French Reproducible Research Network

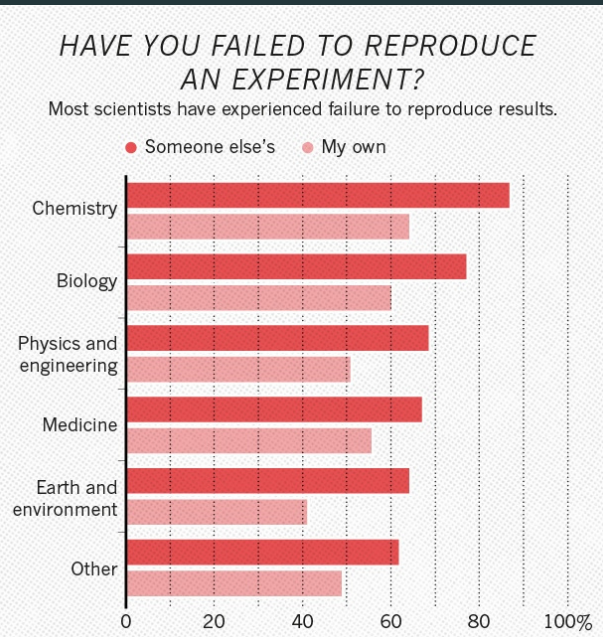
Arnaud Legrand

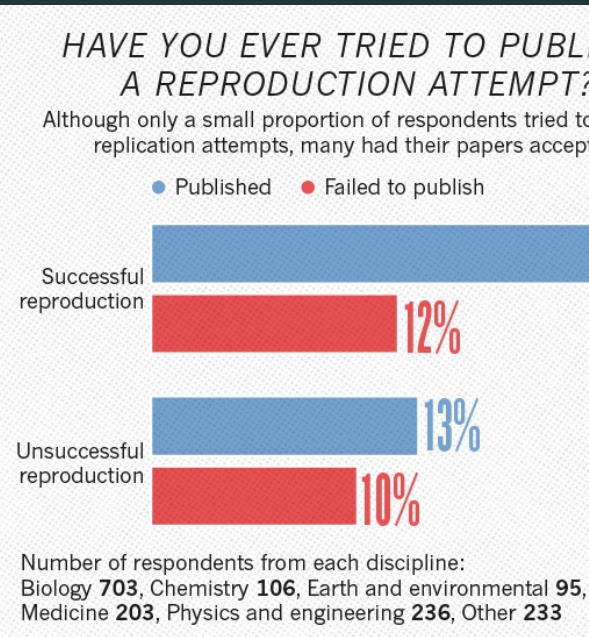
52nd ORAP Forum, Paris
March 2024

Reproducibility Crisis

Is there a reproducibility crisis

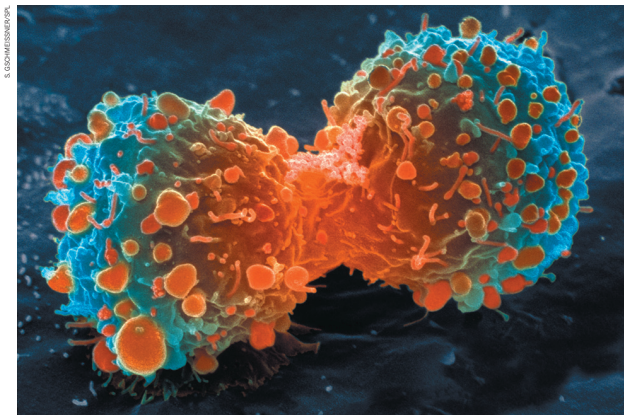
A Nature survey, 2016






COMMENT

AVIAN INFLUENZA Shift expertise to track mutations where they emerge p.534 | EARTH SYSTEMS Past climates give valuable clues to future warming p.537 | HISTORY OF SCIENCE Descartes' lost letter tracked using Google p.540 | OBITUARY Wylie Vale and an elusive stress hormone p.542


S. OSCHMEISSNER/SPL

Many landmark findings in preclinical oncology research are not reproducible, in part because of inadequate cell lines and animal models.

