Por uma Rede Portuguesa de Reprodutibilidade Científica

RN PT Portuguese Reproducibility Network

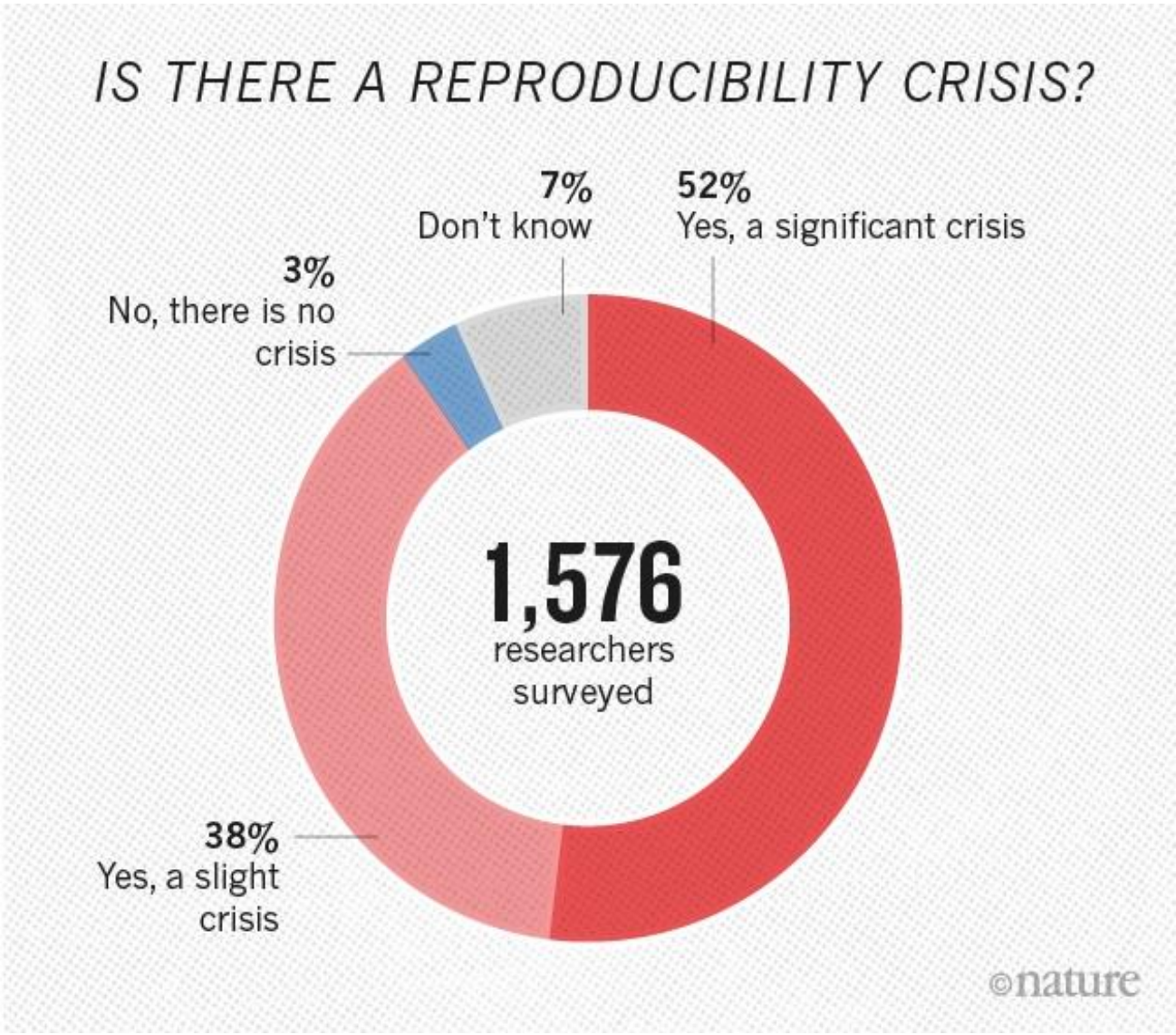
Susana Magalhães, i3s, Universidade do Porto

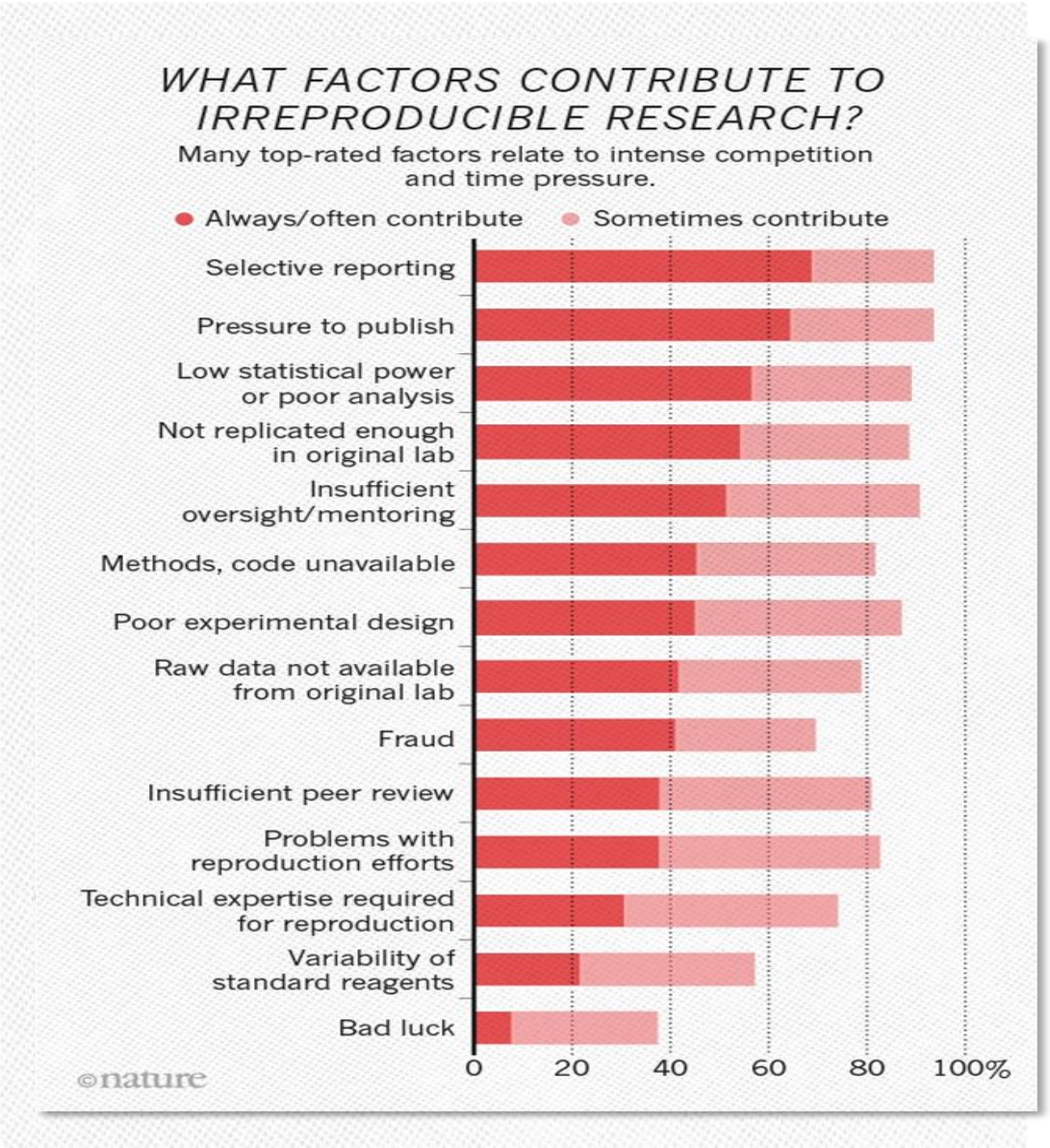
Alessandra S. Souza, FPCEUP, Universidade do Porto

