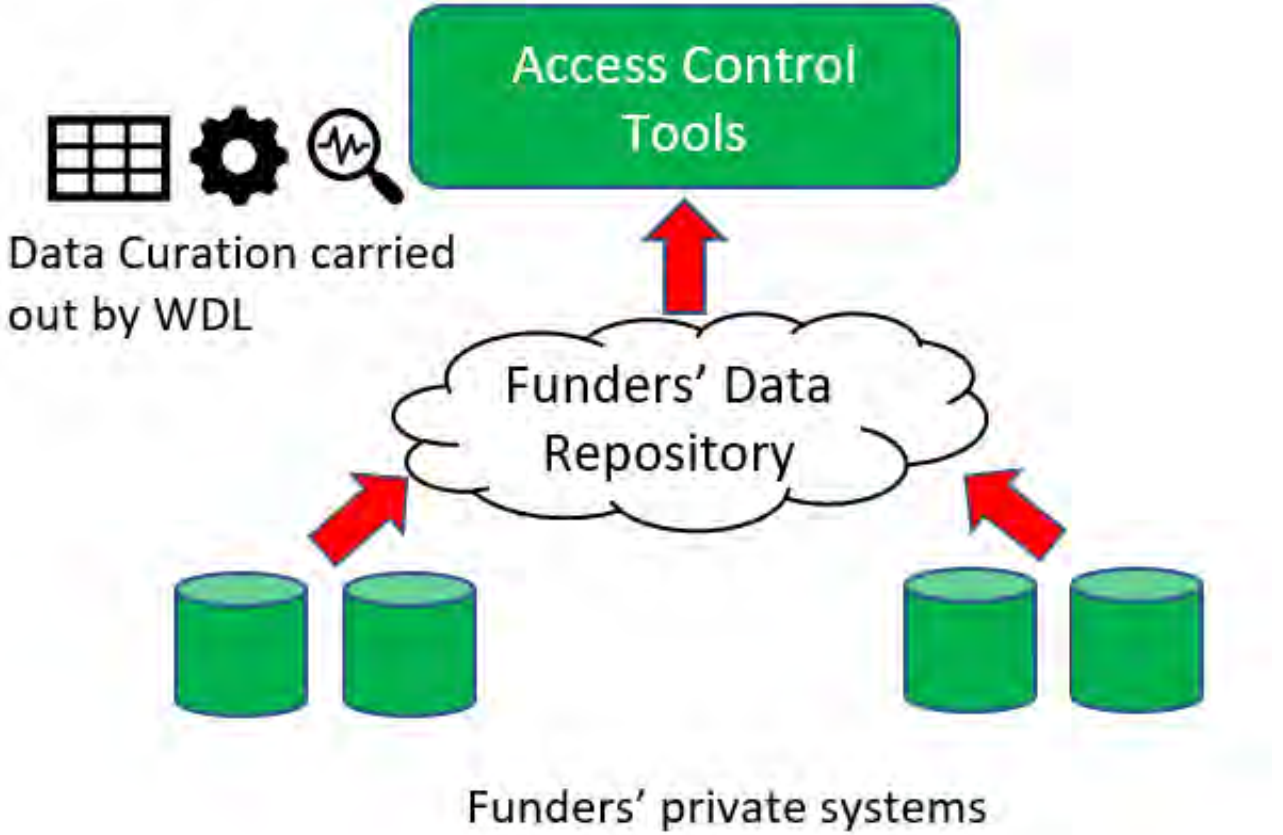


https://dilbert.com/strip/2004-12-11

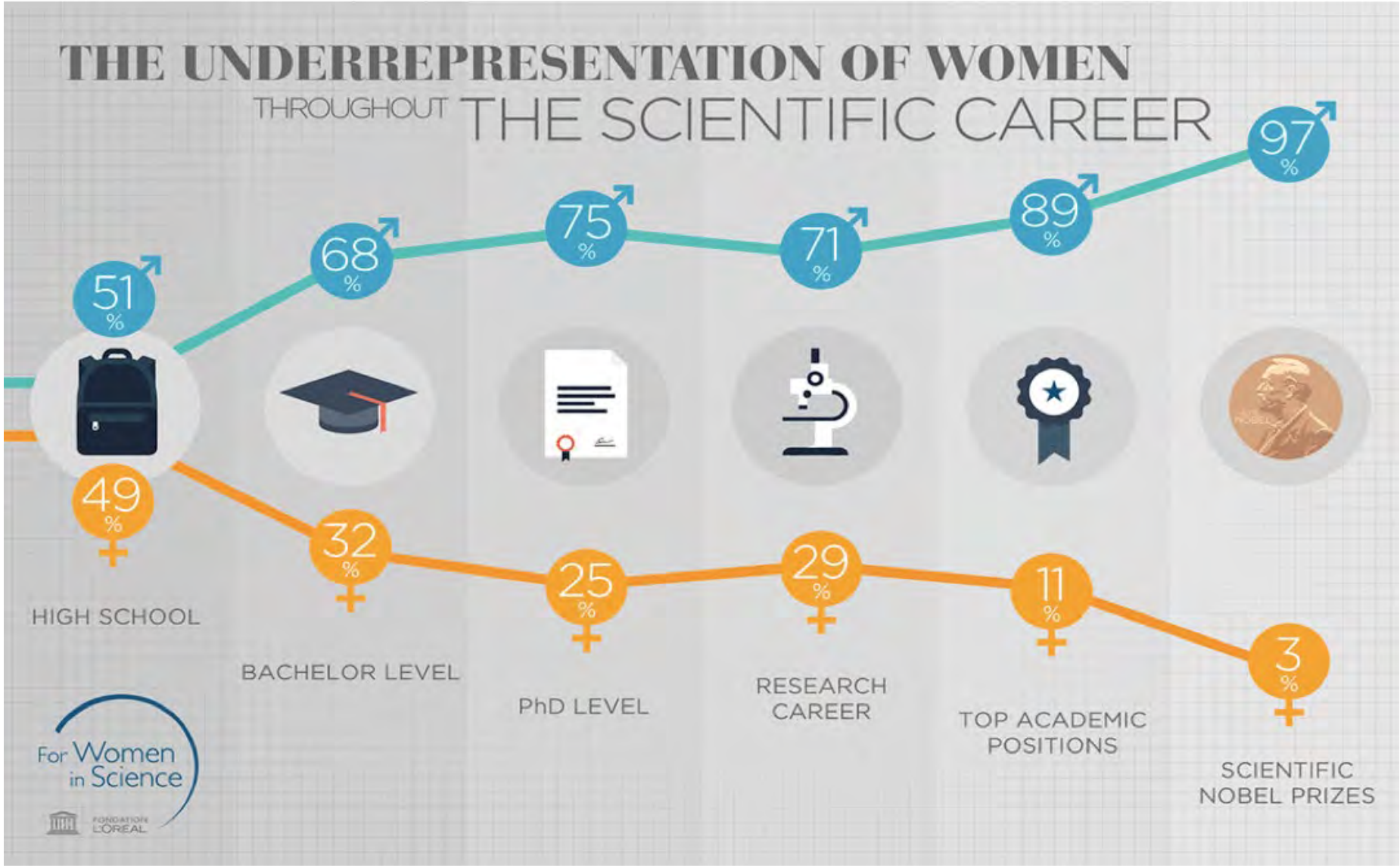
Data sharing based on trust will bring

- Access to more data
- Higher productivity
- Improved validity and insights
- More transparency

Funder Data Platform



First drawing of the Funder Data Platform, Wellcome Data Labs



Digital Science Spotlight - Bridging the Gender Gap #WiSTEMspotlight #ALD15 - Digital Science (digital-science.com)

CRITERIA project
Gender differences in research funding

Australian Government
Australian Research Council

UK Research and Innovation

MICHAEL SMITH FOUNDATION
FOR HEALTH RESEARCH
BC's health research funding agency

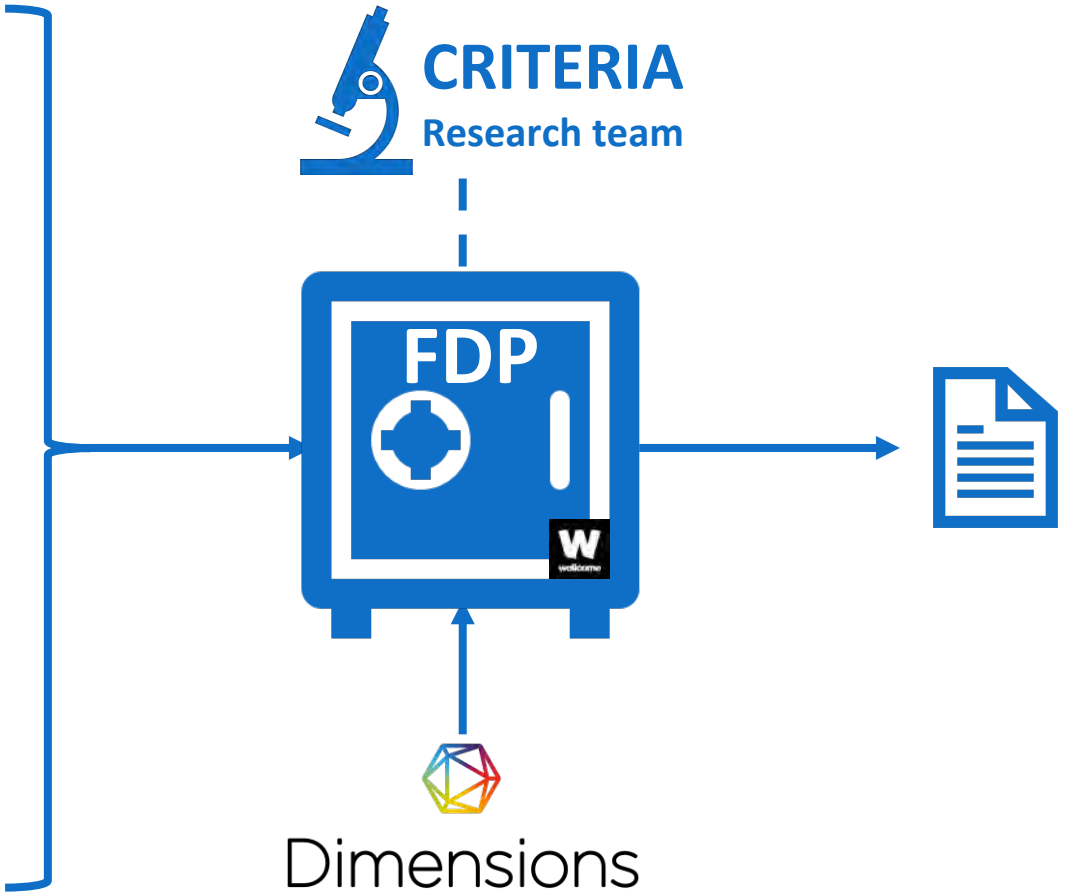
The Research Council of Norway

IndiaAlliance
DBT wellcome

wellcome

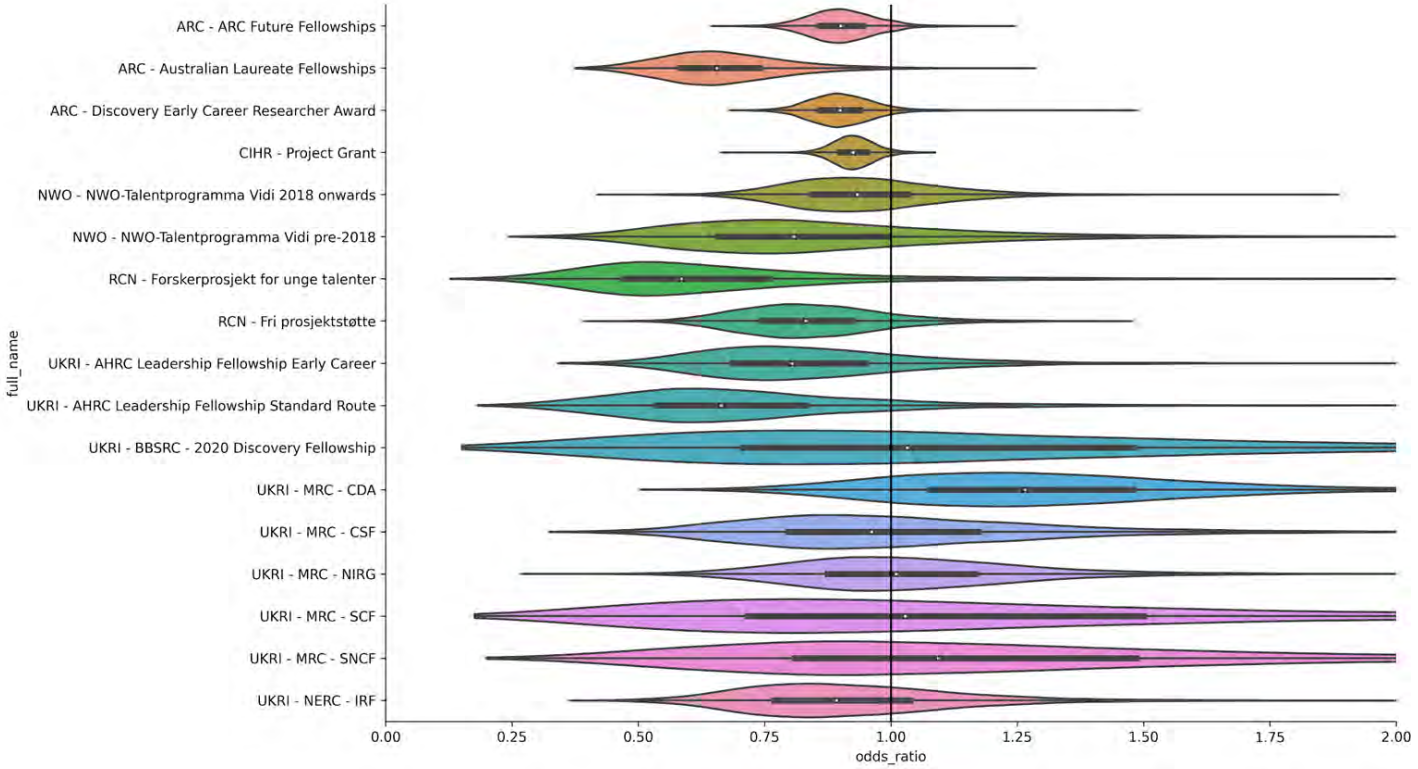
novo nordisk fonden
Benefiting people and society