Raise standards for preclinical cancer research

C. Glenn Begley and **Lee M. Ellis** propose how methods, publications and incentives must change if patients are to benefit.

Efforts over the past decade to characterize the genetic alterations in human cancers have led to a better understanding of molecular drivers of this complex set of diseases. Although we in the cancer field hoped that this would lead to more effective drugs, historically, our ability to translate cancer research to clinical success has been remarkably low[1]. Sadly, clinical trials in oncology have the highest failure rate compared with other therapeutic areas. Given the high unmet need in oncology, it is understandable that barriers to clinical development may be lower than for other disease areas, and a larger number of drugs with suboptimal preclinical validation will enter oncology trials. However, this low success rate is not sustainable or acceptable, and investigators must reassess their approach to translating discovery research into greater clinical success and impact.

Many factors are responsible for the high failure rate, notwithstanding the inherently difficult nature of this disease. Certainly, the limitations of preclinical tools such as inadequate cancer-cell-line and mouse models[2] make it difficult for even ▸

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Must try harder

Too many sloppy mistakes are creeping into scientific papers at the data — and at themselves.

Six red flags for suspect work

C. Glenn Begley explains how to recognize the precilinical papers in which the data won't stand up

Error prone

Biologists must realize the pitfalls of massive amount of data

Know when your numbers are significant

- Nekrutenko & Taylor, Nature Genetics (2012)
- Alsheikh-Ali et al. PLoS ONE (2011)
- Begley & Ellis Nature (2012)

Reproducible Research: an Umbrella Term

Connexions with:

- Open Science/Access/Data/Source/Reviews/Laboratory notebooks/...

Many different terms and issues depending on the domain

- Reproduce, Replicate, Repeat, Rerun, Redo, Reuse, Register, Report

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Psychology, Nutrition HARKING, p-hacking $\rightsquigarrow$ pre-registration

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Genomics software engineering, comput. reproducibility, provenance