Maria Alexandra Ribeiro, Nova Medical School

Pedro Príncipe, Universidade do Minho

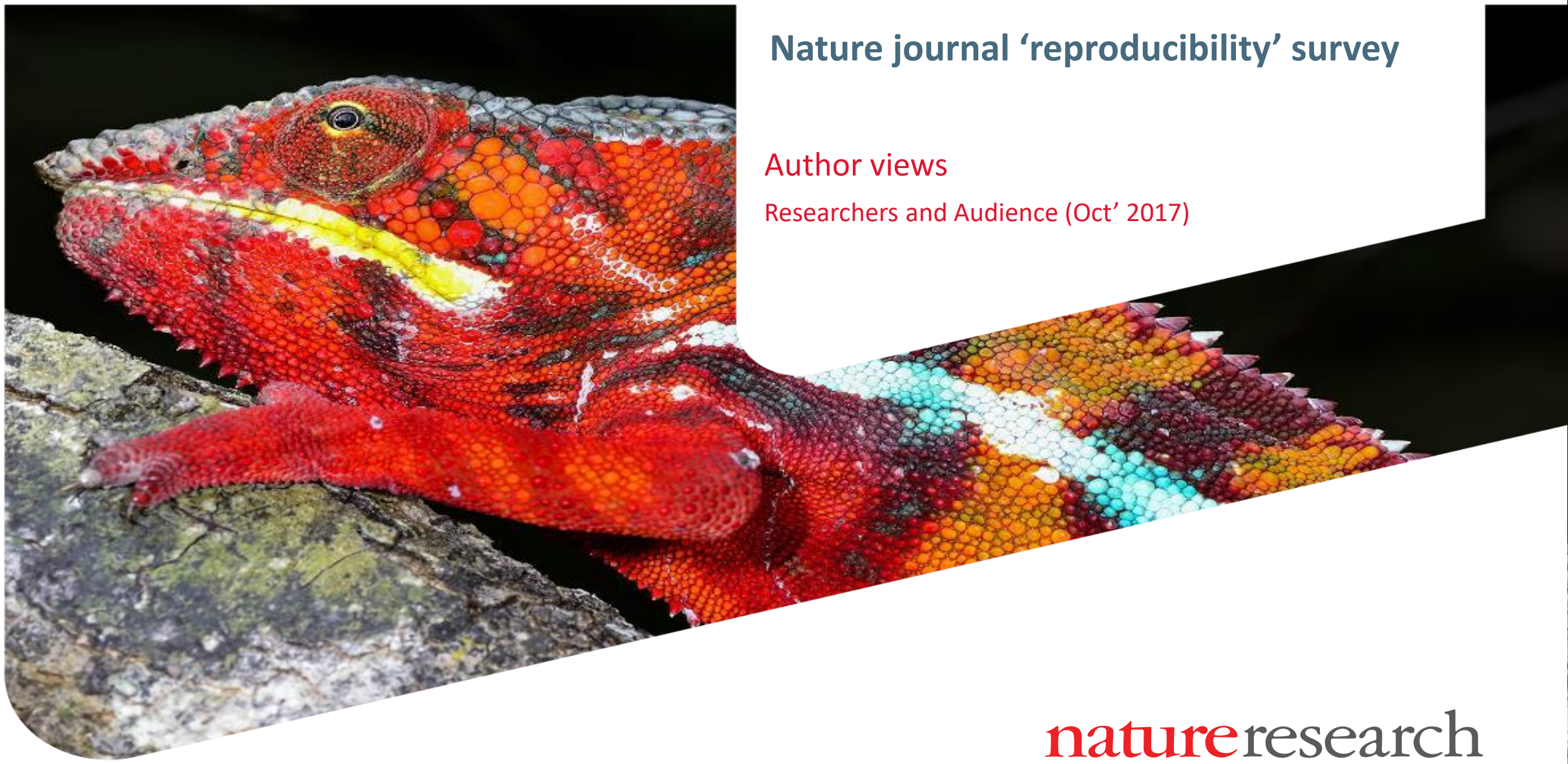
8° Forum GDI – 25-26. November 2021





Baker, M. (**2016**). 1,500 Scientists Lift the Lid on Reproducibility. *Nature* 533 (7604): 452-54. https://doi.org/10.1038/533452a.