20 YEARS
MICHAEL SMITH FOUNDATION FOR HEALTH RESEARCH
BC's health research funding agency

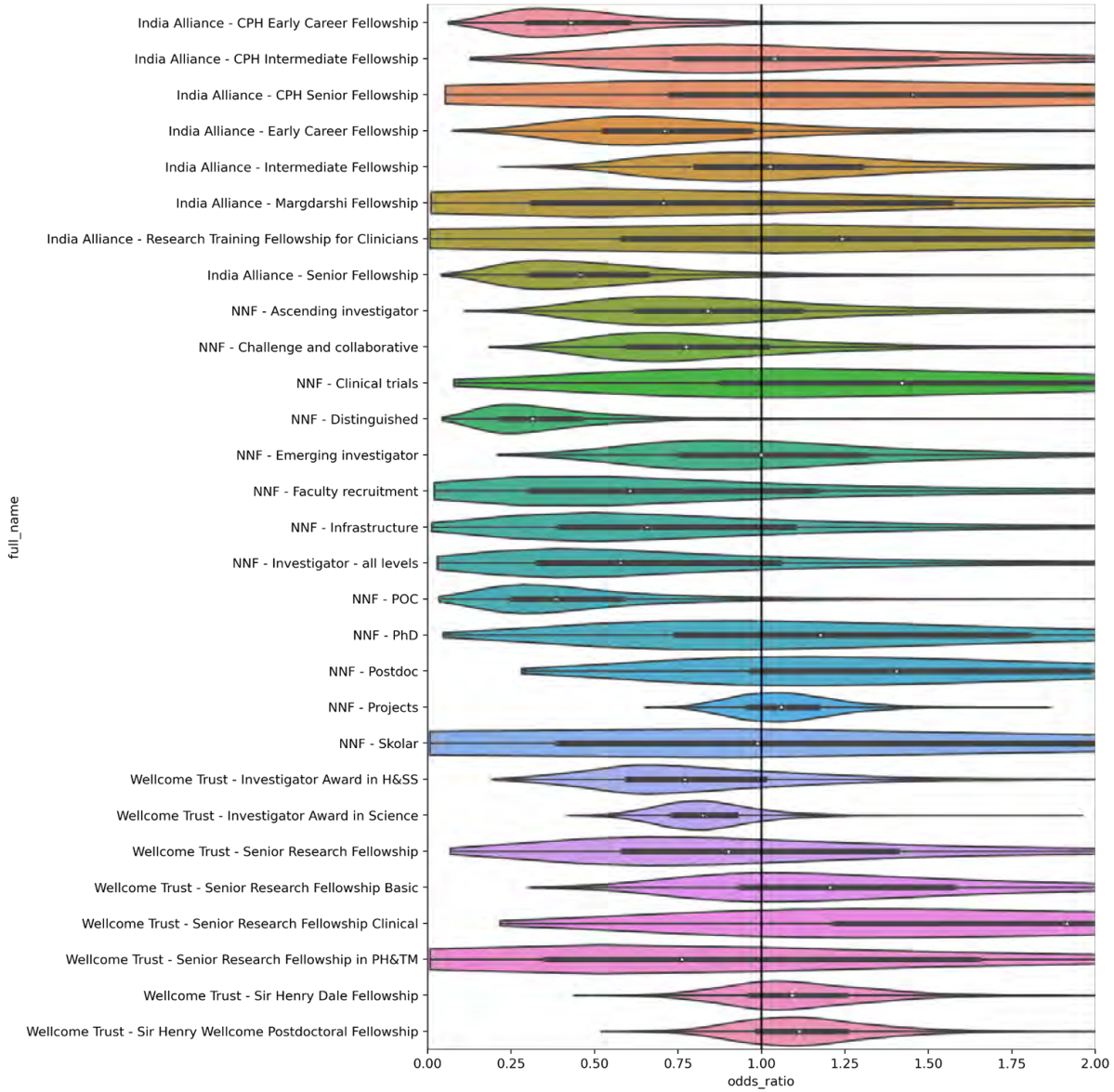


- Evaluation criteria
  - Program of Research — e.g. methodological strength
  - Experience &track record
  - Context
- Process — e.g. has interview stage
- Eligibility
- Reviewer guidance
- Grant conditions — e.g. can be held part-time

Compare gender effects across funders



Compare gender differences across funders



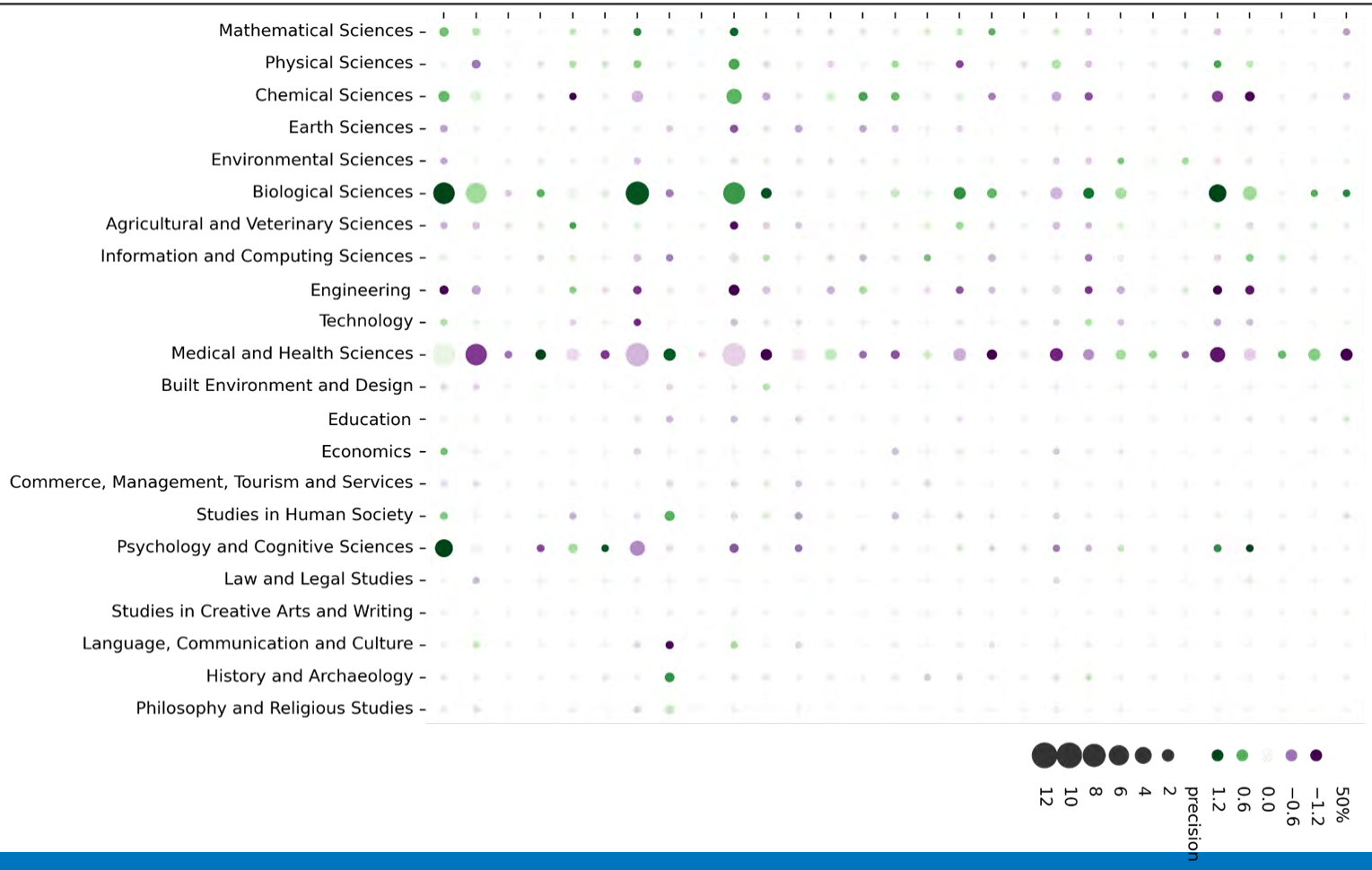
Criteria that may affect gender differences

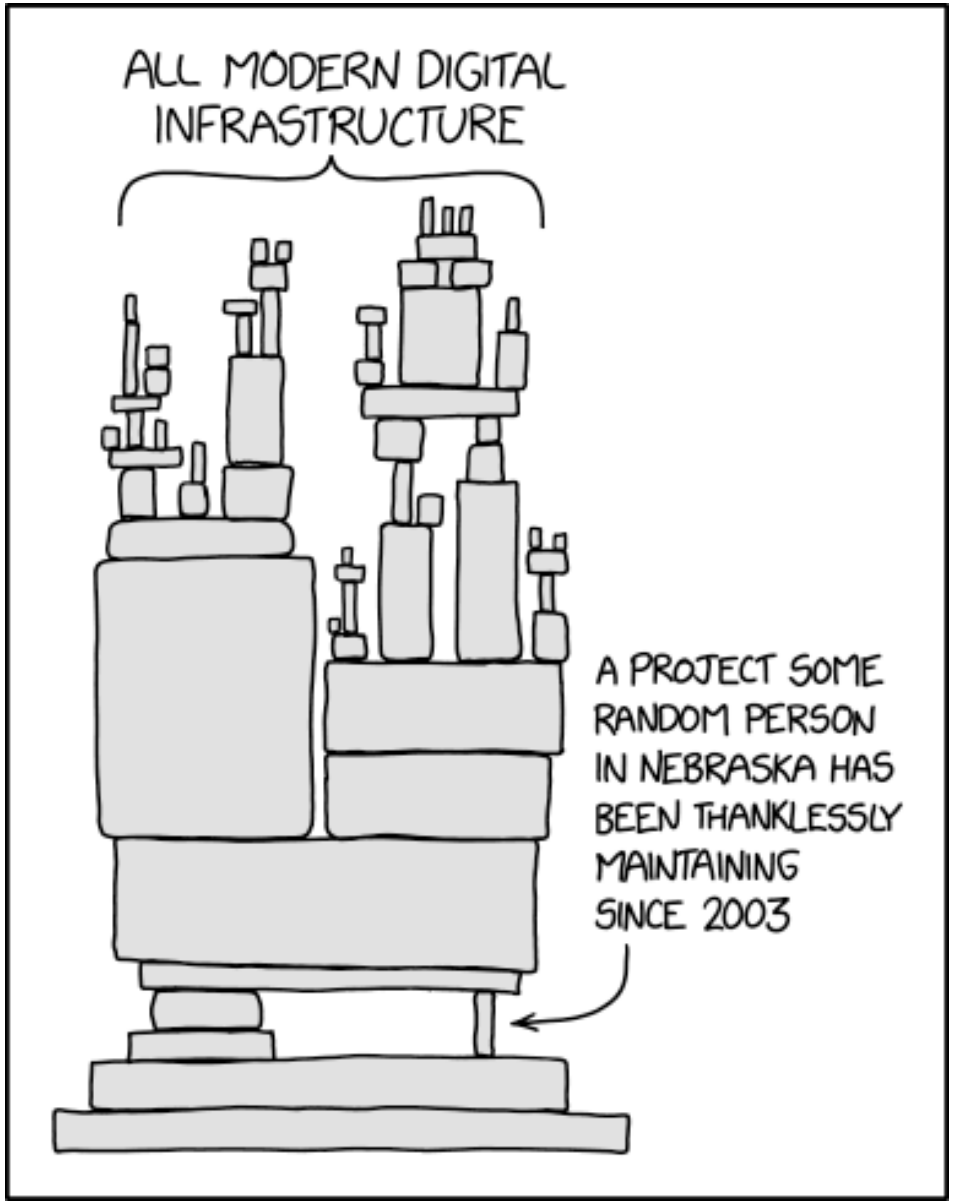
Interview stage

Letter of recommendation

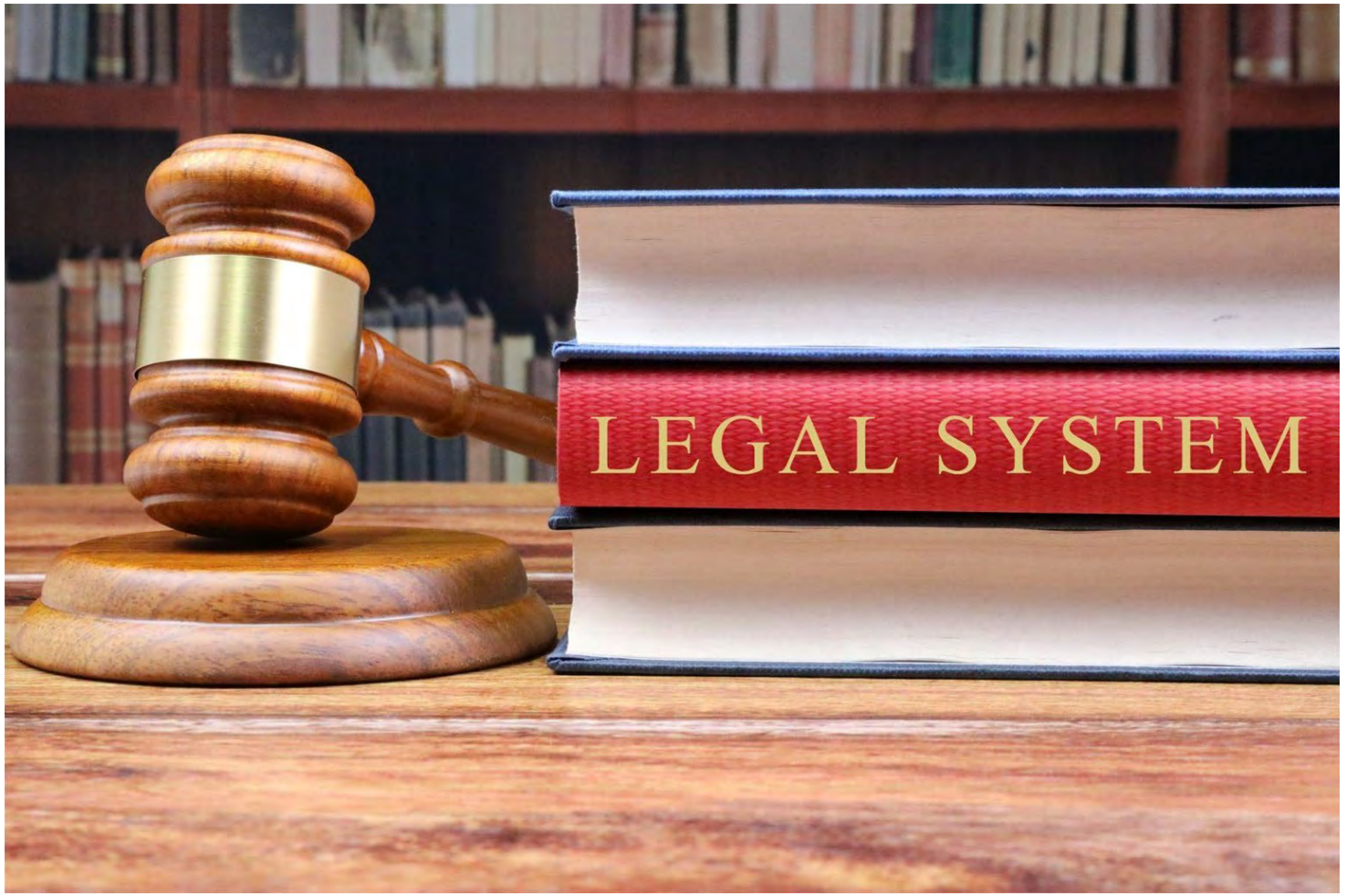
Explicit diversity measures

Compare field effects across funders





https://xkcd.com/2347/



Legal system by Nick Youngson CC BY-SA 3.0 Pix4free


HIGH FENCES
CAN BE
TOPPED TOGETHER
imgflip.com

RoRI's PILOT PHASE: WHAT HAVE WE LEARNED?