Computational fluid dynamics numerical chaos, parallel architectures

Artificial Intelligence most of the above 😉

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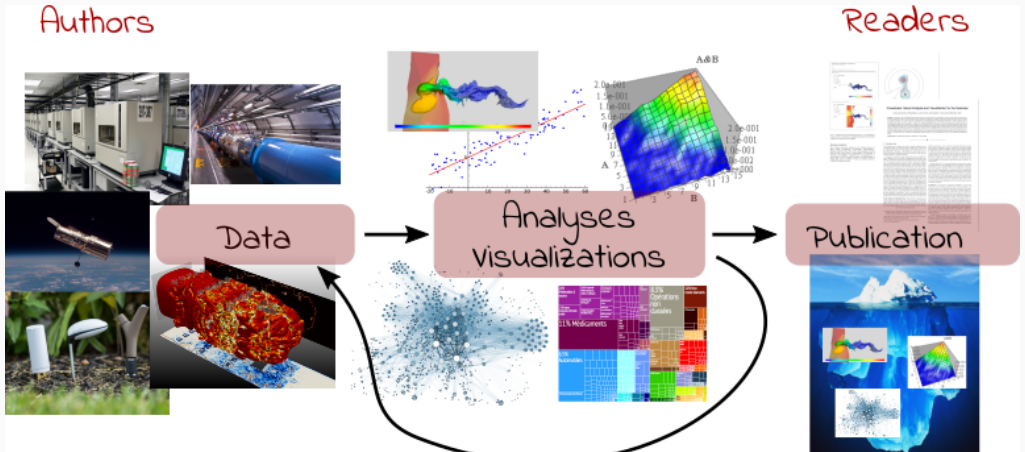
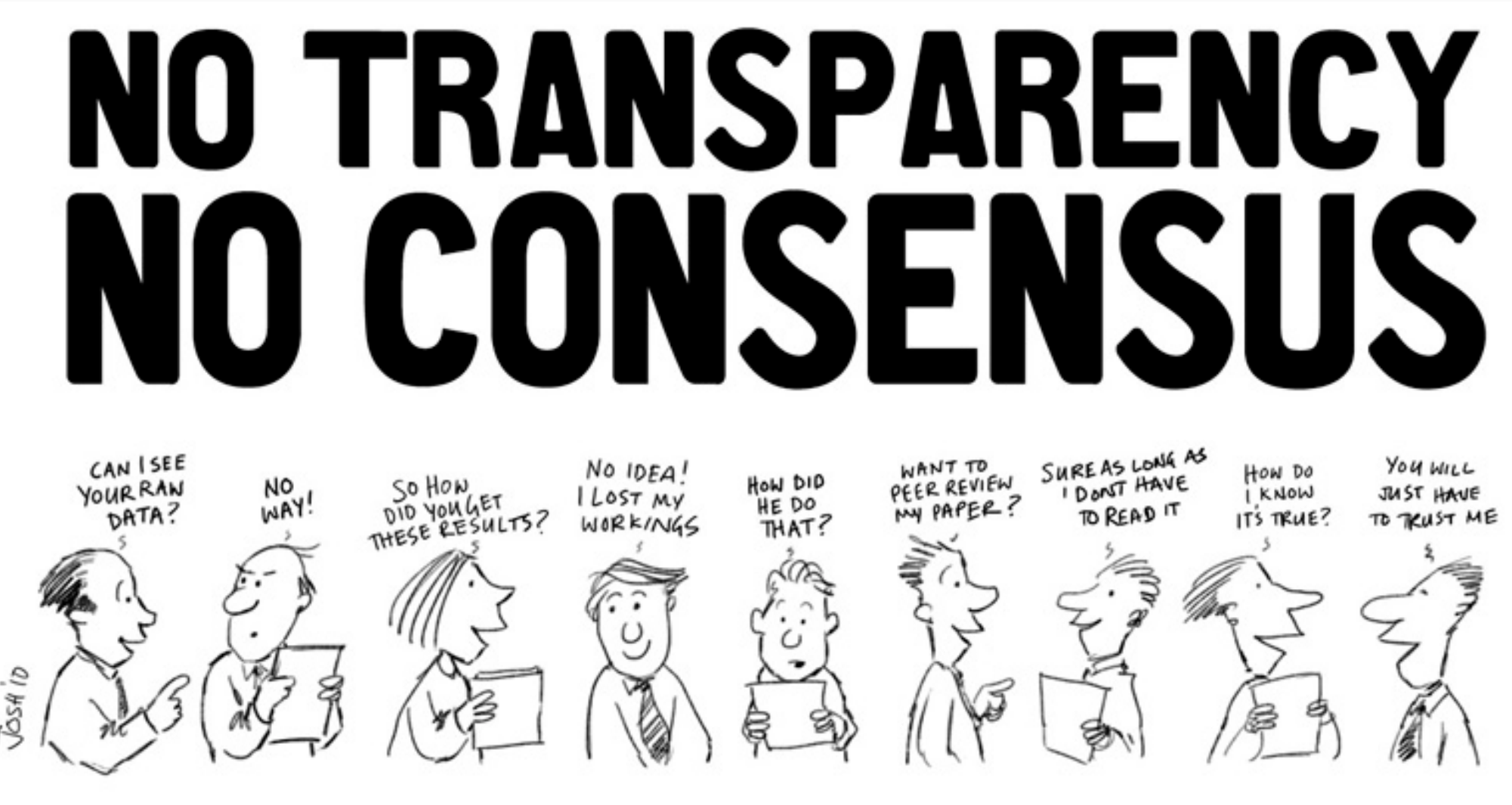
AFAIC, I care about **transparency**