SPRINGER NATURE



How chameleons change colour

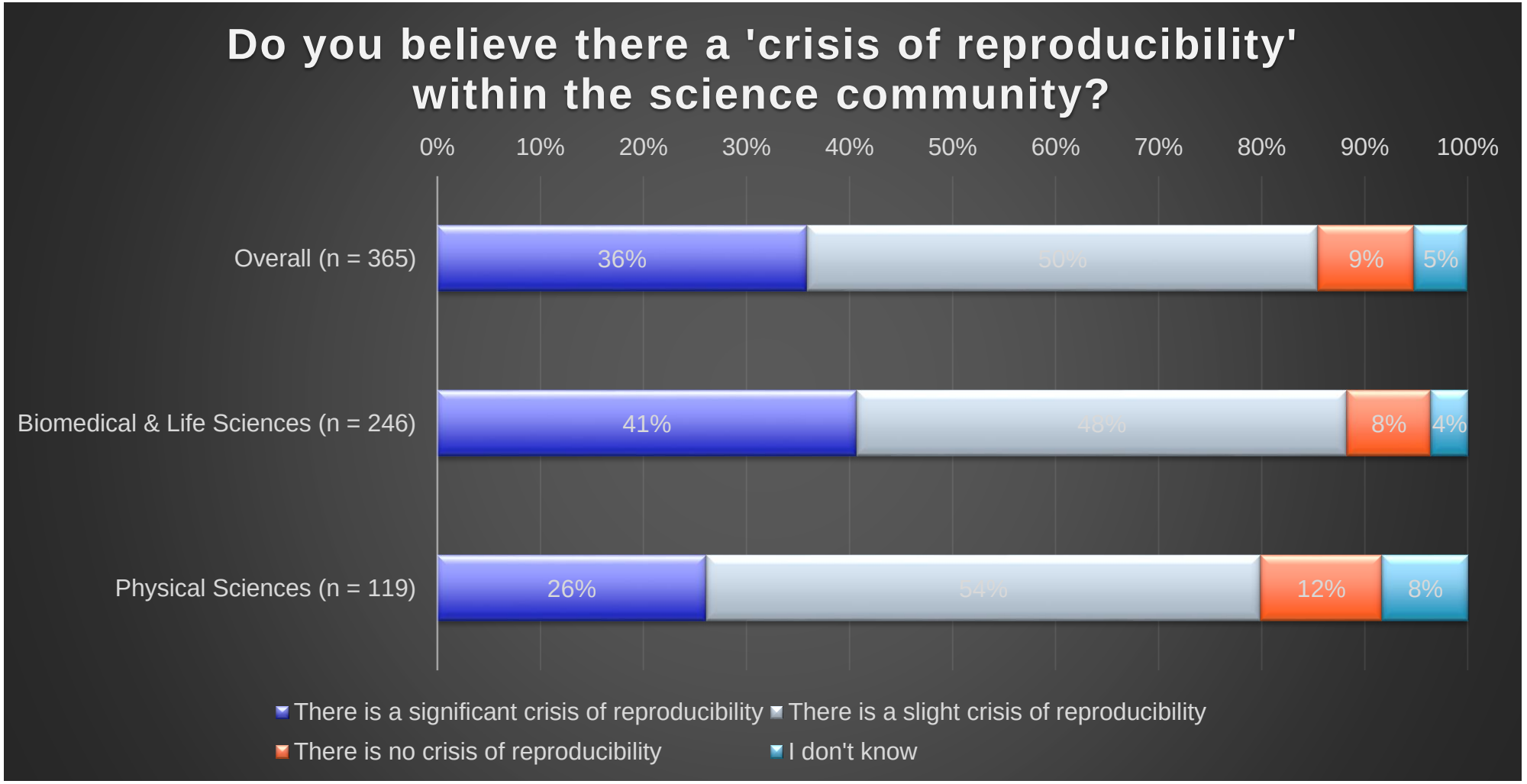
Nature journal ‘reproducibility’ survey

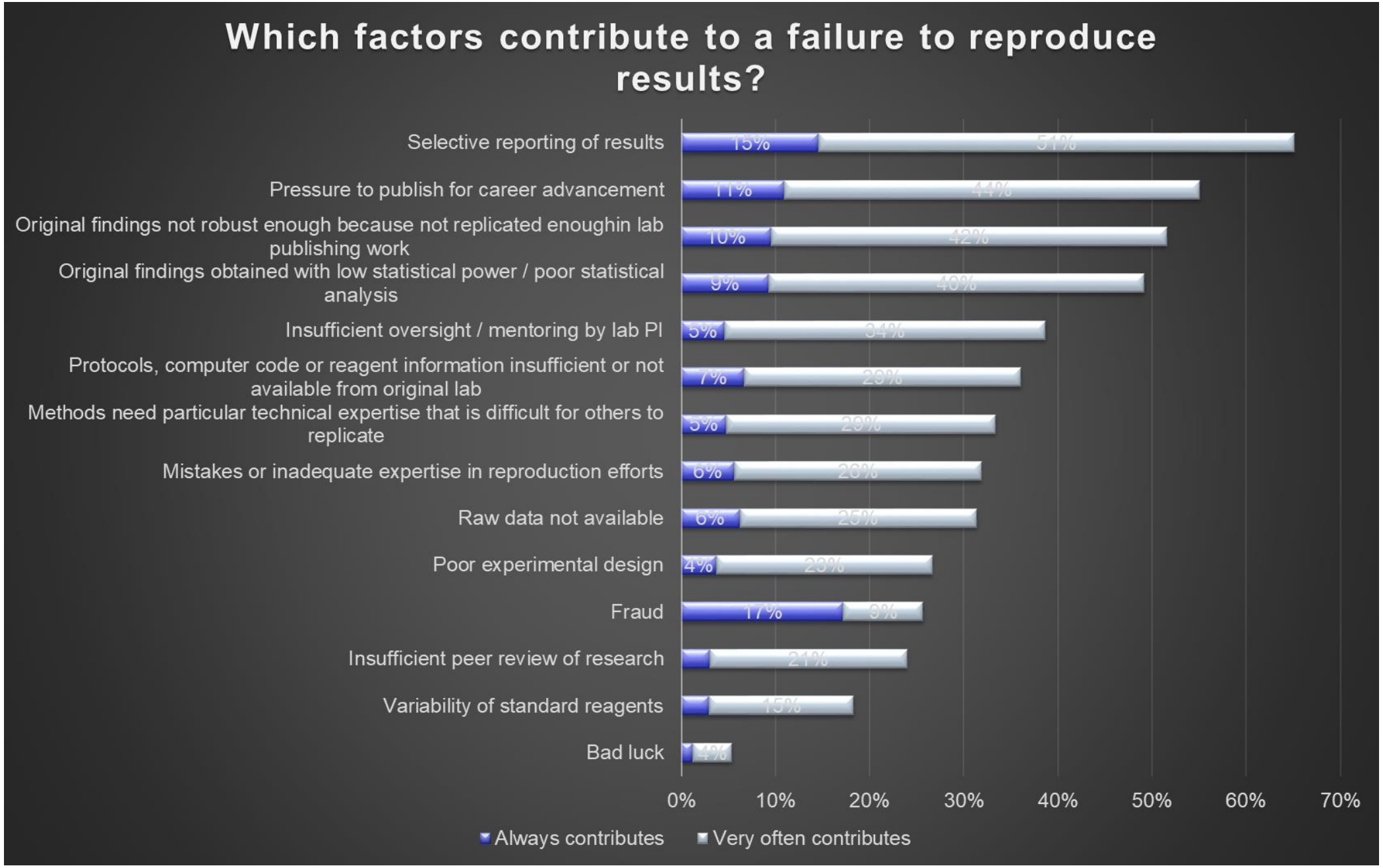
Author views

Researchers and Audience (Oct’ 2017)