Funder experiments

Michele Garfinkel (EMBO) & Tom Stafford (University of Sheffield)

2022-06-20

Topic

RANDOMISATION

Partial randomisation

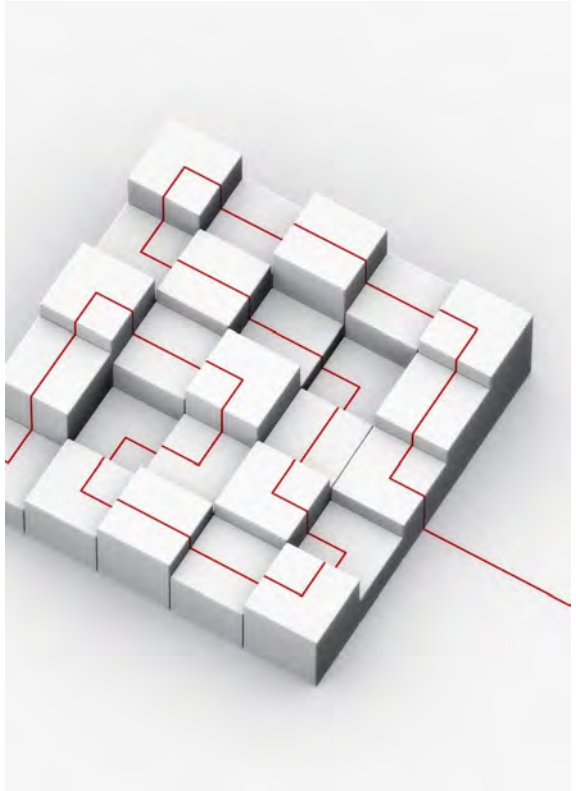
Targeted randomisation

Focal randomisation

Random selection

Lottery

Modified lottery

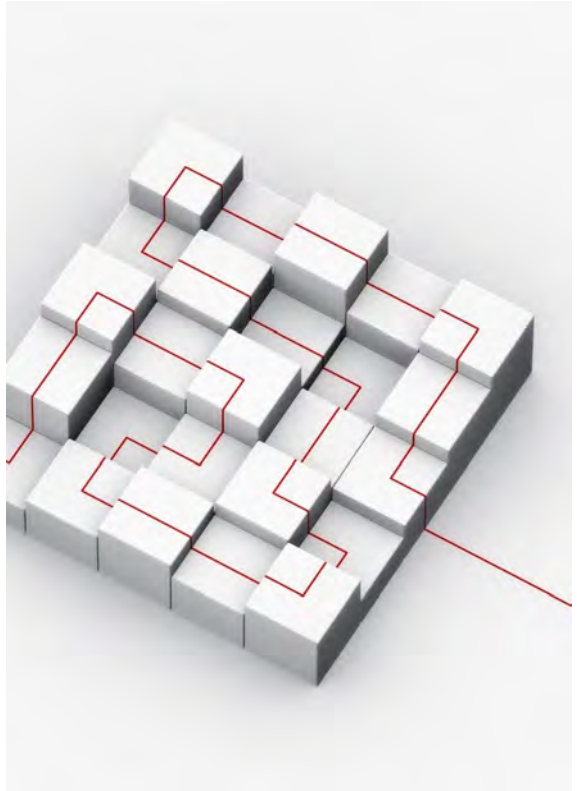


Aim

Learn from and build directly upon existing or planned trials by several of the RoRI partners

Share lessons widely

Build the foundation for a wider series of funder experiments using novel approaches to decision-making and grant allocation



Who made it possible?

Collaboration between 15 strategic partners, RoRI core team, EMBO, SNSF and Nesta's Innovation & Growth Lab

Steering Group: Gert Balling, Marco Bieri, Amanda Blatch-Jones, Michele Garfinkel, Jon Holm, Vincent Traag; Helen Buckley Woods, James Wilsdon

Reporting (motivations, handbook, earlier scoping paper): Sandra Bendiscioli, Albert Bravo-Biosca, Ester Czibor, Teo Firpo, Michele Garfinkel, Tom Stafford, James Wilsdon, Helen Buckley Woods

Australian Research Council
Alfred P. Sloan Foundation
Austrian Science Fund
Chan Zuckerberg Initiative
European Molecular Biology Organization
Michael Smith Health Research BC
National Institute for Health Research
Innovation Growth Lab at Nesta (non-RoRI partner)
Netherlands Organisation for Scientific Research
Novo Nordisk Fonden
Research Council Norway
Swiss National Science Foundation
UK Research and Innovation
Volkswagen Foundation
Wellcome Trust

RoRI RESEARCH ON RESEARCH INSTITUTE

Why experiment?

"If I look back on many years of involvement in political decision-making and policy-making around science, innovation and R&D, ***I am struck by how much of it tends to turn on gut feel of the individuals involved, than on hard evidence and analysis****. This is of course ironic, since good science is all about testing hypotheses against data, empirical results and facts."*

Sir John Kingman*,*

Reflections on his time as Chair of UK Research and Innovation, 2021

Funder experiments are co-produced

RoRI RESEARCH ON RESEARCH INSTITUTE

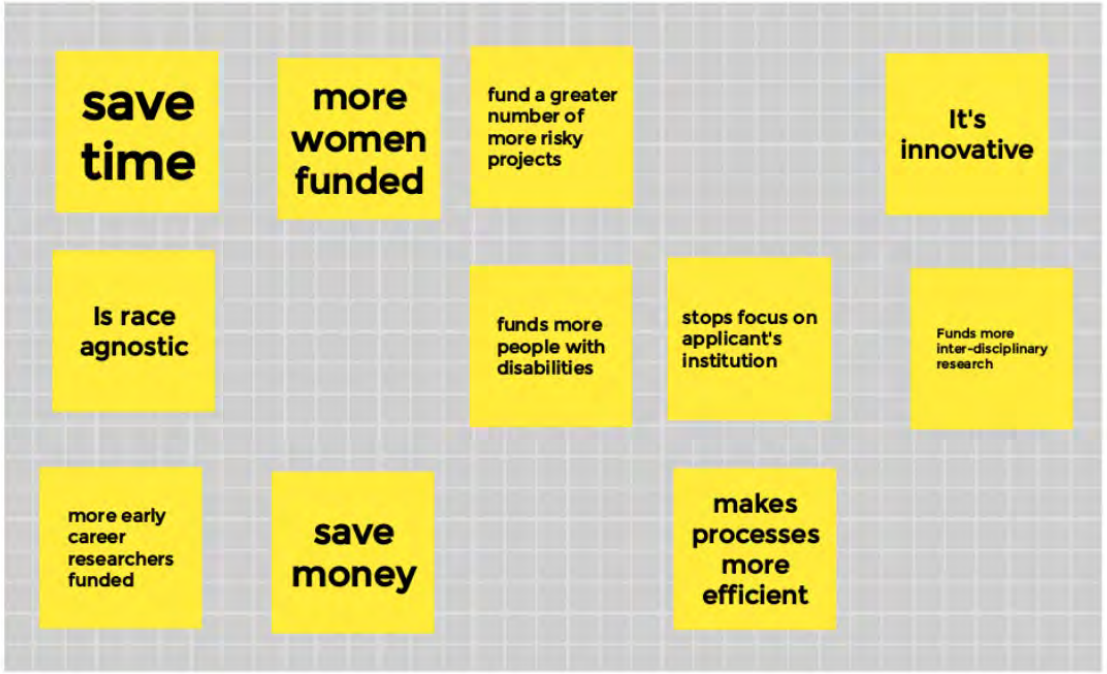
RoRI Working Paper No. 7

Why draw lots? Funder motivations for using partial randomisation to allocate research grants

Helen Buckley Woods and James Wilsdon

December 2021

Figure 3: Example Jamboard prepared for elicitation exercise



Summary: organisational motivations

Fairness: decision making, diversity, perceived fairness, the law

The Grey Zone: eliminating deadlock and overcoming unhelpful group dynamics

Disciplinary spread: overcoming bias to creative research, overlooked fields and 'cold' topics

Innovation: allied to values, a 'nice to have' by-product, is it really innovative?

Efficiency: money saving or more costly? Time saving: desirable, but gains may be negligible

Funder experiments with partial randomisation: conclusions (1)

- ✓ Well accepted by applicants, reviewers, scientific community and media
- ✓ Acceptance is conditional to an initial peer reviewed selection
- ✓ No negative effects
- ✓ PR extended to other schemes
- ✓ More data is needed to draw meaningful conclusions
- ✓ To be able to make comparisons, it is important to evaluate the same aspects or effects

VolkswagenStiftung

Experiment! In search of bold research ideas

Swiss National Science Foundation

Postdoc.Mobility Fellowships

FWF Der Wissenschaftsfonds.

1000 Ideas Programme

hrc nz

Explorer Grants

Part 1

The case for experimental research funding

To RCT
or not to RCT?

Future funder experiments

Sequential evaluation for review debiasing

Navigating the grey zone: capturing reviewer uncertainty

Matthew: studying cumulative advantages in funding evaluation

A large multi-funder trial of partial randomisation

Experiments with the use of narrative CVs

Designing panel rules for smarter decision making

Responsible uses of AI & machine learning in research evaluation

Future funder experiments

Sequential evaluation for review debiasing

BIAS & BIAS MITIGATION

Navigating the grey zone: capturing reviewer uncertainty

JUDGEMENT AND EVALUATION

Matthew: studying cumulative advantages in funding evaluation

EXPERIMENT / TRIAL DESIGN

A large multi-funder trial of partial randomisation

GROUP DECISION MAKING

Experiments with the use of narrative CVs

TRUST & TRANSPARENCY IN DECISION PROCESSES

Designing panel rules for smarter decision making

Responsible uses of AI & machine learning in research evaluation

Bendiscioli, Sandra; Firpo, Teo; Bravo-Biosca, Albert; Czibor, Eszter; Garfinkel, Michele; Stafford, Tom; et al. (2022):

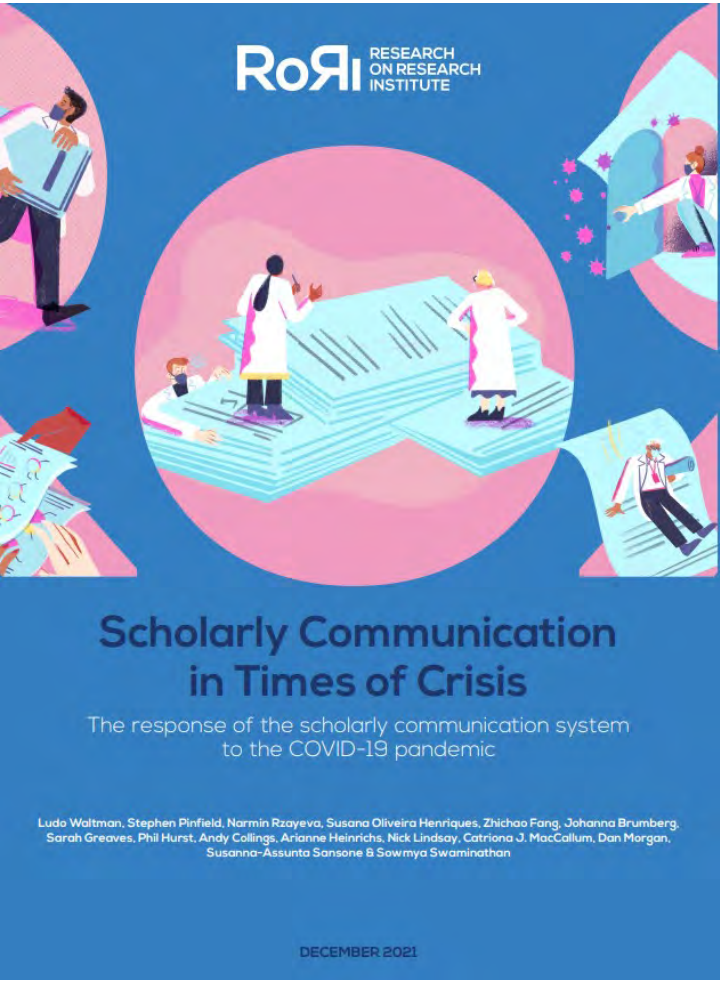
The experimental research funder's handbook (Revised edition, June 2022, ISBN 978-1-7397102-0-0).

Research on Research Institute. Report. https://doi.org/10.6084/m9.figshare.19459328.v2

RoRI's PILOT PHASE: WHAT HAVE WE LEARNED?

Funder experiments

Michele Garfinkel (EMBO) & Tom Stafford (University of Sheffield)
michele.garfinkel@embo.org & t.stafford@sheffield.ac.uk



Peer review in times of crisis

Lessons Hindawi learned from its collaboration with RoRI

Catriona J. MacCallum & Ludo Waltman

An SNSF and RoRI meeting to launch RoRI's second phase
20th June 2022

0000-0001-9623-2225

Covid Rapid Review Initiative: Aims

Encourage manuscript transfer

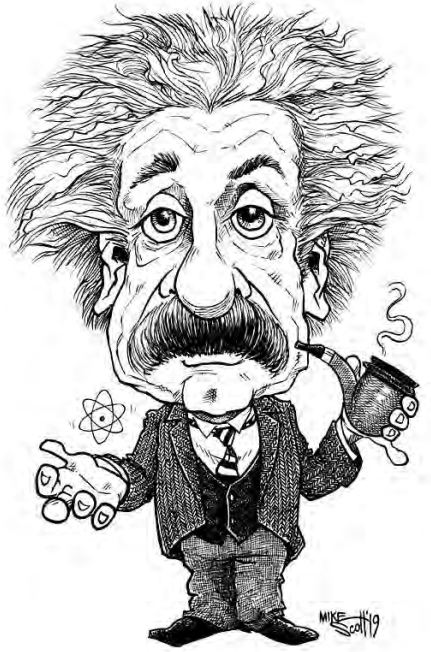
Ensure preprinting

Ensure data sharing

Expand reviewer pool

Were we helping and how would we know??

we invited RoRI to help us…



RoRI
RESEARCH ON RESEARCH INSTITUTE

What were the right questions?

Where was the data…?

How do we do this?

We took an evidence-informed approach

Findable Accessible Interoperable Reusable

We shared data on ***all*** our journals

rates

times

titles

abstracts

DOIs

on rejected articles too!

what if it makes us look bad…?

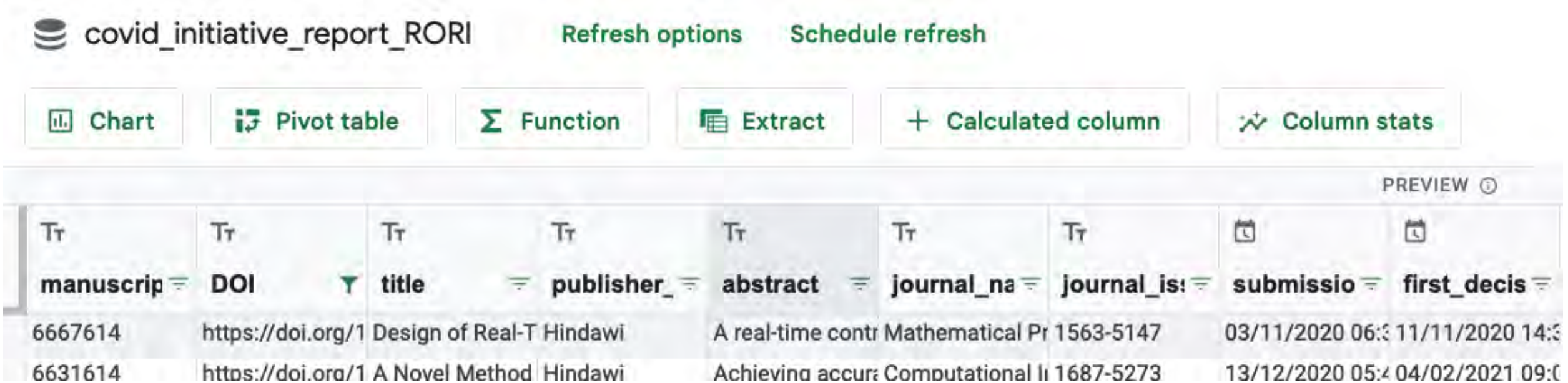
Sharing data is hard

Multiple sources

Gaps and bugs

Inconsistencies

Reproducibility



With thanks to Alessandra Auddino Hindawi Solutions Analyst, Open Science

We learned a lot

Collaboration is key

Expert scrutiny helps!

being open about problems

Better data management

getting our act together

you can share data

We benefited lots

insights into our services

insights into open science

where we could improve

insights into other publishers

innovation in publishing

challenging and rewarding and fun

Sharing data is political (can't versus won't)