Scientific Consensus



Global Reproducibility Networks

https://www.ukrn.org/global-networks/

UKRN UK Reproducibility Network

About | Community | Resources | Activities | Join UKRN | Contact

Global Networks

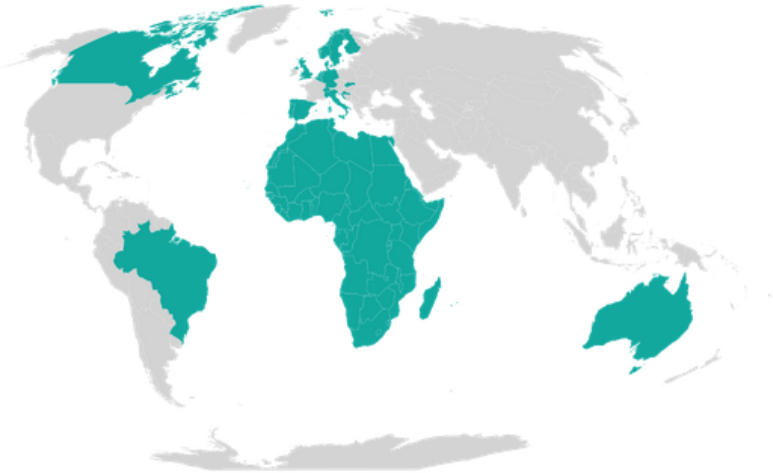
Outside the UK? Find a Reproducibility Network in your area

See full Global Networks Statement

Global Reproducibility Networks

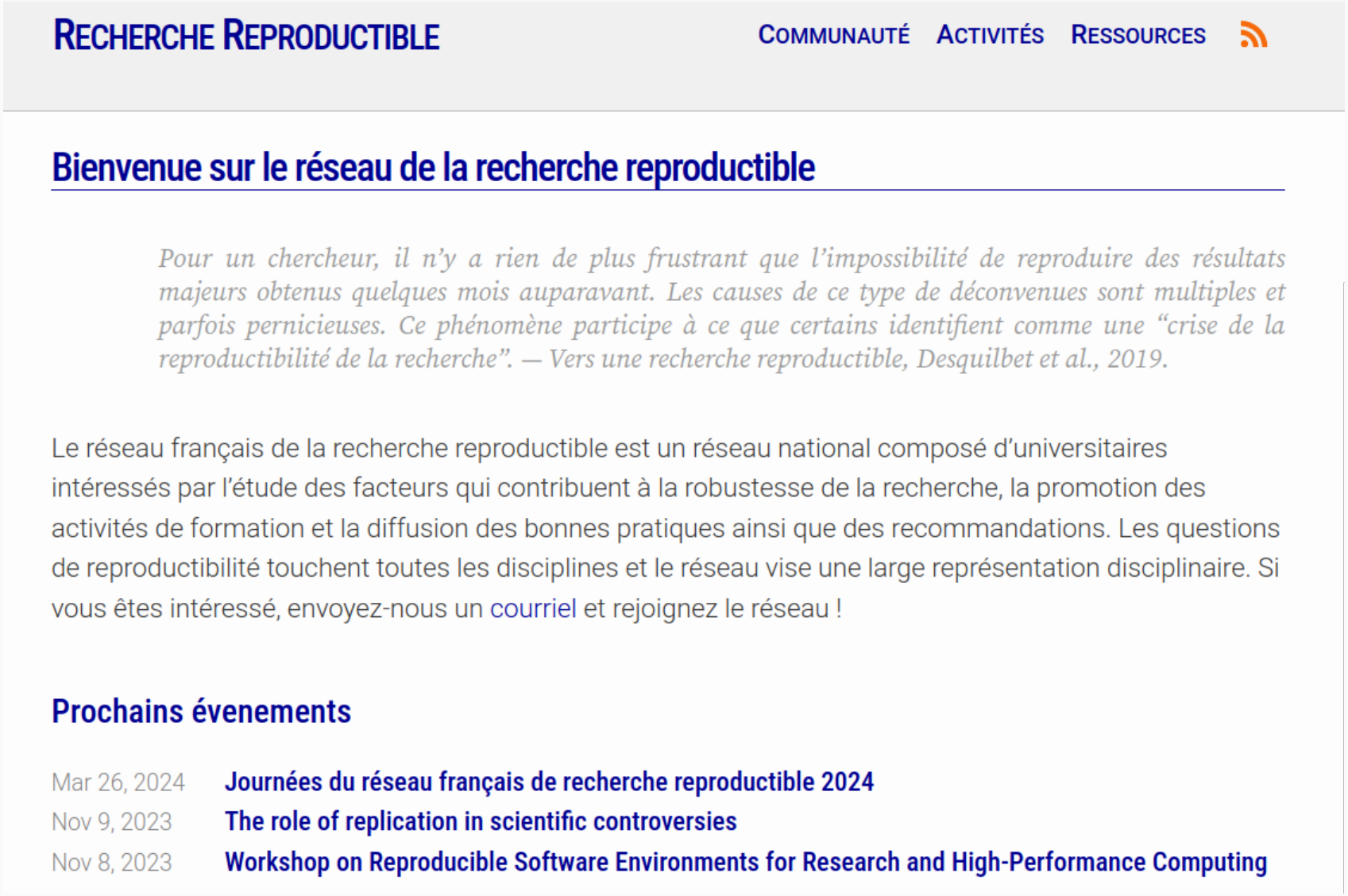
A Reproducibility Network (RN) is a national, peer-led consortium of researchers that aims to promote and ensure rigorous research practices by establishing appropriate training activities, designing and evaluating research improvement efforts, disseminating best practice and working with stakeholders to coordinate efforts across the sector. RNs aim for broad disciplinary representation and an intensive interdisciplinary dialogue (e.g., with funding agencies, publishers, learned societies and other sectoral organisations, as well as researchers from all disciplines and across all career stages).