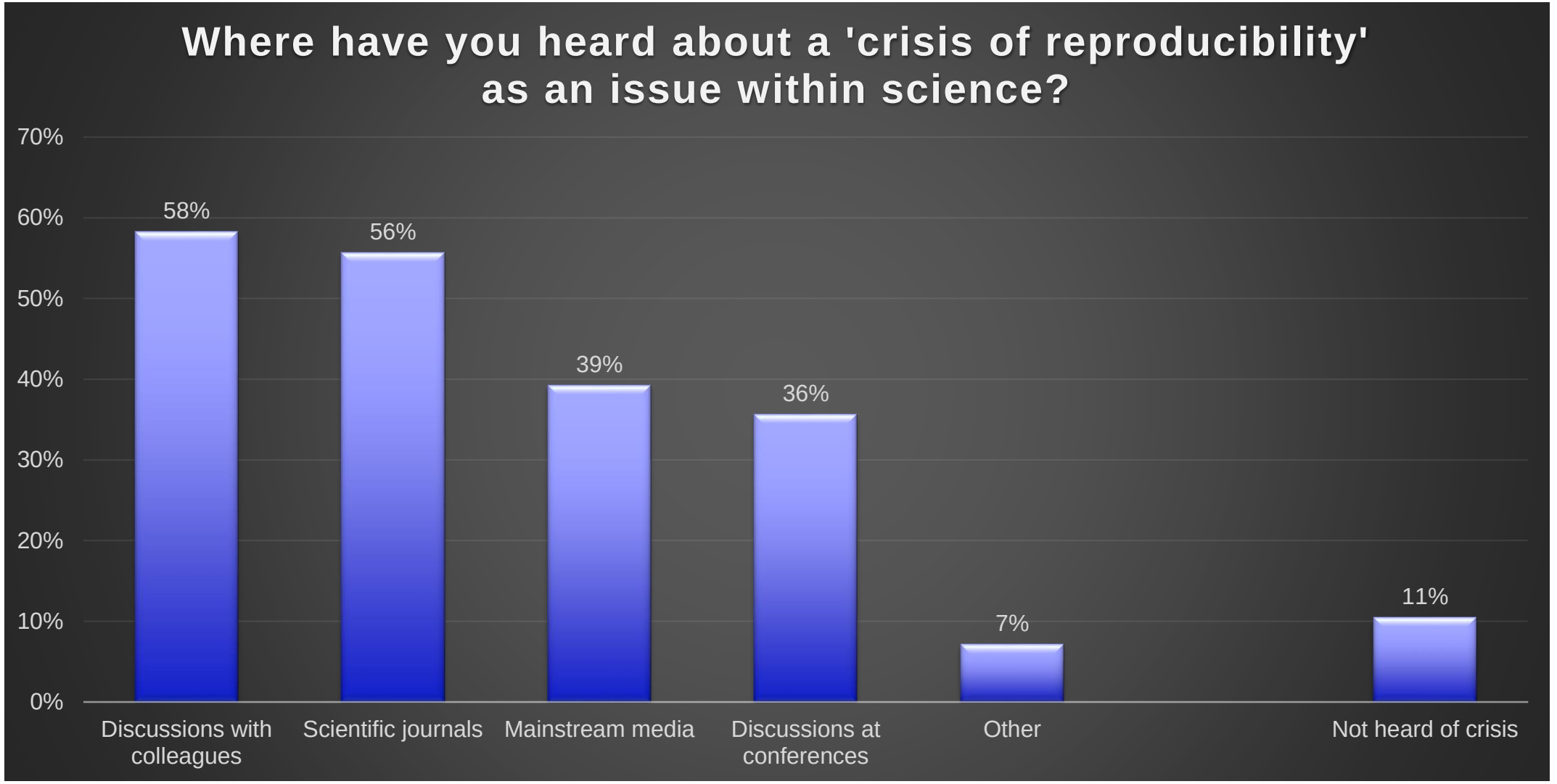
nature research

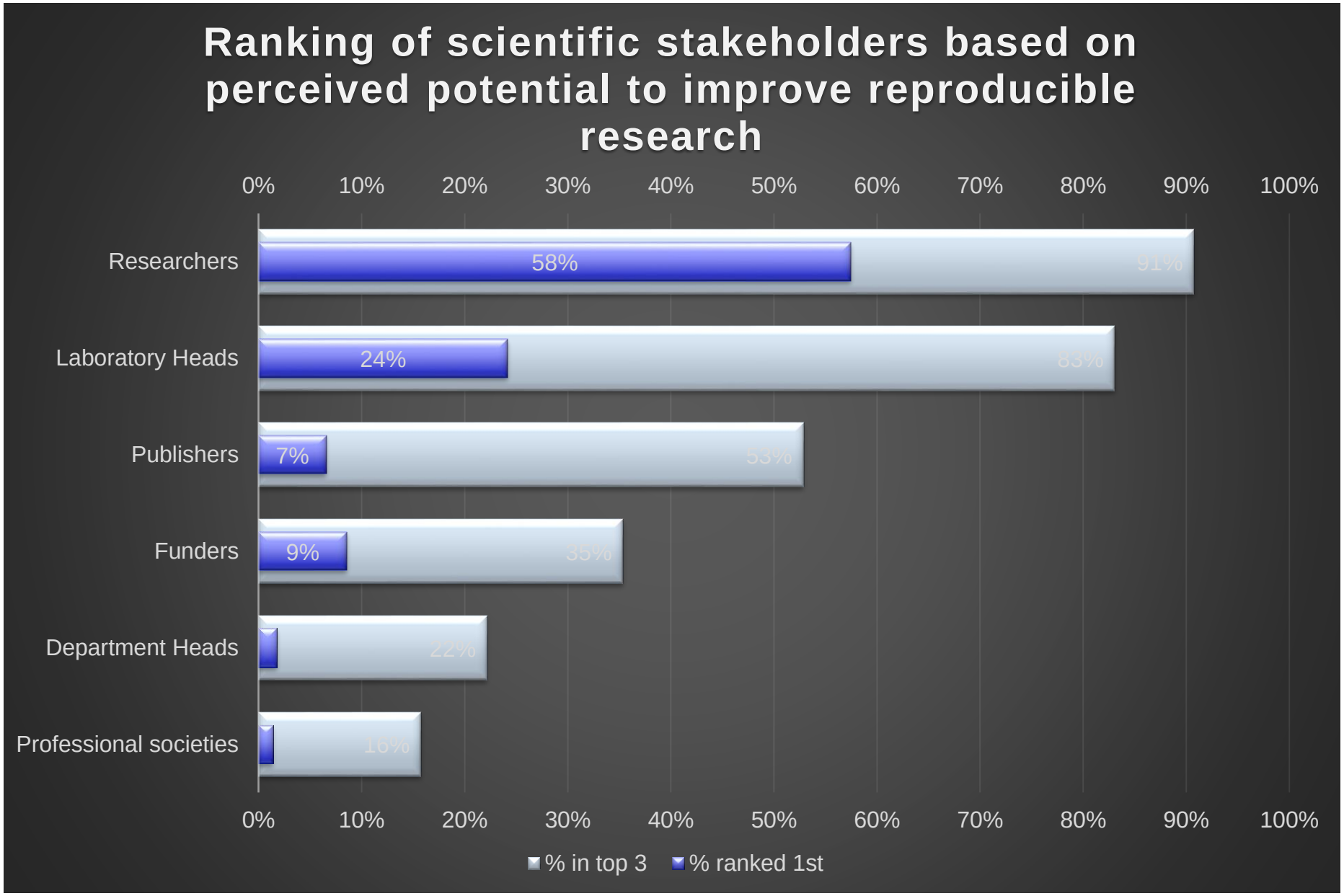
Crisis of Reproducibility: Nature Reproducibility Efforts (Oct. 2017)