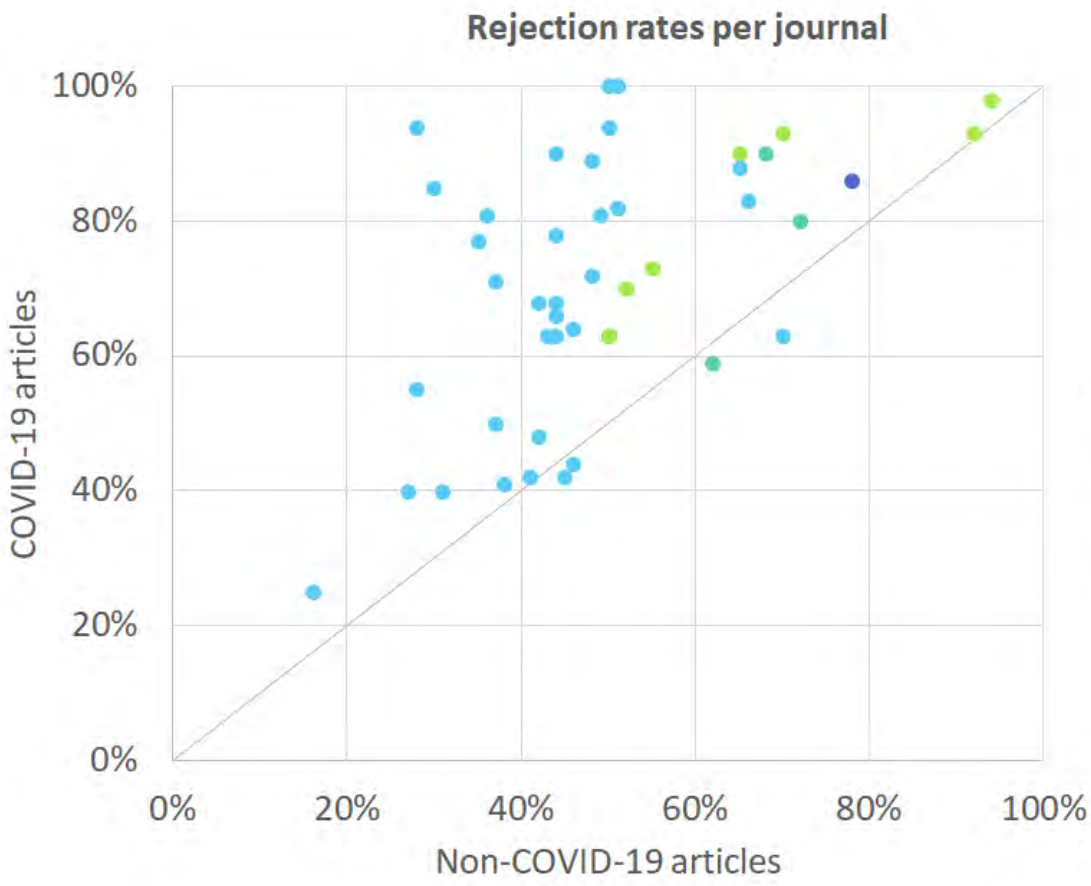
Inconsistent standards across the industry

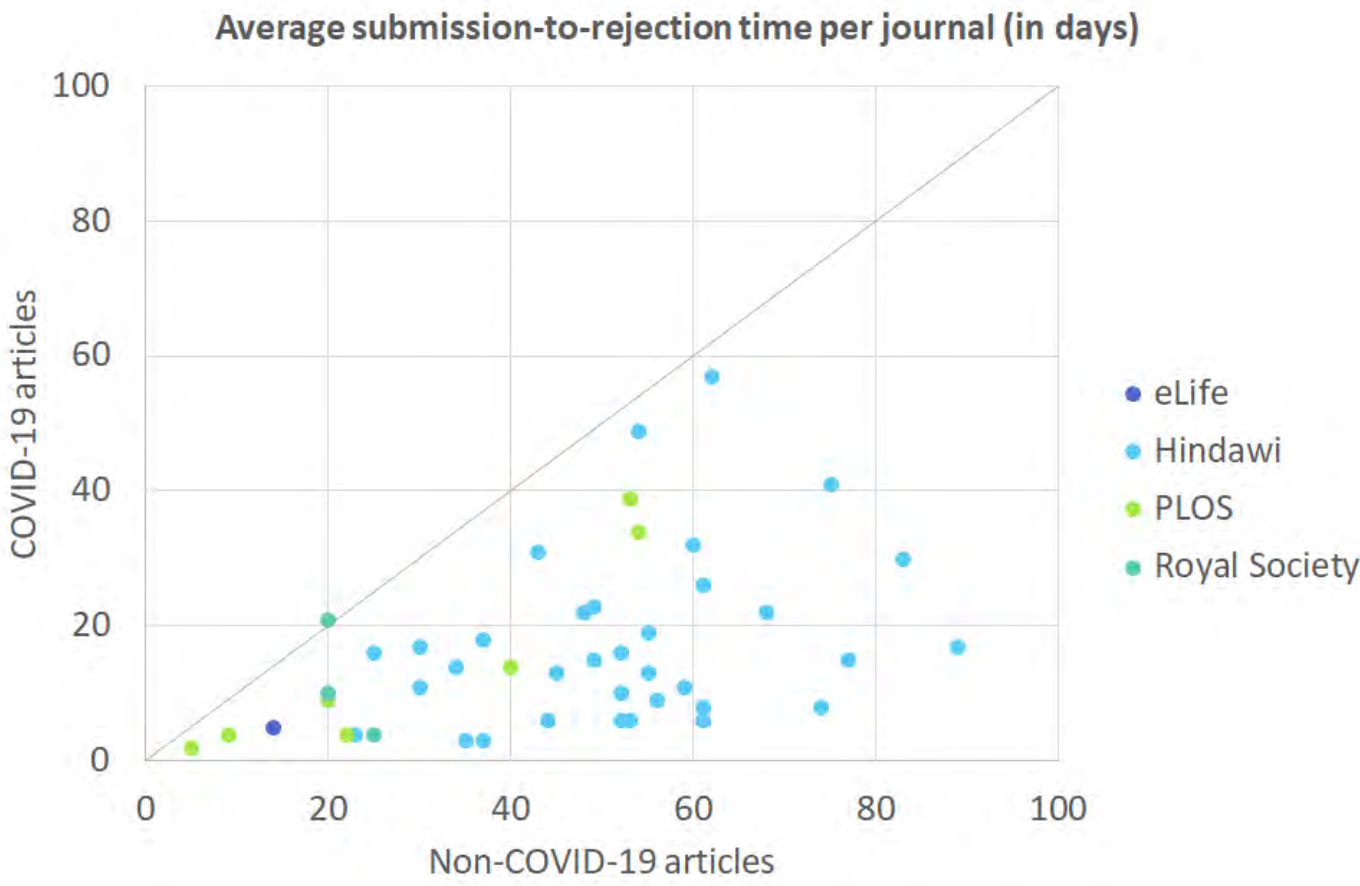
What is 'First Decision' …?

How do you define time of acceptance…?

Standards are like toothbrushes…

Covid articles were rejected more and more quickly

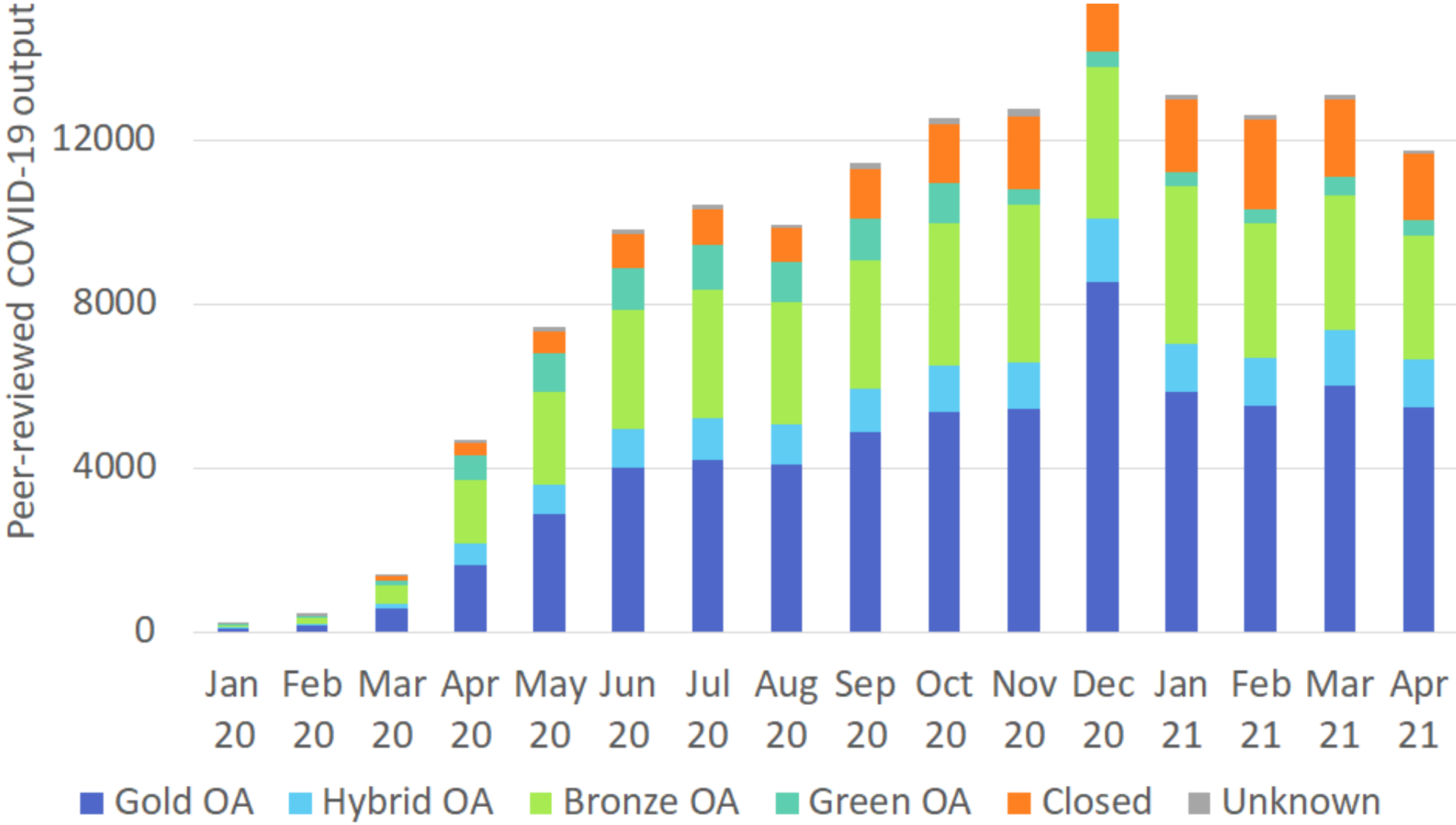




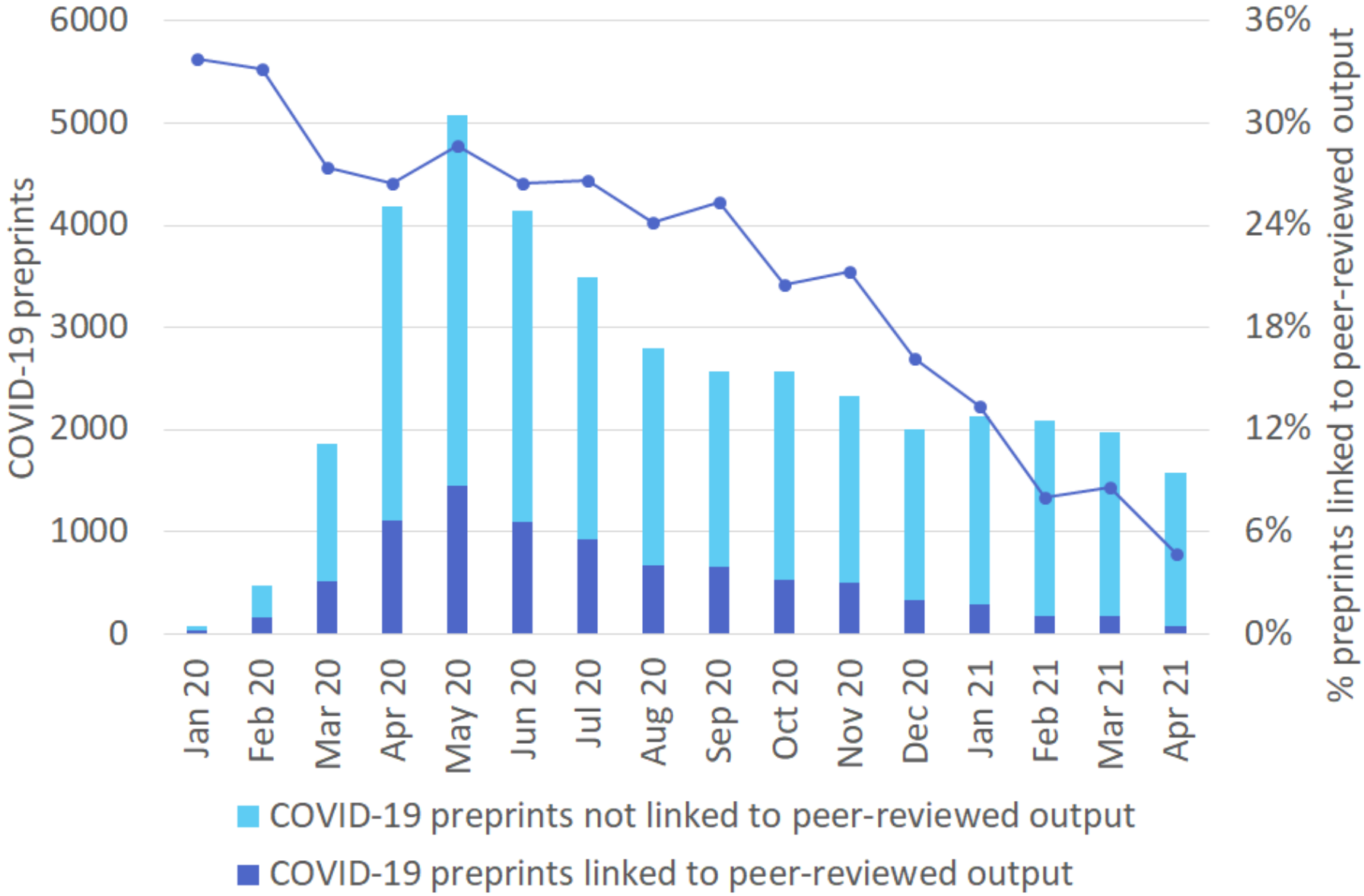
Some signed the pledge

but didn't make COVID articles freely accessible.