To reach as many researchers as possible, and to operate as efficiently as possible, we are keen to support other countries interested in creating similar networks. If you are interested in setting up a national RN, or finding out who in your country is working towards this, please contact us.



French Reproducibility Network

http://www.recherche-reproductible.fr/



RECHERCHE REPRODUCTIBLE

COMMUNAUTÉ ACTIVITÉS RESSOURCES

Bienvenue sur le réseau de la recherche reproductible

> *Pour un chercheur, il n'y a rien de plus frustrant que l'impossibilité de reproduire des résultats majeurs obtenus quelques mois auparavant. Les causes de ce type de déconvenues sont multiples et parfois pernicieuses. Ce phénomène participe à ce que certains identifient comme une "crise de la reproductibilité de la recherche". — Vers une recherche reproductible, Desquilbet et al., 2019.*

Le réseau français de la recherche reproductible est un réseau national composé d'universitaires intéressés par l'étude des facteurs qui contribuent à la robustesse de la recherche, la promotion des activités de formation et la diffusion des bonnes pratiques ainsi que des recommandations. Les questions de reproductibilité touchent toutes les disciplines et le réseau vise une large représentation disciplinaire. Si vous êtes intéressé, envoyez-nous un courriel et rejoignez le réseau !

Prochains évenements

Mar 26, 2024 **Journées du réseau français de recherche reproductible 2024**
Nov 9, 2023 **The role of replication in scientific controversies**
Nov 8, 2023 **Workshop on Reproducible Software Environments for Research and High-Performance Computing**

French Reproducibility Network Days: 1st Edition

March 2023, Institut Pasteur, Paris

cnrs GDR Groupement de recherche MaDICS Masses de données, informations et connaissances en sciences

INSTITUT PASTEUR

Toward an inter-disciplinary look on our respective approaches and definitions

- *Observational, experimental, statistical, computational, etc.*

Identify volunteers, possible collaboration topics, diversity of concerns/practices, educational resources,...

French Reproducibility Network: Envisioned Governance

Emerging Network more than 100 members ! (Mailing-list, Website, Forum)

Steering comittee

- Céline Acary-Robert (Univ. Grenoble Alpes)
- Sarah Cohen-Boulakia (Univ. Paris-Saclay)
- Arnaud Legrand (CNRS, Grenoble)
- Frédéric Lemoine (Institut Pasteur)
- Nicolas Rougier (Inria Bordeaux)

Transversal colleges ... Training, Publication, International/Europe, ...

... with specific Working Groups

- Quality of biological samples
- Cartography (MOOCS, Online ressource, Curricula, Reprohackathons, ReproducibiliTea)

Ministry support 1 *chargé(e) de projet* (application until the end of March) to help the network growth

French Reproducibility Network Days: 2nd Edition