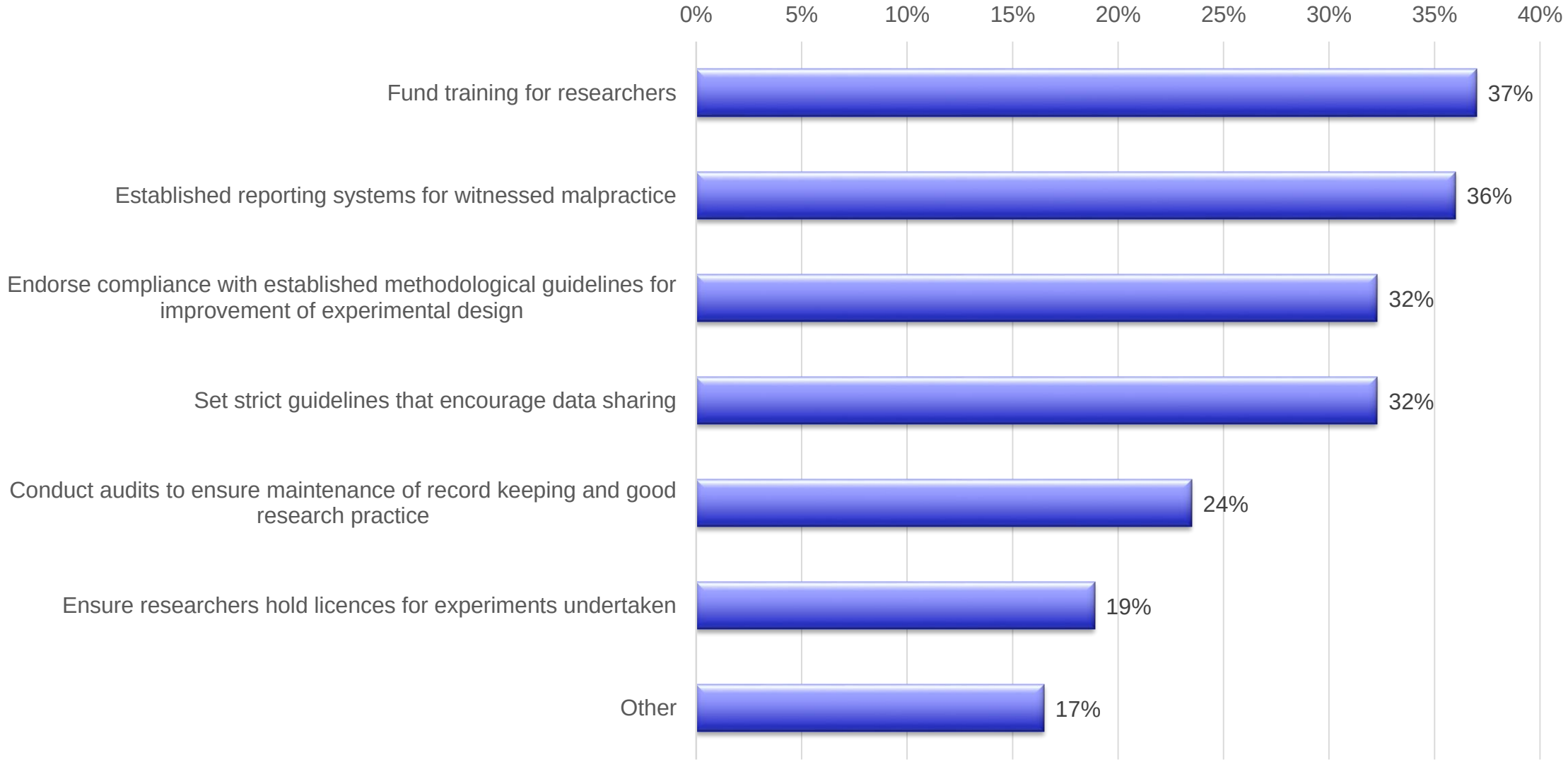

Which factors contribute to a failure to reproduce results?
Selective reporting of results
15%
51%
Pressure to publish for career advancement
11%
44%
Original findings not robust enough because not replicated enoughin lab publishing work
10%
42%
Original findings obtained with low statistical power / poor statistical analysis
9%
40%
Insufficient oversight / mentoring by lab PI
5%
34%
Protocols, computer code or reagent information insufficient or not available from original lab
7%
29%
Methods need particular technical expertise that is difficult for others to replicate
5%
29%
Mistakes or inadequate expertise in reproduction efforts
6%
28%
Raw data not available
6%
25%
Poor experimental design
4%
23%
Fraud
17%
9%
Insufficient peer review of research
21%
Variability of standard reagents
15%
Bad luck
4%
0%
10%
20%
30%
40%
50%
60%
70%
Always contributes
Very often contributes

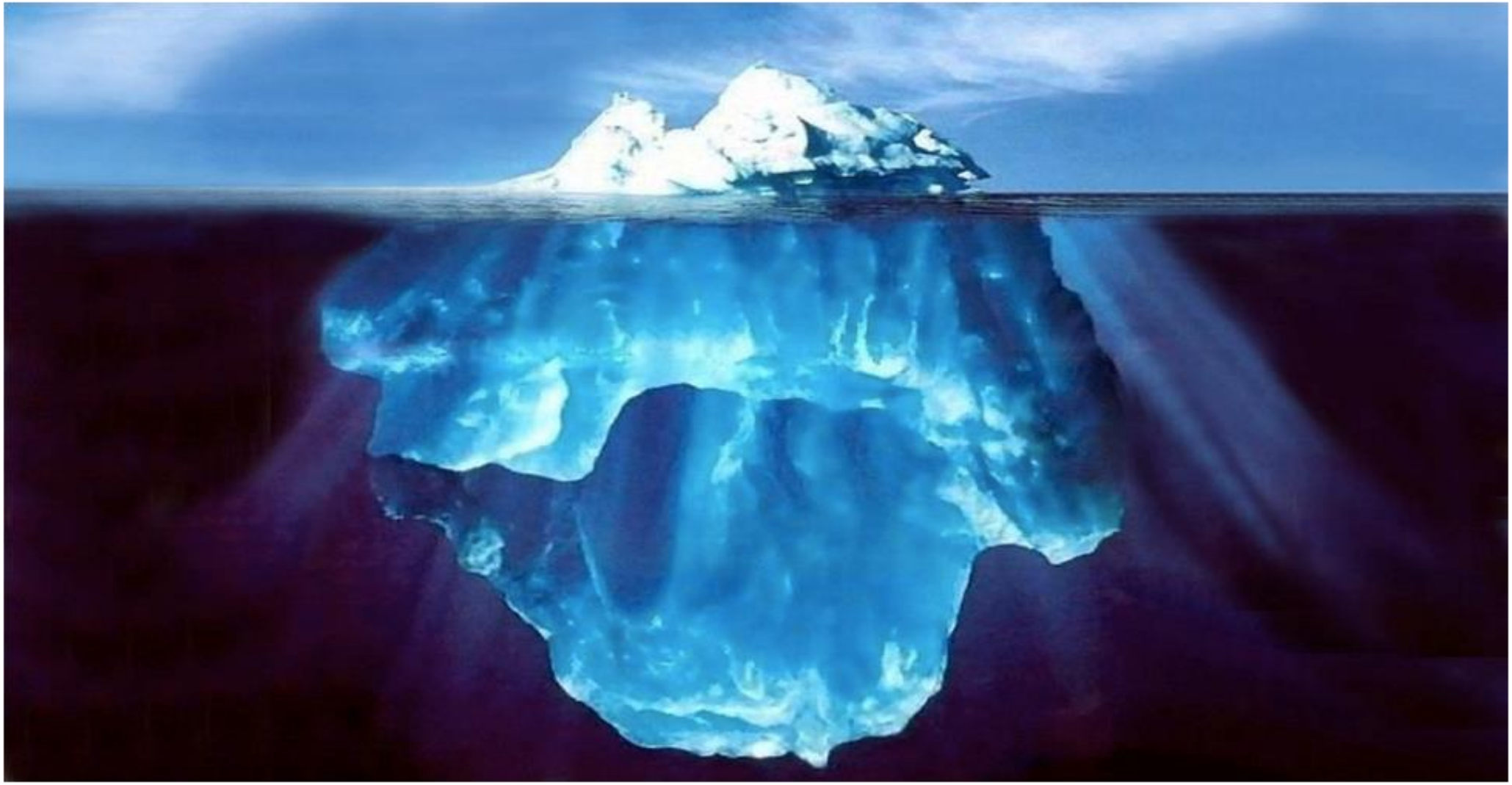
Where is reproducibility being discussed?