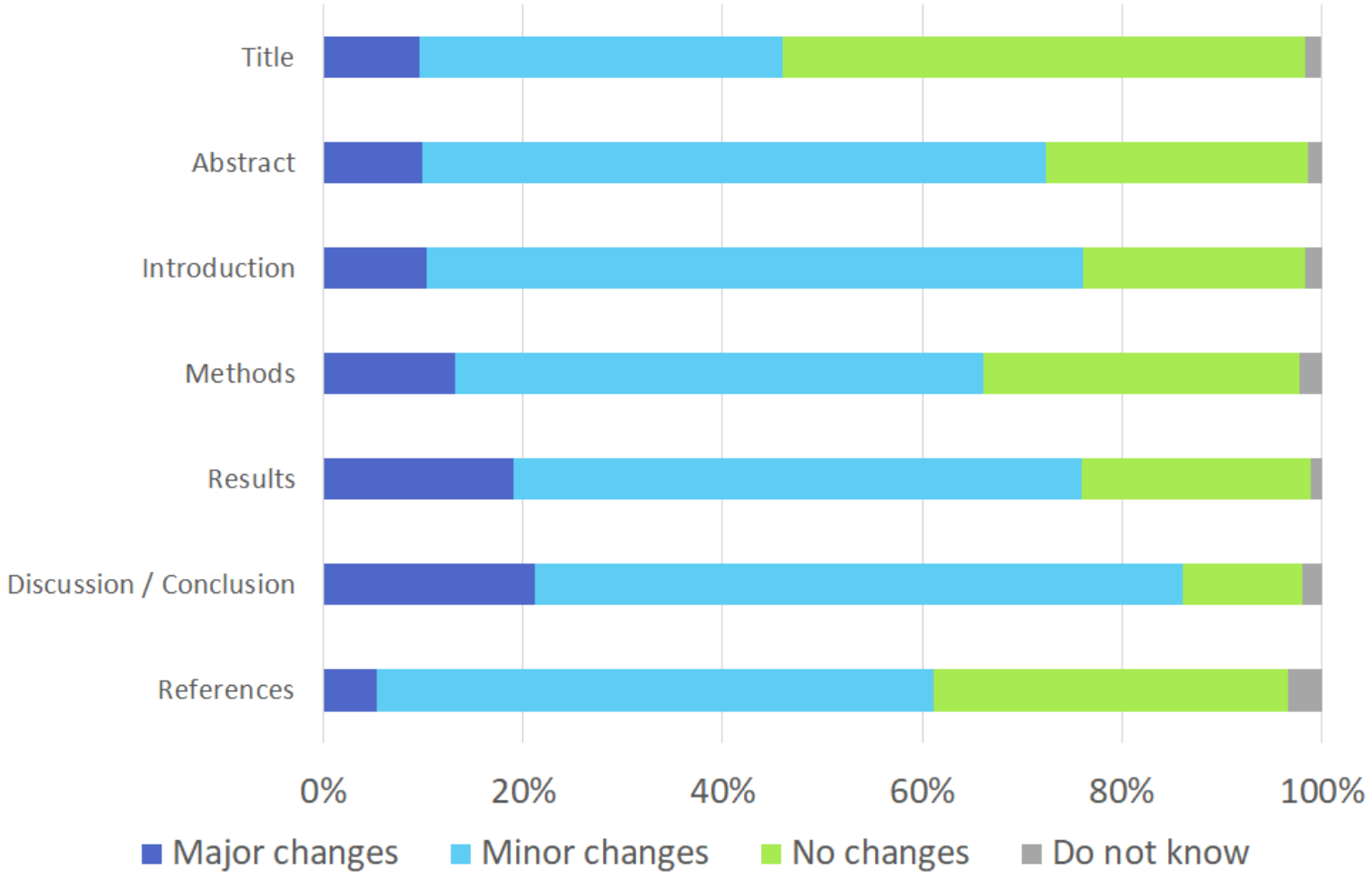
Open access



Most Covid articles weren't linked to preprints



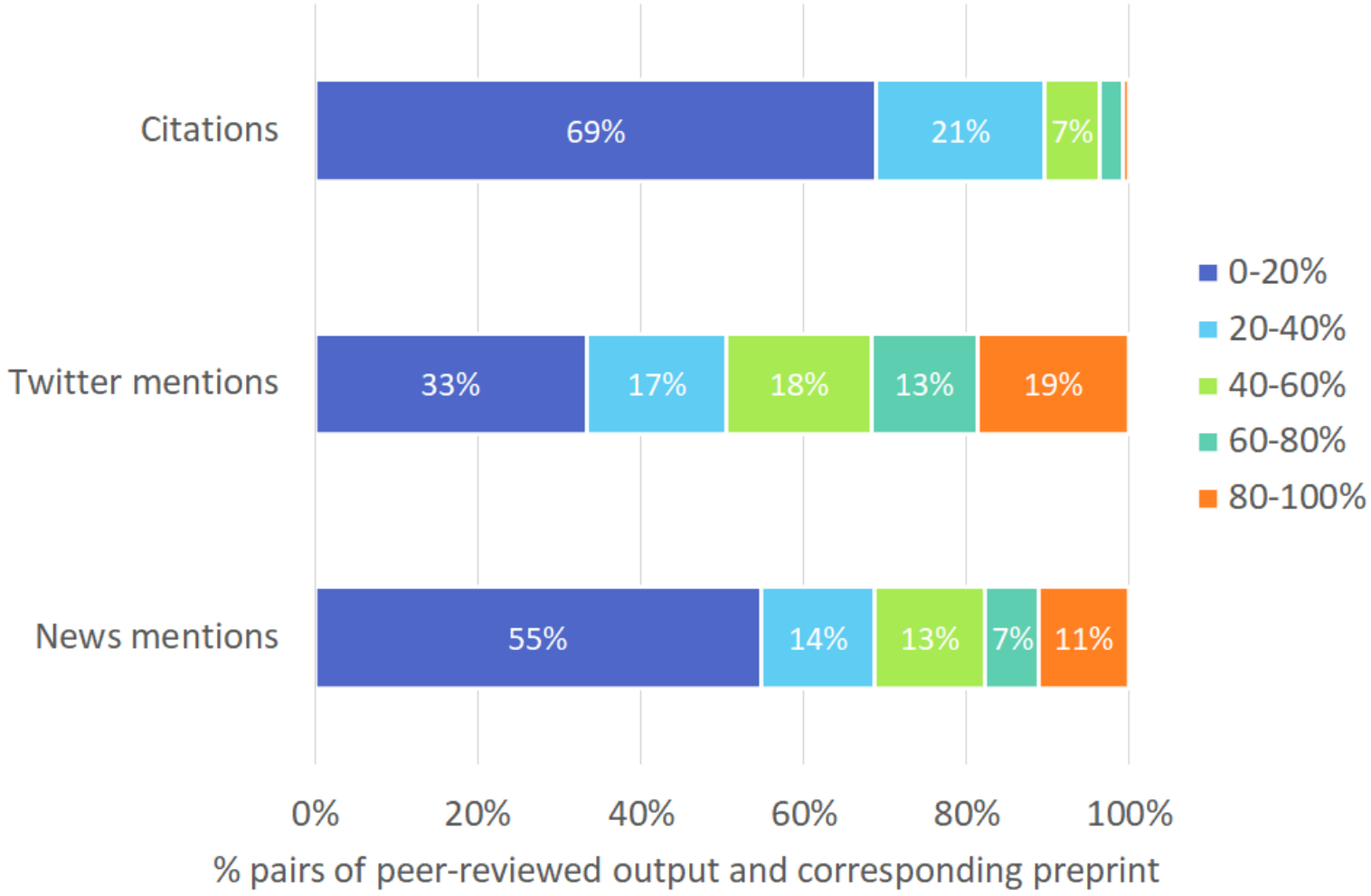
Journal peer review doesn't make substantial differences



Bypassing traditional slow peer review

SNSF

Peer-reviewed articles with preprints get more attention



SNSF

Let's take an open-science approach to scholarly publishing

Data sharing is essential for innovation

Innovation

What about a publisher data platform?

Collaboration, openness and sharing data benefits everyone

What Have We Learned?

Mark A. Musen, M.D., Ph.D.
Stanford University
musen@Stanford.edu

Michelle Barker, Ph.D., M.B.A.
Open Science Consultant
michelle@researchsoft.org

SCIENTIFIC DATA

Amended: Addendum

OPEN

SUBJECT CATEGORIES

» Research data

» Publication characteristics

Comment: The FAIR Guiding Principles for scientific data management and stewardship

Mark D. Wilkinson *et al.*[#]

Received: 10 December 2015

Accepted: 12 February 2016

Published: 15 March 2016

There is an urgent need to improve the infrastructure supporting the reuse of scholarly data. A diverse set of stakeholders—representing academia, industry, funding agencies, and scholarly publishers—have come together to design and jointly endorse a concise and measureable set of principles that we refer to as the FAIR Data Principles. The intent is that these may act as a guideline for those wishing to enhance the reusability of their data holdings. Distinct from peer initiatives that focus on the human scholar, the FAIR Principles put specific emphasis on enhancing the ability of machines to automatically find and use the data, in addition to supporting its reuse by individuals. This Comment is the first formal publication of the FAIR Principles, and includes the rationale behind them, and some exemplar implementations in the community.

FAIR principles depend on community standards for metadata that are not objectively computable

F1: (Meta) data are assigned globally unique and persistent identifiers

F2: Data are described with rich metadata

F3: Metadata clearly and explicitly include the identifier of the data they describe

F4: (Meta)data are registered or indexed in a searchable resource

A1: (Meta)data are retrievable by their identifier using a standardised communication protocol

A1.1: The protocol is open, free and universally implementable

A1.2: The protocol allows for an authentication and authorisation where necessary

A2: Metadata should be accessible even when the data is no longer available

I1: (Meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation

I2: (Meta)data use vocabularies that follow the FAIR principles

I3: (Meta)data include qualified references to other (meta)data

R1: (Meta)data are richly described with a plurality of accurate and relevant attributes

R1.1: (Meta)data are released with a clear and accessible data usage license

R1.2: (Meta)data are associated with detailed provenance

R1.3: (Meta)data meet domain-relevant community standards

Human sample from Homo sapiens

Identifiers BioSample: SAMN15811762; Sample name: CST3-M15545

Organism Homo sapiens (human)
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Haplorrhini; Simiiformes; Catarrhini; Hominoidea; Hominidae; Homininae; Homo

Package Human; version 1.0

disease name	1.脑淀粉样血管病
Hereditary way	1.AD
...	...
altitude	C
Chr	chr20
Start	23618395
End	23618395
...	...
GO_cellular_component	extracellular region;basement membrane;extracellular space;lysosome;multi cytoplasm;extracellular exosome;tertiary granule lumen;ficolin-1-rich granule
GO_molecular_function	amyloid-beta binding;protease binding;endopeptidase inhibitor activity;cystei

Full metadata record available at: https://www.ncbi.nlm.nih.gov/biosample/15811762

Good metadata need ontologies!

age
Age
AGE
`Age
age (after birth)
age (in years)
age (y)
age (year)
age (years)
Age (years)
Age (Years)
age (yr)
age (yr-old)
age (yrs)
Age (yrs)

age [y]
age [year]
age [years]
age in years
age of patient
Age of patient
age of subjects
age(years)
Age(years)
Age(yrs.)
Age, year
age, years
age, yrs
age.year
age_years

Gene Expression Omnibus

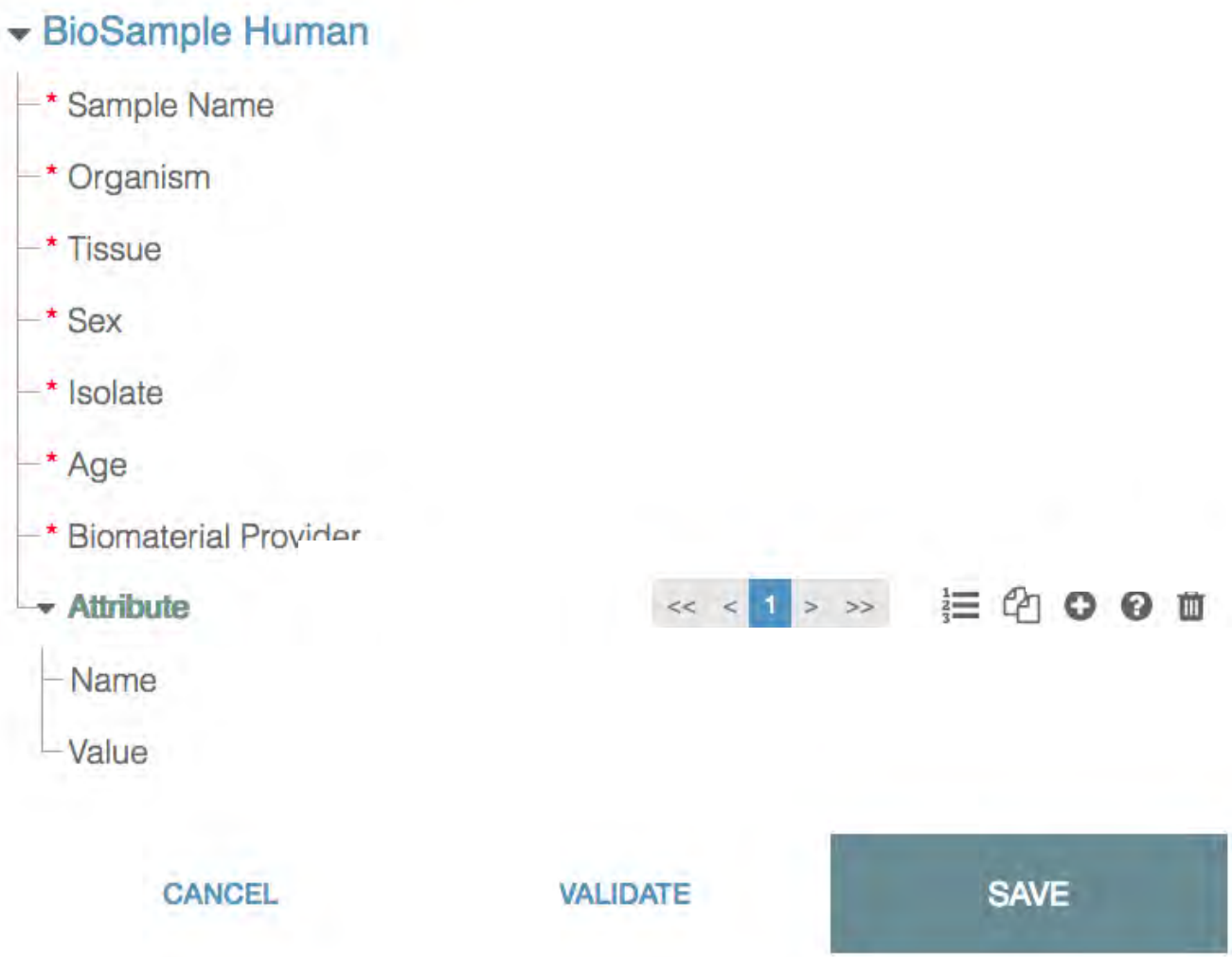
Minimum Information About a Microarray Experiment - MIAME

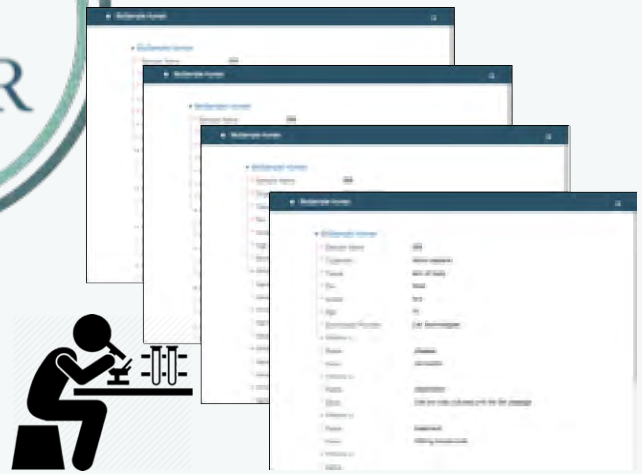
MIAME describes the **Minimum Information About a Microarray Experiment** that is needed to enable the interpretation of the results of the experiment unambiguously and potentially to reproduce the experiment. [Brazma et al., Nature Genetics]

The six most critical elements contributing towards MIAME are:

1. The raw data for each hybridisation (e.g., CEL or GPR files)
2. The final processed (normalised) data for the set of hybridisations in the experiment (study) (e.g., the gene expression data matrix used to draw the conclusions from the study)
3. The essential sample annotation including experimental factors and their values (e.g., compound and dose in a dose response experiment)
4. The experimental design including sample data relationships (e.g., which raw data file relates to which sample, which hybridisations are technical, which are biological replicates)
5. Sufficient annotation of the array (e.g., gene identifiers, genomic coordinates, probe oligonucleotide sequences or reference commercial array catalog number)
6. The essential laboratory and data processing protocols (e.g., what normalisation method has been used to obtain the final processed data)

For more details, see MIAME 2.0.


BioSample Human
* Sample Name
* Organism
* Tissue
* Sex
* Isolate
* Age
* Biomaterial Provider
Attribute
<< < 1 > >>
Name
Value
CANCEL
VALIDATE
SAVE



(1) **M4M Workshops**

Powered by CEDAR

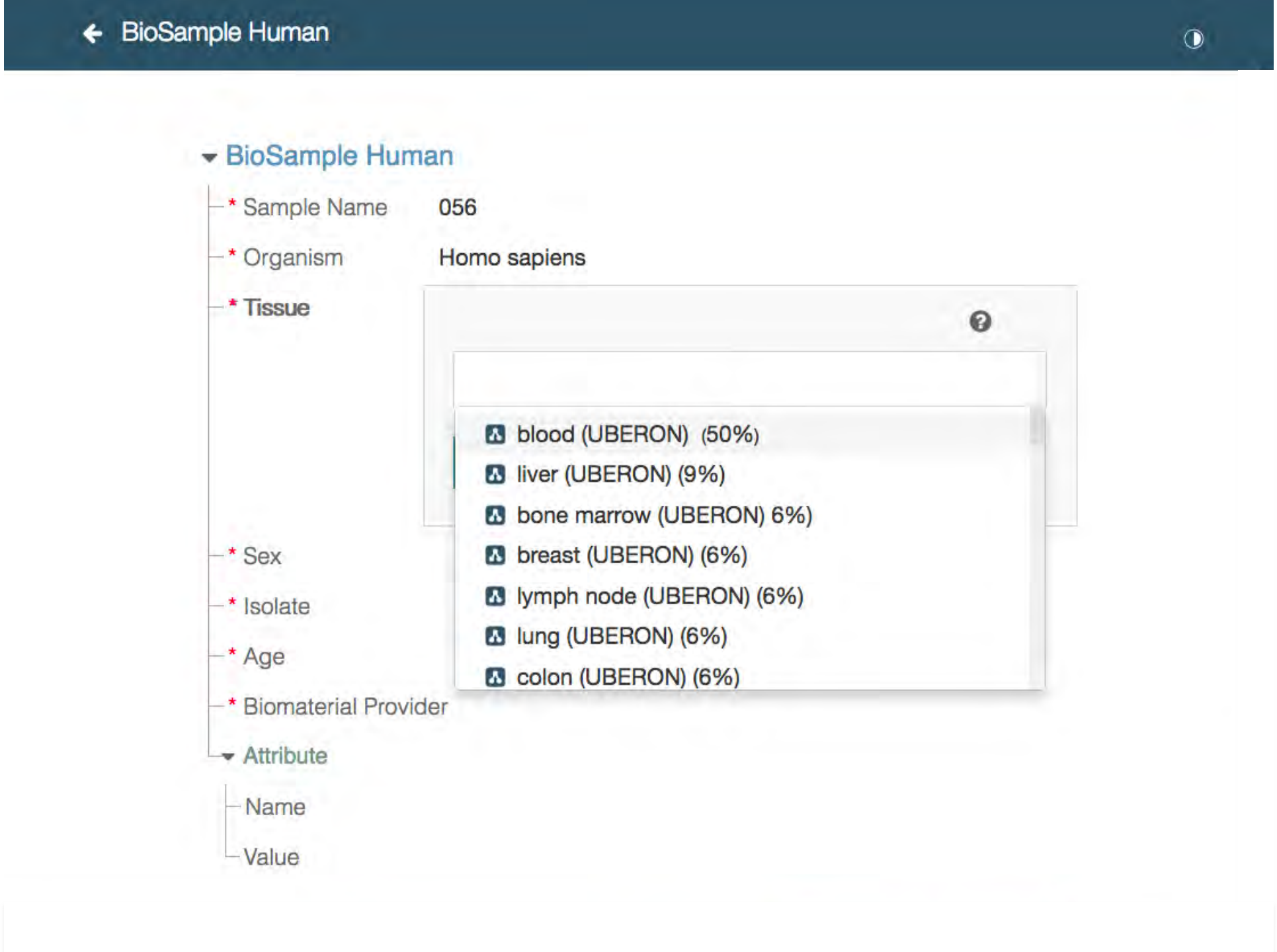
Building community-specific metadata standards

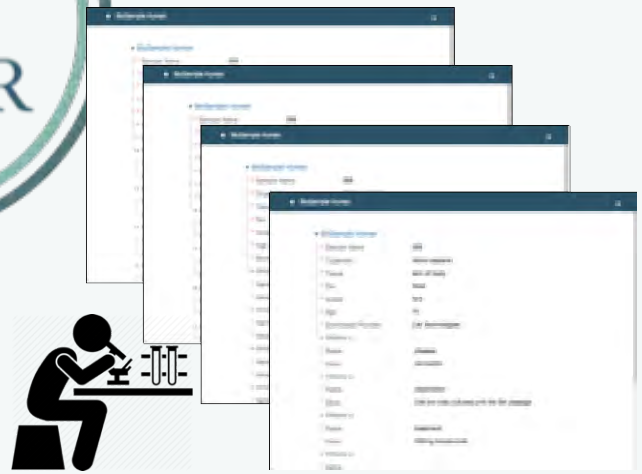
(2) **CEDAR Workbench**

Creating community-specific metadata

(3) **FAIRware Workbench**

Automating evaluation of community-specific metadata


BioSample Human
BioSample Human
* Sample Name
056
* Organism
Homo sapiens
* Tissue
blood (UBERON) (50%)
liver (UBERON) (9%)
bone marrow (UBERON) 6%)
breast (UBERON) (6%)
lymph node (UBERON) (6%)
lung (UBERON) (6%)
colon (UBERON) (6%)
* Sex
* Isolate
* Age
* Biomaterial Provider
Attribute
Name
Value



(1) **M4M Workshops**

Powered by CEDAR

Building community-specific metadata standards

(2) **CEDAR Workbench**

Creating community-specific metadata

(3) **FAIRware Workbench**

Automating evaluation of community-specific metadata

10.15468/9vuieb

1 Select Template — 2 Align Fields — 3 Repair Metadata

LIST VIEW METADATA VIEW

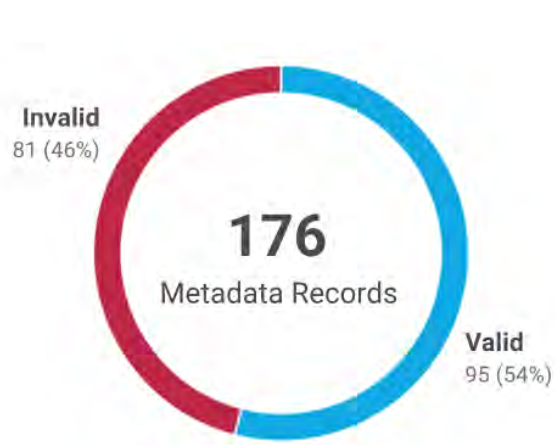
METADATA	ISSUE	SUGGESTED REPAIR	ACTION
titles			
title (1): DataCite Example			
title (2): Demonstration of DataCite Metadata			
language: eng	Invalid field value	Replace by EN-US	Accept / Decline
publicationYear: January 2014	Invalid field value	Replace by 2014	Accept / Decline
main topic: Documentation	Field name not found in template	Replace by Topic (BIBFRAME)	Accept / Decline
identifier			
identifier: 10.1234/example-full			
identifierType: DOI			

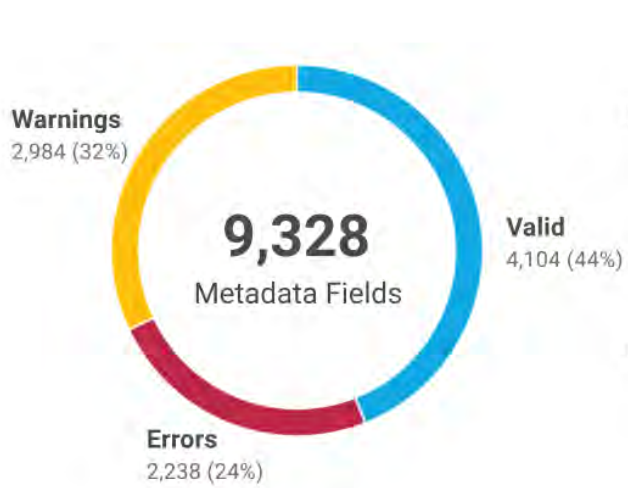
Summary report

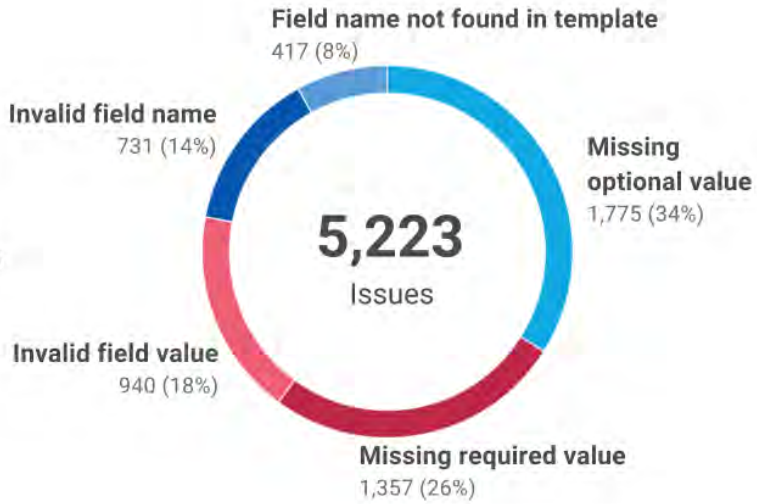
176 metadata records

Template: DataCite Metadata Schema 4.4

DOWNLOAD (PDF) DOWNLOAD (JSON)







Report per field

FIELD NAME	# RECORDS	SUMMARY REPORT (Errors / Warnings / Valid)	TOP ISSUES
creatorName	176 (100%)	63% 37%	Missing required value

Metadata for Machines Workshops

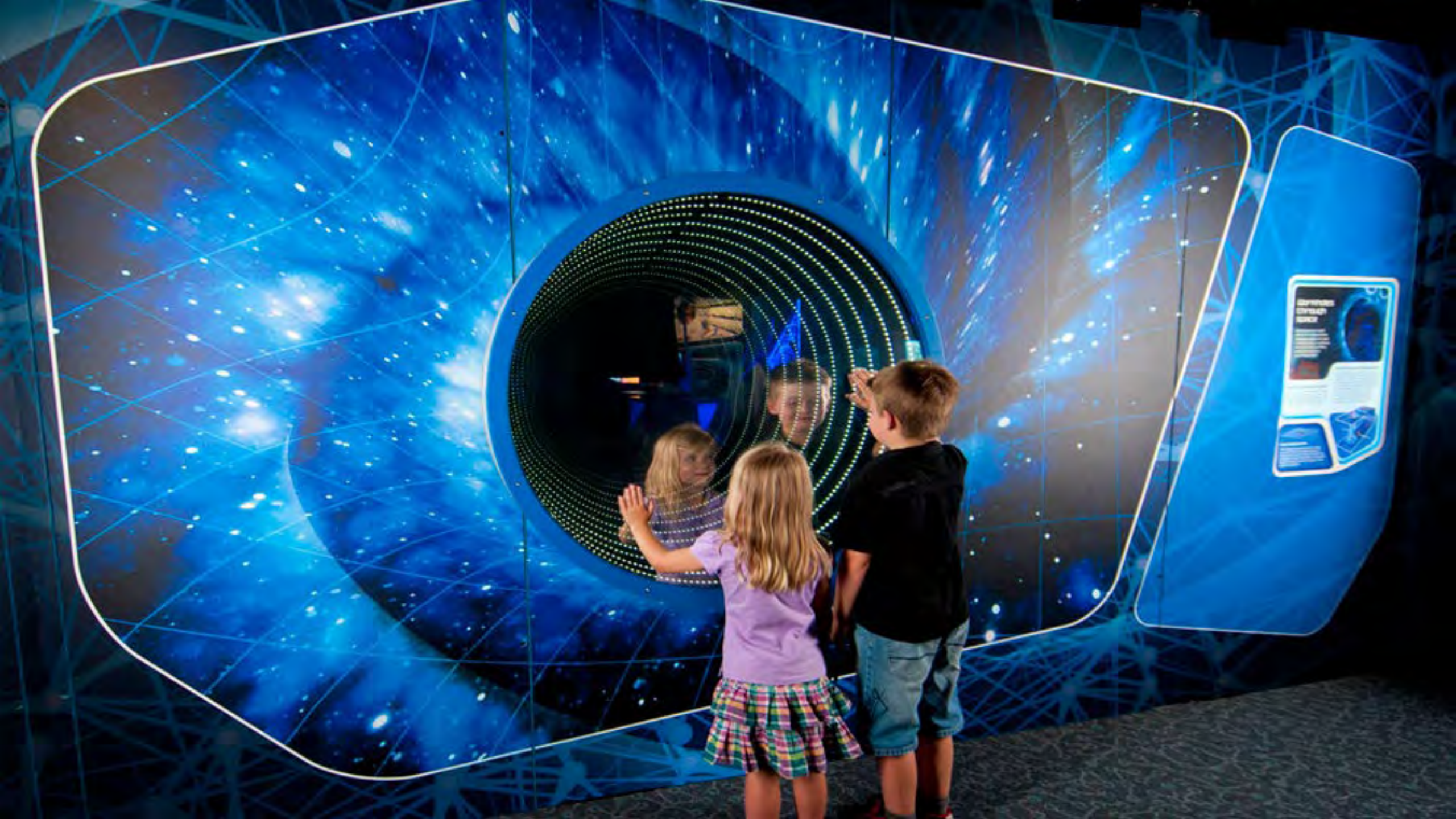
GO FAIR

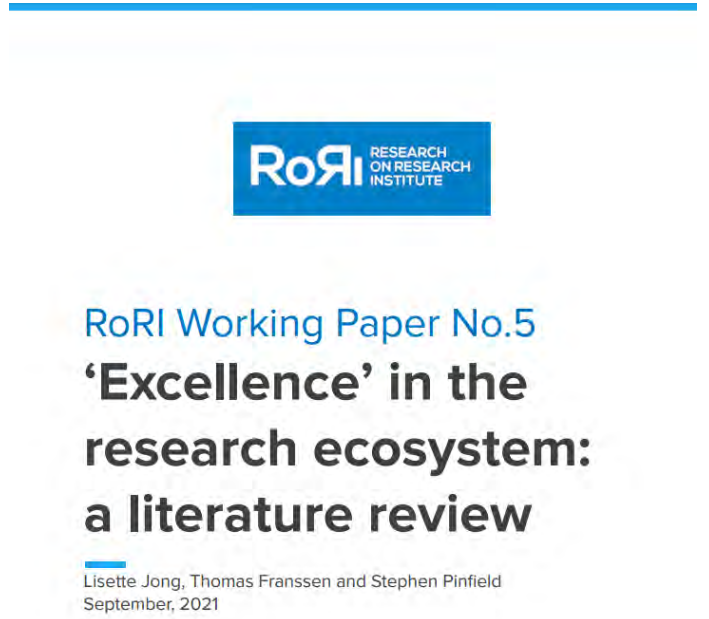
M4M

RoRI RESEARCH ON RESEARCH INSTITUTE

FORS
explore.understand.share.