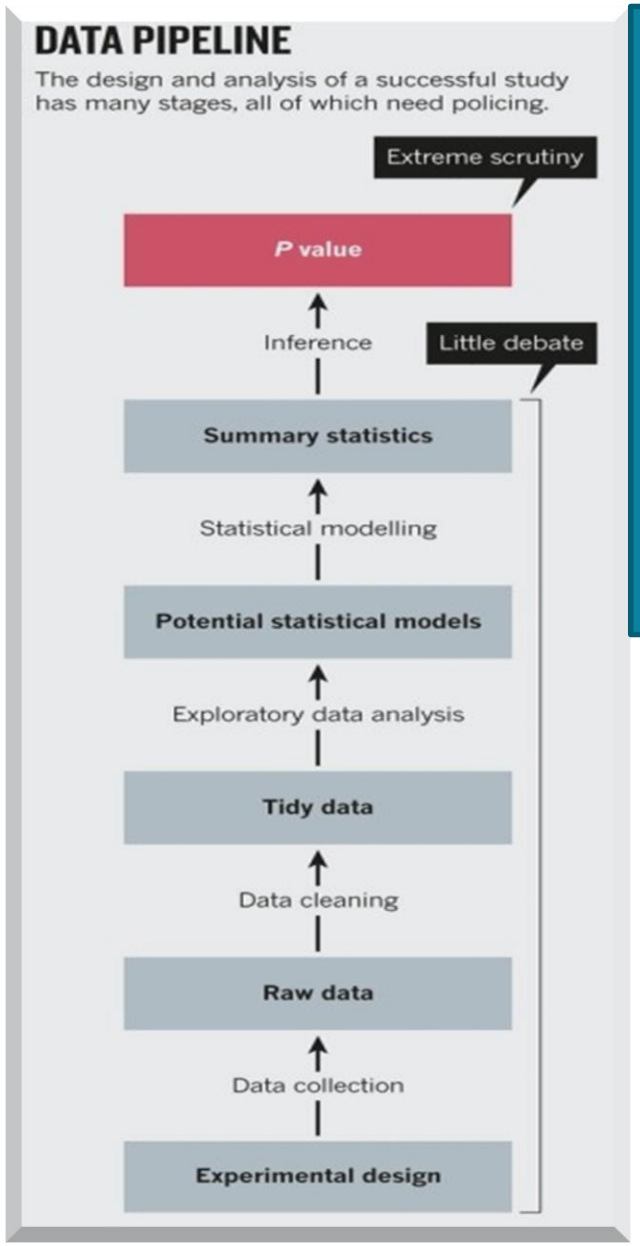



Ranking of scientific stakeholders based on perceived potential to improve reproducible research
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Researchers
58%
91%
Laboratory Heads
24%
83%
Publishers
7%
53%
Funders
9%
35%
Department Heads
22%
Professional societies
16%
% in top 3
% ranked 1st

Which, if any, of the actions listed have you found research institutions undertaking to improve reproducibility?







O Papel das instituições: clima ético e formação em ética e integridade da investigação

Better education is a start. Just as anyone who does DNA sequencing or remote-sensing has to be trained to use a machine, so too anyone who analyses data must be trained in the relevant software and concepts. Even investigators who supervise data analysis should be required by their funding agencies and institutions to complete training in understanding the outputs and potential problems with an analysis."

Leek, J., Peng, R. Statistics: *P* values are just the tip of the iceberg. *Nature* **520,** 612 (2015). https://doi.org/10.1038/520612a

NAOMI A. P. STARK

No reproducibility without preproducibility

Instead of arguing about whether results hold up, let's push to provide enough information for others to repeat the experiments, says **Philip Stark**.

From time to time over the past few years, I've politely refused requests to referee an article on the grounds that it lacks enough information for me to check the work. This can be a hard thing to explain.

Our lack of a precise vocabulary — in particular the fact that we don't have a word for 'you didn't tell me what you did in sufficient detail for me to check it' — contributes to the crisis of scientific reproducibility. In computational science, 'reproducible' often means that enough information is provided to allow a dedicated reader to repeat the calculations in the paper for herself. In biomedical disciplines, 'reproducible' often means that a different lab, starting the experiment from scratch, would get roughly the same experimental result.

In 1992, philosopher Karl Popper wrote: "Science may be described as the art of systematic oversimplification — the art of discerning what we may with advantage omit." What may

or analysis is preproducible if it has been described in adequate detail for others to undertake it. Preproducibility is a prerequisite for reproducibility, and the idea makes sense across disciplines.

The distinction between a preproducible scientific report and current common practice is like the difference between a partial list of ingredients and a recipe. To bake a good loaf of bread, it isn't enough to know that it contains flour. It isn't even enough to know that it contains flour, water, salt and yeast. The brand of flour might be omitted from the recipe with advantage, as might the day of the week on which the loaf was baked. But the ratio of ingredients, the operations, their timing and the temperature of the oven cannot.