Virtual Fly Brain



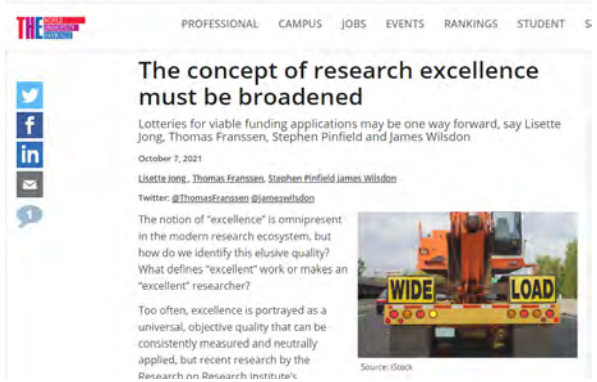


The 'Transforming Excellence' Project

Stephen Pinfield & Diego Baptista

Research team: Lisette Jong, Thomas Franssen,

& Stephen Pinfield



REF 2021 Research Excellence Framework

Rathenau Instituut

Excellence is extra-ordinary

Thirty years of focus on excellence in Dutch science policy

The ‘excellence regime’

Exzellenzinitiative


palgrave communications

We'd like to understand how you use our websites in order

Open Access | Published: 19 January 2017

"Excellence R Us": university research and the fetishisation of excellence

Samuel Moore, Cameron Neylon, Martin Paul Eve, Daniel Paul O'Donnell & Damian Pattinson


PNAS

RESEARCH ARTICLE | SOCIAL SCIENCES

The Matthew effect in science funding

Thijs Bol, Mathijs de Vaan, and Arnout van de Rijt Authors Info & Affiliations

Edited by Christopher Winship, Harvard University, Cambridge, MA, and accepted by Editorial Board Member Adrian E. Raftery March 29, 2018 (received for review November 10, 2017)

April 23, 2018 | 115 (19) 4887-4890 | https://doi.org/10.1073/pnas.1719557115

Critiques of excellence

CHAPTER
6

Research excellence is a neo-colonial agenda (and what might be done about it)

Cameron Neylon

Swiss National Science Foundation

wellcome

CIHR IRSC Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

Australian Government
Australian Research Council

The challenge for funders

FWF Der Wissenschaftsfonds.

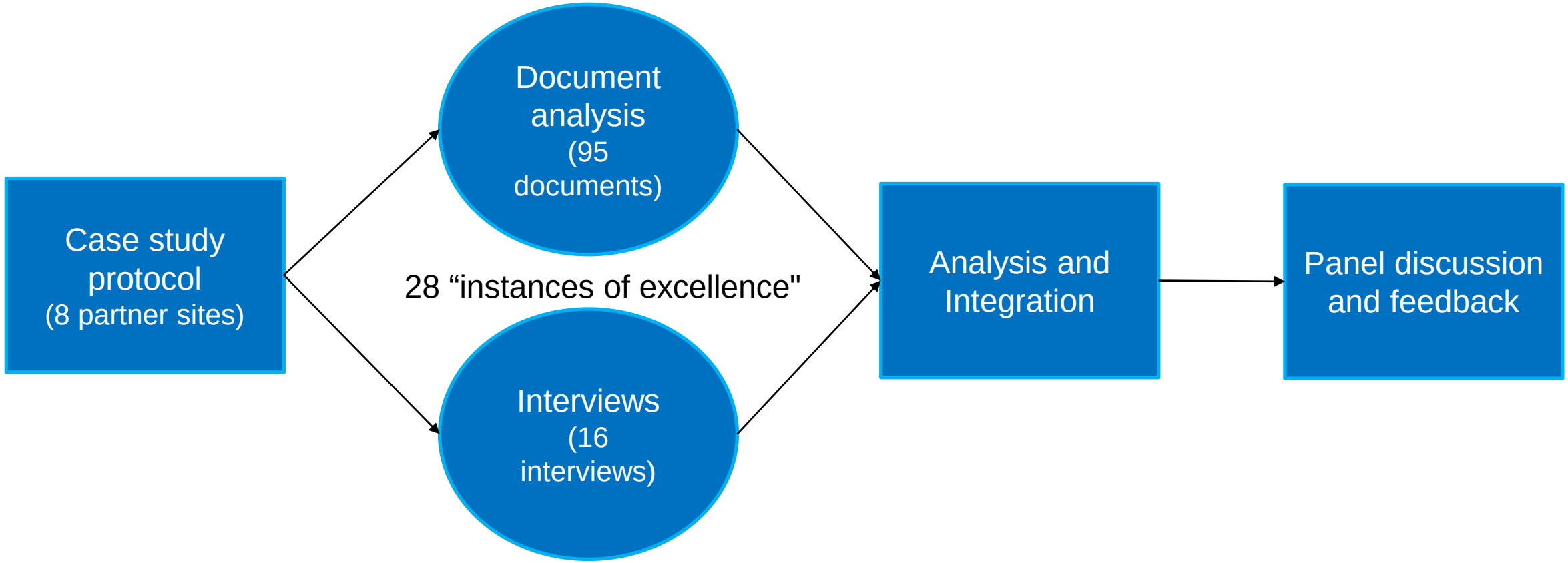
FONDAZIONE Telethon

Case study partners

Michael Smith Health Research BC

EMBO

Empirical qualitative co-produced research: Case studies of funders



Varieties of ‘excellence’

	Statutes or legal act	Mission & strategic statements	Grant programs, guidelines & scoring systems	Research evaluation	Knowledge transfer	New excellence related frameworks	Other
Australian Research Council			✓	✓			
Austrian Science Fund (FWF)			✓			✓	✓
Canadian Institutes of Health Research	✓	✓	✓				✓
Fondazione Telethon	✓	✓	✓	✓	✓		
EMBO	✓		✓				
Michael Smith Health Research BC		✓	✓	✓	✓		✓
Swiss National Science Foundation	✓		✓			✓	✓
Wellcome Trust						✓	✓

From ‘matter of fact’ to ‘matter of concern’

Cumulative advantage and homogeneity

Equity, diversity and inclusion

Expertise and mission

Patching

Pluralizing

Transforming

Patching

DORA

long lists of publications

Pluralizing

Narrative-style format:

- Generation of knowledge
- Development of others
- Contributions to field

RESEARCH ON RESEARCH INSTITUTE

Experiment, translate & transform:

RoRI Phase 2 prospectus

James Wilsdon, RoRI Phase 2 launch, 20 June 2022
@RoRInstitute @jameswilsdon

RoRI is a partnership initiative

The Wellcome Trust, Digital Science and the Universities of Sheffield and Leiden have joined forces to create RoRI

RoRI launches to enable more strategic, open, diverse, and inclusive research

We're thrilled to announce the launch of the Research on Research Institute (RoRI) – an international consortium of research funders, academic institutions, and technologists working to champion the latest approaches to research on research.

Co-founded by the Wellcome Trust, the universities of Sheffield and Leiden, and Digital Science, the RoRI consortium will undertake transformative and translational research on research (also known as meta-research, science of science or meta-science). By analysing research systems and experimenting with decision and evaluation data, tools

nature
International journal of science

Subscribe

EDITORIAL · 01 OCTOBER 2019

A kinder research culture is possible

Wellcome is right to call out hyper-competitiveness in research and question the focus on excellence. But other funders must follow its move.

The focus on excellence in research can contribute to a negative working culture. Credit: James Brittain/ViewPictures/UIG/Getty

Wellcome's director Jeremy Farrar didn't hold back. "The emphasis on excellence in the research system is stifling diverse thinking and positive behaviours," he wrote in a blog post last month. "The relentless drive for research excellence has created a culture in modern science that cares exclusively about what is achieved and not about how it is achieved." These are strong words, not least because Farrar acknowledges that the UK biomedical funding charity that he leads helped to create such a focus on excellence.

Wellcome is not alone — excellence is everywhere. Germany plans to spend €533 million (US$581 million) a year on its Excellence Strategy. In the United Kingdom, £2 billion (US$2.5 billion) of public funding is allocated annually to universities through a suite of funds that support "excellence wherever it is found". Australia's research-evaluation system is called Excellence in Research for Australia. Worldwide, research facilities are being named centres of excellence, and excellence is scattered generously in the pages of universities' strategic plans.

PDF version

RELATED ARTICLES

Some hard numbers on science's leadership problems

Science needs to redefine excellence

"Excellence R Us": university research and the fetishisation of excellence

SUBJECTS

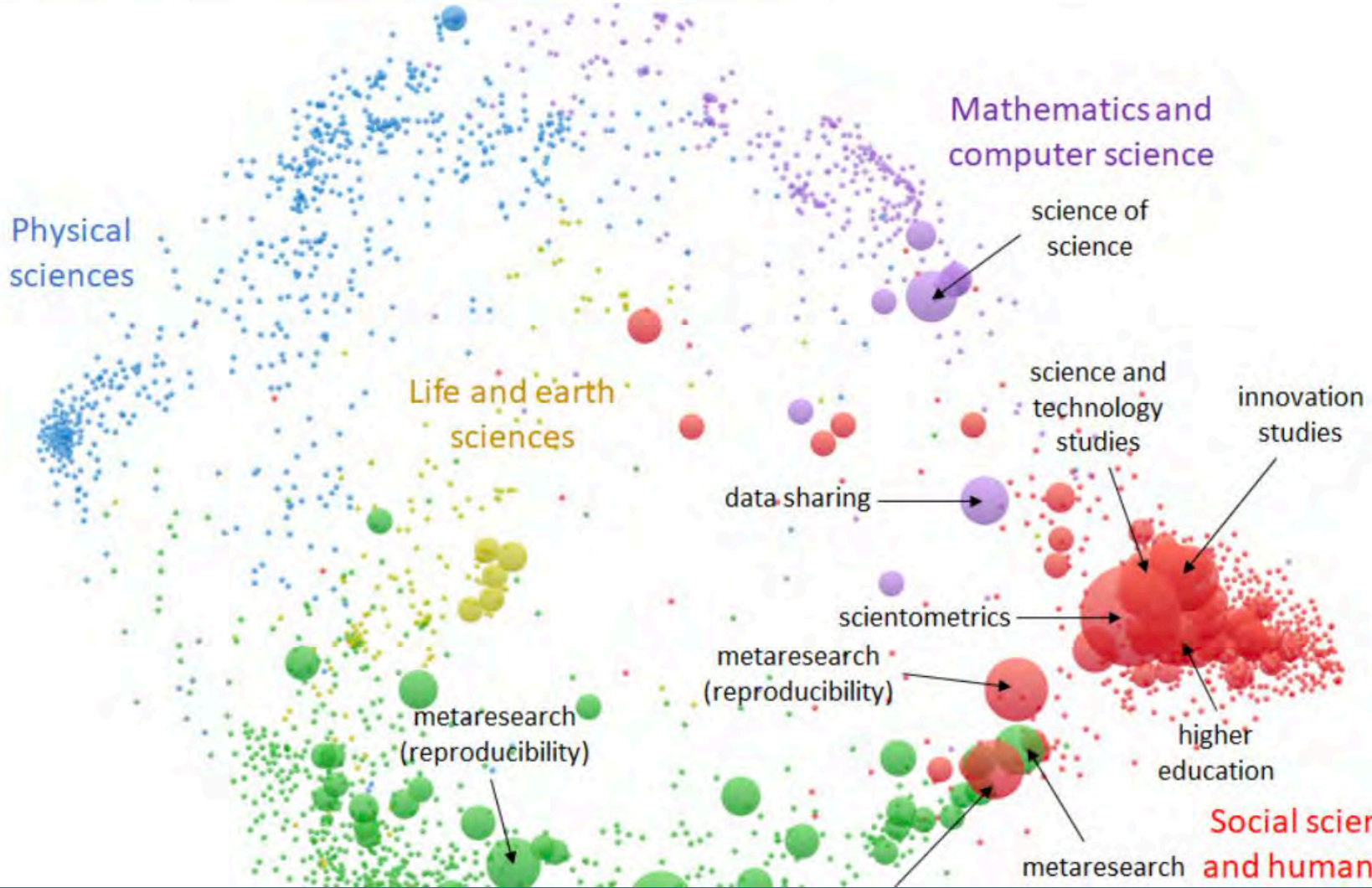
Culture Funding Research data Research management

"Wellcome and its partners in RoRI should be commended for taking an important first step. They have recognized that there are problems in research culture and that these need to be fixed. RoRI will help to probe some of the causes of distress, and suggest solutions. Now, other funders and research-management societies must join the mission…"

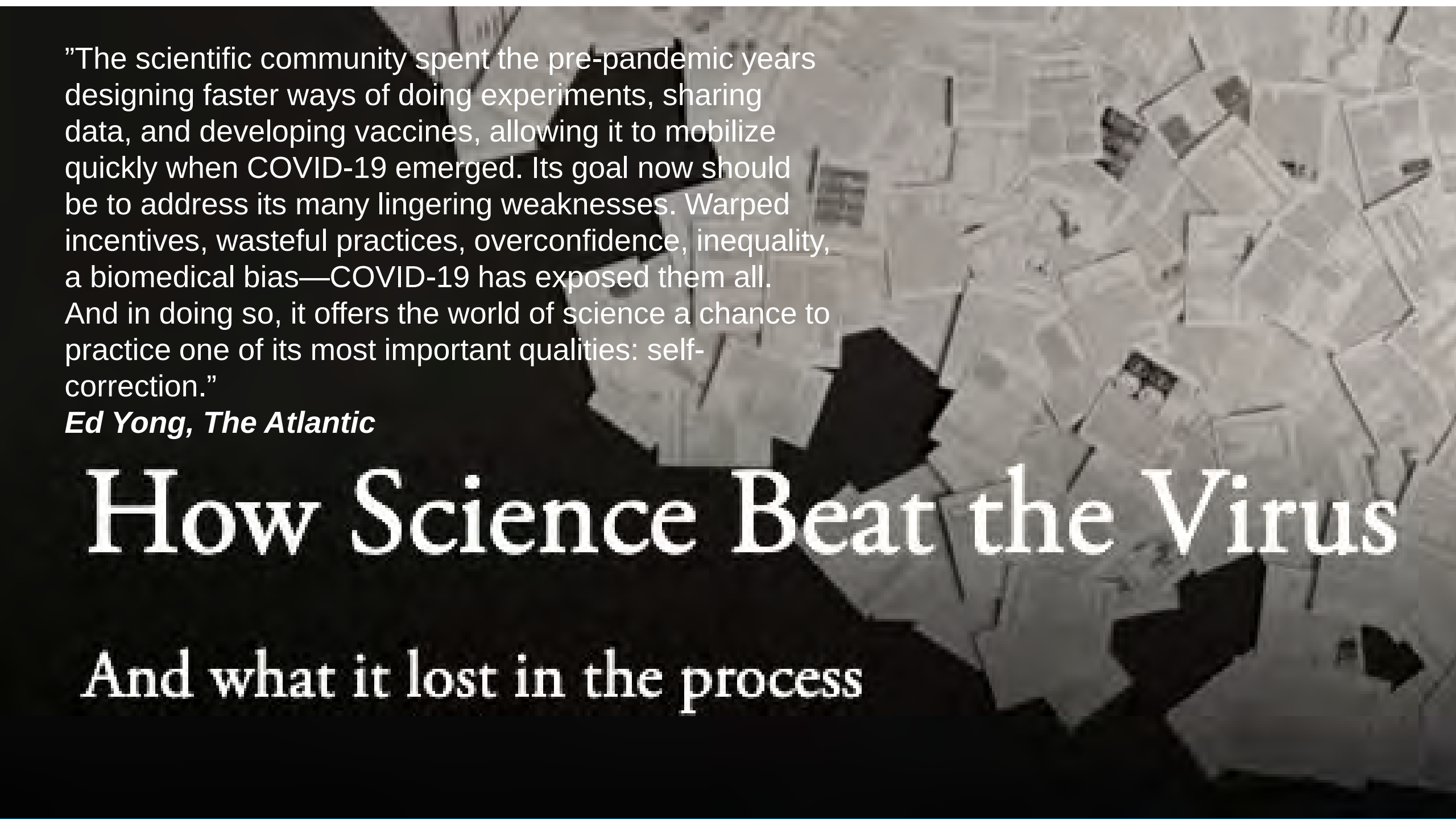
Nature editorial, 1 October 2019


The African Academy of Sciences
CIHR IRSC
Canadian Institutes of Health Research
Instituts de recherche en santé du Canada
DIGITAL science
FONDAZIONE
Telethon
The Research Council of Norway
FNSNF
Fonds national suisse
Schweizerischer Nationalfonds
Fondo nazionale svizzero
Swiss National Science Foundation
ALFRED P. SLOAN FOUNDATION
The University Of Sheffield.
Chan Zuckerberg Initiative
hhmi
Howard Hughes Medical Institute
wellcome
Australian Government
Australian Research Council
novo nordisk fonden
IndiaAlliance
DBT wellcome
NIHR
National Institute for Health Research
VolkswagenStiftung
FWF
Der Wissenschaftsfonds.
CWTS
Meaningful metrics
EMBO
MICHAEL SMITH FOUNDATION FOR HEALTH RESEARCH
BC's health research funding agency
UKRI
UK Research and Innovation

At its heart, research on research is about ensuring that we have the evidence we need to realise the full potential of research. It's about using robust methods to test interventions, and to generate and analyse data about the inner workings of the research system, and the impacts that research has in and on society.



Analysis by RoRI of academic publications related to research on research highlight how these fields have grown and diversified over the past decade.[1]


”The scientific community spent the pre-pandemic years designing faster ways of doing experiments, sharing data, and developing vaccines, allowing it to mobilize quickly when COVID-19 emerged. Its goal now should be to address its many lingering weaknesses. Warped incentives, wasteful practices, overconfidence, inequality, a biomedical bias—COVID-19 has exposed them all. And in doing so, it offers the world of science a chance to practice one of its most important qualities: self-correction.”
Ed Yong, The Atlantic
How Science Beat the Virus
And what it lost in the process

Our five aims for the pilot phase (2020-2021)

Carter Research Navigation

RoRI RESEARCH ON RESEARCH INSTITUTE

To support and build capacity for interdisciplinary, mixed-method and translational RoR in and across research systems worldwide ***(research role)***

To connect academic RoR capabilities to the data and analytical resources of our founding and strategic partners (***translation role***)

With these partners, to experiment, coproduce and test new tools, indicators, funding modes, decision and evaluation frameworks (***innovation role***)

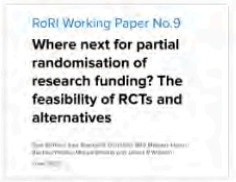
To critically evaluate RoR methods and support engagement with RoR data and evidence by decision makers and wider society (***brokerage role***)

To create an independent space for RoR learning, networking and collaboration between researchers, policymakers, funders and technologists (***facilitator role***)

Research on Research Institute: Independent Review of Pilot Phase (2019-2021)

Dr Ian Carter
Director, Carter Research Navigation Ltd
June 2022

RoRI Funder Data Platform & CRITERIA project overview
Presentation posted on 20.06.2022
Vincent Traag



Where next for partial randomisation of research funding? T…
Preprint posted on 20.06.2022
Tom Stafford

Research on Research Institute: Independent Review of Pilot Phas…
Report posted on 20.06.2022
Ian Carter

The experimental research funder's handbook (Revised …
Report posted on 20.06.2022
Sandra Bendiscioli

A checklist for funder experiments with partial randomisation
Online resource posted on 20.06.2022
Research on Research Insti…

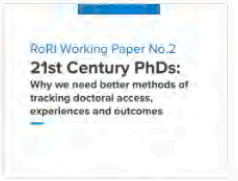
Can we fix it? Are incremental tweaks to research practices, …
Presentation posted on 25.05.2022
James Wilsdon

The pandemic veneer: COVID-19 research as a mobilisation of …
Preprint posted on 07.05.2022
Daniel Hook

Career pathways in research: the current data landscape (Ro…
Report posted on 18.04.2022
Zeynep Anli

RoRI Working Paper No. 8. Career pathways in researc…
Dataset posted on 18.04.2022
Zeynep Anli

Experiments with randomisation in research funding: …
Report posted on 18.04.2022
Helen Buckley Woods



21st Century PhDs: Why we need better methods of tracking…
Report posted on 18.04.2022
RoRI Institute

The changing role of funders in responsible research assessme…
Report posted on 18.04.2022
Stephen Curry

Home

Responsible Research Assessment – a virtual conference from the Global Research Council

November 23 - 27, 2020

Register Now →

the GRC

ited to promoting the sharing of ctices for high-quality collaboration encies worldwide. It recognises the s previous work, such as the merit review, for developing a ding of the topic of responsible nt amongst funders. With the ic putting a spotlight on the rnational collaboration in scientific ocial impact of research becoming e is now renewed urgency for gether and reconsider how research aluated. This conference presents a for research funders to come ether, learn and look to the future. engaged discussions over the

Professor Andrew Thompson

UKRI Champion for International and GRC Governing Board member

Dr. Molapo Qhobela

CEO of NRF South Africa and Chair of the GRC Governing Board

RoRI RESEARCH ON RESEARCH INSTITUTE

RoRI Working Paper No.3

The changing role of funders in responsible research assessment:

progress, obstacles and the way ahead

Stephen Curry, Sarah de Rijcke, Anna Hatch, Dorsamy (Gansen) Pillay, Inge van der Weijden and James Wilsdon

November 2020

Produced in partnership with:

GLOBAL RESEARCH COUNCIL · DORA · UKRI UK Research and Innovation · NRF National Research Foundation

RoRI RESEARCH ON RESEARCH INSTITUTE

Phase 2 structure

Core partners

12-15 research funders, universities and technology providers. Together these partners govern and sustain the core functions of RoRI.

Partnership board
Core partners (including those who are CIC members)
Strategic direction, priorities, management of funds

Sub-committees of Partnership Board
Including Audit & Finance

Executive team
Day-to-day operations and oversight of projects

RoRI research fellows
Lead individuals from within Core Partners
Dedicated time on RoRI projects

RoRI nodes / labs
Smaller nodes or labs hosted by core partners
Operating at national or regional system level

RoRI Ltd
A Community Interest Company (CIC) under UK law. Brings legal and bureaucratic simplification Holds funds. Owns, manages and preserves infrastructure and other IP. Devolves all other responsibilities to the Partnership Board.

Board of directors
Nominated from CIC members.
Light touch governance: audit, accounts

Infrastructure
Funder Data Platform, FAIRware etc

Project partners
Funders, scholarly communication platforms & publishers; researchers; tech providers.
Ad hoc project participation & support.

International advisory group
Academic, policy, funder & scholarly communication leaders. Source of informal high-level guidance and advice

Associate faculty
Leading researchers from universities and institutions worldwide who collaborate on specific RoRI projects

THE BENEFITS OF A COMMUNITY INTEREST COMPANY (CIC)

1. The CIC brand provides:

- reassurance to stakeholders, as the asset lock and community purpose are regulated
- a higher profile for social enterprises and not-for-profit companies
- a growing network and voice within the social enterprise and third sector.

2. The CIC has transparency of operation.

- An annual CIC report is placed on the public record for public scrutiny.

  The CIC report describes:
- the CIC's activities and the benefit provided to the community



Gert V Balling, Katrin Milzow and Sarah de Rijcke (Co-Chairs of RoRI)

Jon Griffiths + 5 21h

RoRI Phase 2 ideas

Thinking about themes and projects for phase 2

Experiments with evaluation

wkaltenbrunner 18d

Inventory of challenges with ths implementation of narrative CVs

Key ideas: Create an **inventory of challenges related to the implementation of narrative CVs across different funders, and develop strategies to tackle them** – e.g. inertia of established indicator-centric review practices, resistance to the narrative format by (some) reviewers, inertia of organizational culture, technical difficulties, effects of disciplinary culture on use etc.

Infrastructures & Data Sharing

Helen Buckley Woods 7d

Research on Research on Research: a meta RoRI case study

Key idea(s): What can we learn from our uncommon modes of working as a large scale multi-stakeholder research consortium that will add to knowledge on practice/research co-produced projects? Considering different vectors of engagement, what lessons have we learned about bringing different knowledge types together, conducting co-produced

Research Priorities & Portfolios

Jon Griffiths 2mo

Engaging the citizen. The impact of crowd knowledge on science

Key idea(s): A research study funded by a Marie Curie grant, led by Cindy Lopez-Bento (Head of Science of Science at FNR and Professor at the University of Leuven). 'The project...aims to increase the understanding we have of crowd science. [...an approach that allows a wide base of (non-scientific) volunteers to participate in research projects.] The project will, for example, use

Impacts, Indicators & Culture Change

Jon Griffiths 2mo

The productivity and public value of research

Key idea(s): Over the last decade we have seen a tendency to connect more directly the setting of research agendas with the attainment of socio-economic goals through devices such as "grand challenges" and "mission driven research". At the same time, there are some indications that

About

Jon Griffiths 2mo

About this board

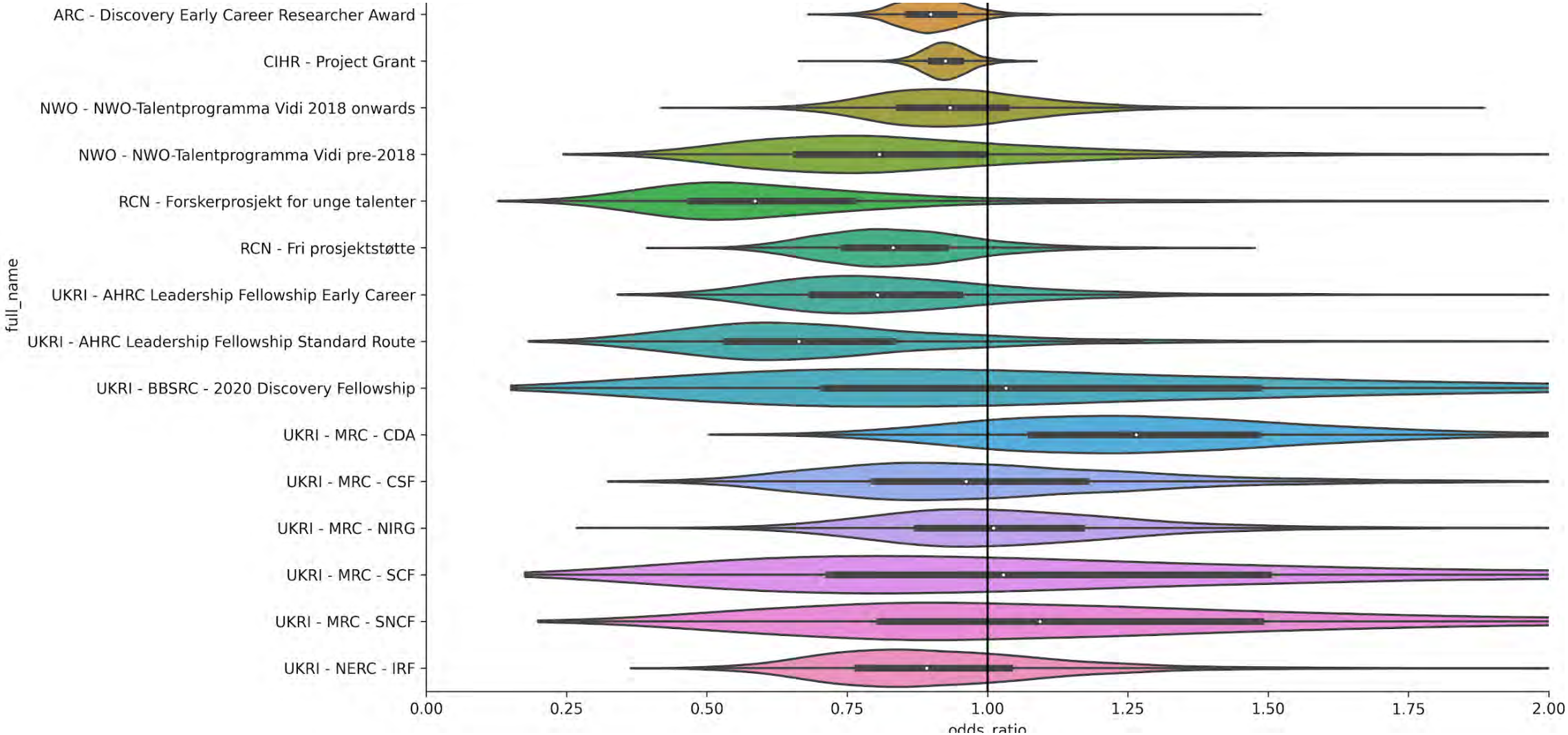
RoRI RESEARCH ON RESEARCH INSTITUTE

Please comment and vote on the cards, as well as adding your own ideas.

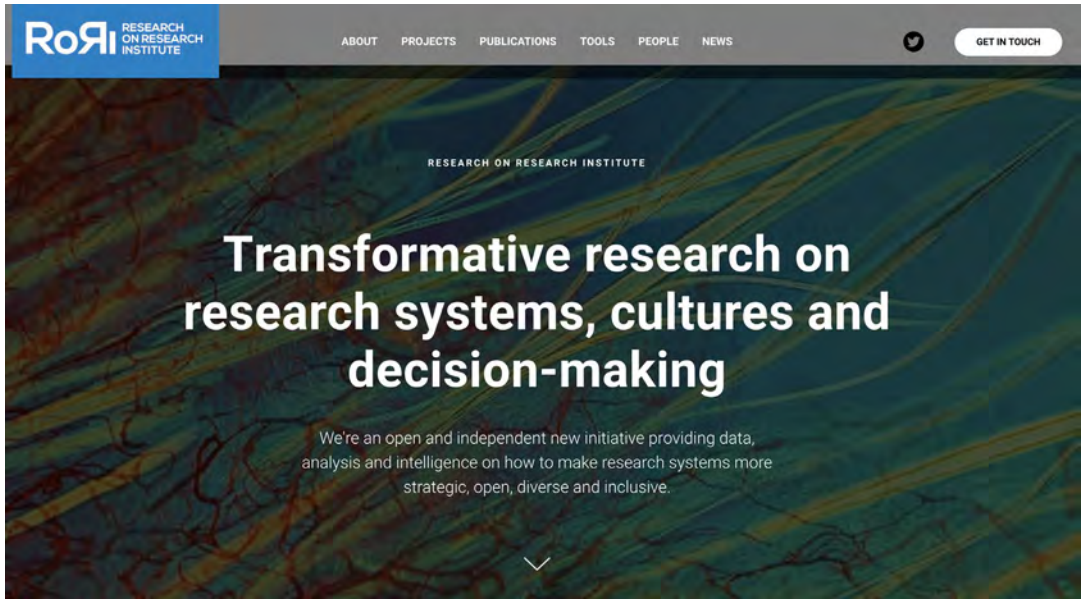
Colour coding:
Orange: Continuation and development of phase 1 projects
Purple: Ideas from pilot phase long-list
White: New ideas
Blue: Infrastructure, networks and capacity-building

0 0 0

Add comment


ARC - Discovery Early Career Researcher Award
CIHR - Project Grant
NWO - NWO-Talentprogramma Vidi 2018 onwards
NWO - NWO-Talentprogramma Vidi pre-2018
RCN - Forskerprosjekt for unge talenter
RCN - Fri prosjektstøtte
UKRI - AHRC Leadership Fellowship Early Career
UKRI - AHRC Leadership Fellowship Standard Route
UKRI - BBSRC - 2020 Discovery Fellowship
UKRI - MRC - CDA
UKRI - MRC - CSF
UKRI - MRC - NIRG
UKRI - MRC - SCF
UKRI - MRC - SNCF
UKRI - NERC - IRF
full_name
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
odds_ratio

Join us…



http://researchonresearch.org

@RoRInstitute