Given preproducibility — a 'scientific recipe' — we can attempt to make a similar loaf of scientific bread. If we follow the recipe but do not get the same result, either the result is sensitive to small details that cannot be controlled, the result is incorrect or the recipe was not precise enough (things were omitted to


Assessment
Observation
Rubric
Projects
Measurement
Scale
Marking
Schedule
Essay
True-and-False
Testing-Devices
Fill-in-the-blanks
Worksheets
Multiple-Choice
Rating
Evaluation
Methods
Portfolio
Short-Answers
Non-Testing-Devices
Presentations
Completion-Type
Role-play
Performance
Exhibitions
Assessment-Tools
Test-Items
Scheme
Checklist
Journal

Ciência Aberta e Responsável:
Transparência, Integridade, Robustez e Rigor

- **Partilha** de dados, materiais e publicações
- Mudança da **cultura** institucional
- Modificação dos **incentivos**
- Valorização da **replicação**
- Valorização da **colaboração internacional**
- Criação de uma ciência mais **diversa e inclusiva**

Suporte para Mudança

Redes de Reprodutibilidade

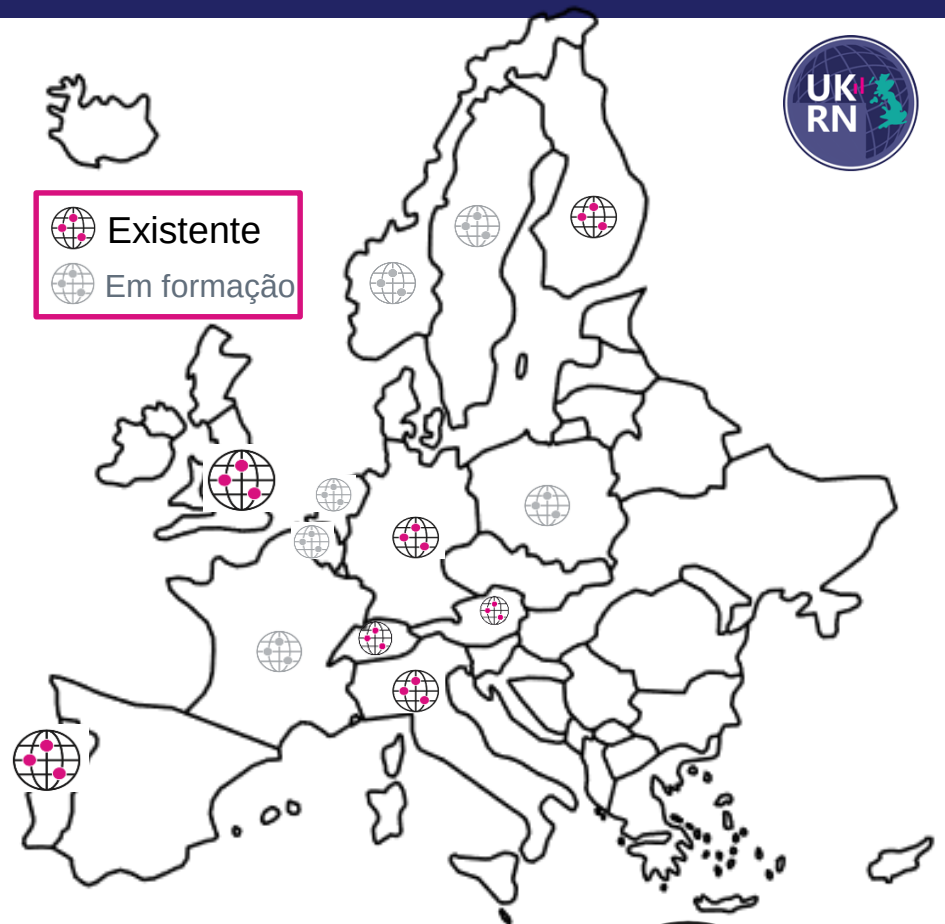
Associação de pares que tem como principal finalidade contribuir para a adoção de práticas de investigação replicáveis, transparentes, robustas e de elevado rigor científico e ético.

Objetivos:

a. a organização de fóruns de discussão e atividades de formação

b. a curadoria de materiais e recursos

c. a investigação, sistematização e disseminação de novas formas de fazer icas de investigação.



RN UK UK Reproducibility Network

RN CH Swiss Reproducibility Network

RN DE German Reproducibility Network

RN FI Finnish Reproducibility Network

RN SK Slovak Reproducibility Network

RN IT Italian Reproducibility Network

RN PT Portuguese Reproducibility Network

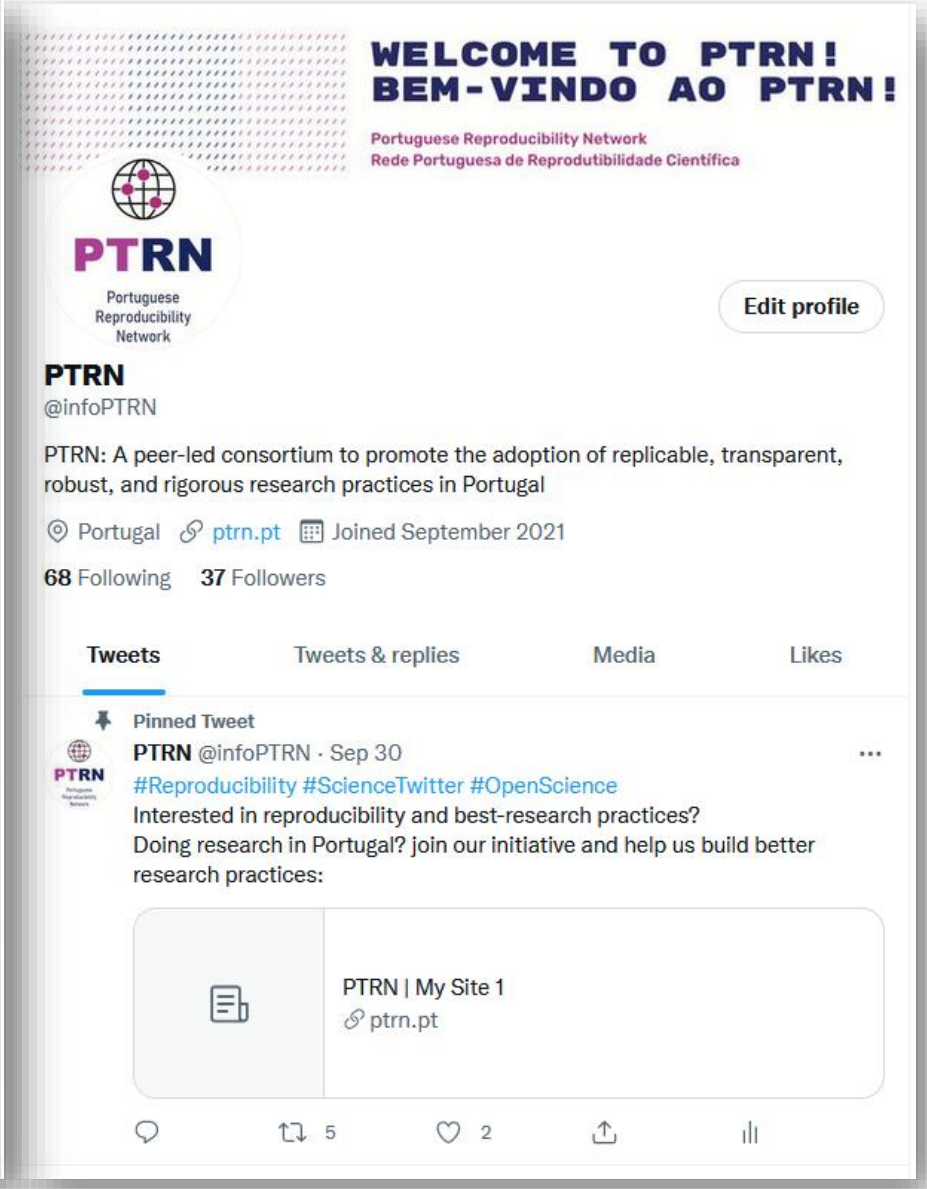
Conheça a PTRN:

Rede Portuguesa de Reprodutibilidade Científica

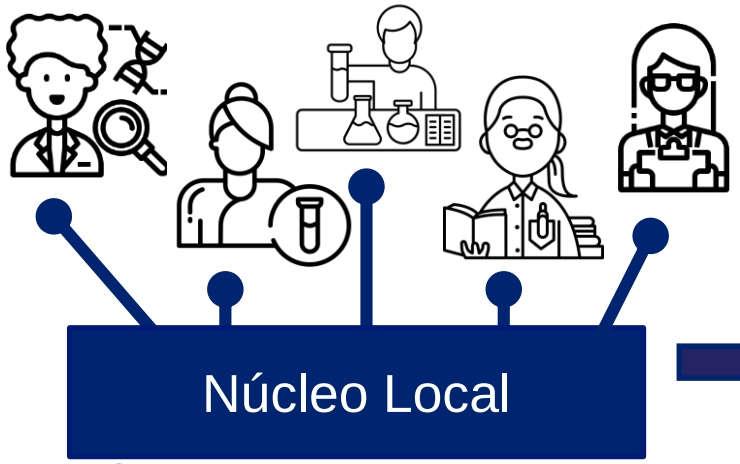
Contato:
ptrn.info@gmail.com

https://www.ptrn.pt

@infoPTRN



Como funciona a PTRN?

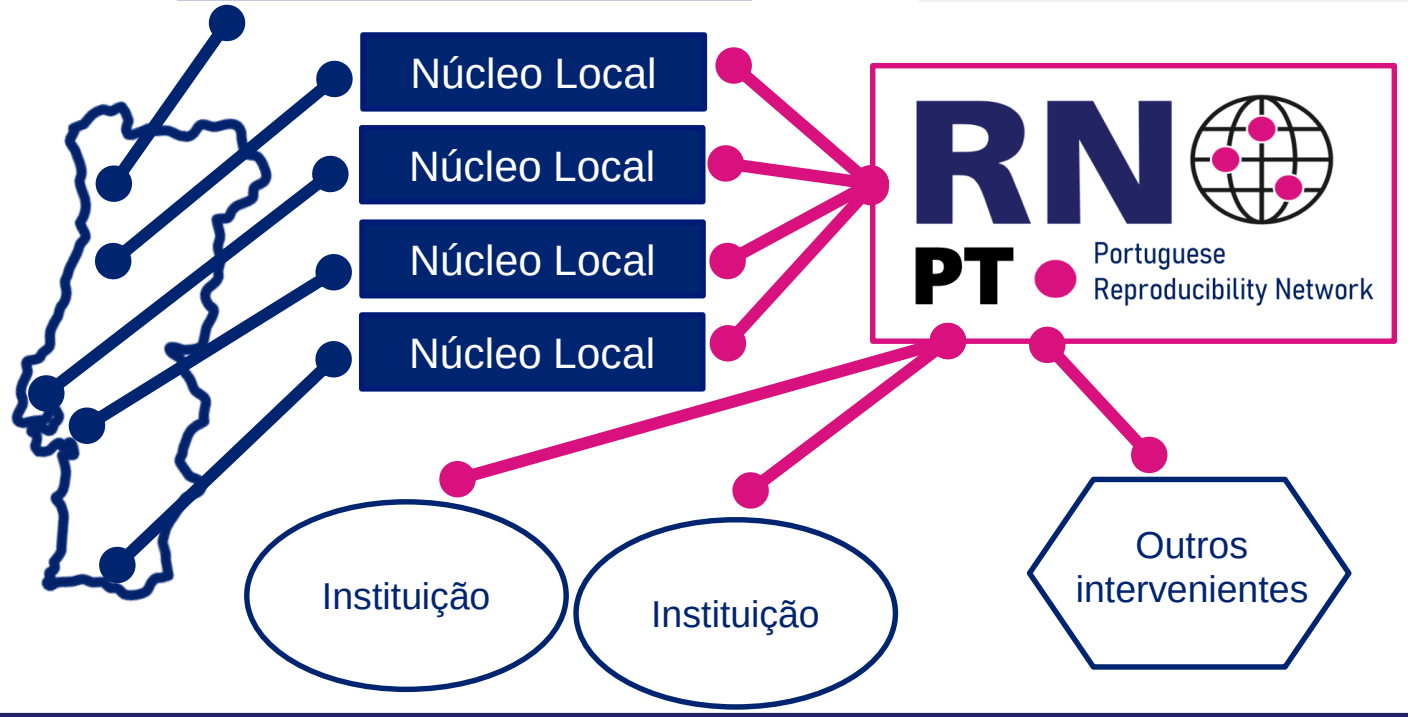


Núcleo Local

Investigadores e comunidade académica
(gestores de dados, gestores de repositórios digitais e data centers, técnicos de informação, bibliotecas, arquivos e curadoria de dados, especialistas de informática, cientistas de dados e gestores de ciência)

Organizam atividades de promoção de ciência aberta e responsável
- Journal clubs
- Workshops/formações, palestras, "Open Science Day"

Iniciativas de valorização de boas práticas de investigação



Coordenar esforços a nível nacional

Facilitar a partilha de recursos entre núcleos
- Sistematizar recursos materiais
- Conectar experts e formadores

Integração de instituições de ensino superior à rede

Comunicação com intervenientes no processo científico (e.g., agências de financiamento, editoras)

Participe!

A PTRN é aberta à comunidade académica em todo território nacional!

Grupos existentes:

→ **Junte-se a iniciativa para partihar experiências**

<u>Não existe</u> um grupo?

→ **PTRN pode ajudar a criar um grupo**

https://www.ptrn.pt

Agradecemos a atenção!

PTRN Portuguese Reproducibility Network

https://www.ptrn.pt

ptrn.info@gmail.com

@infoPTRN