St. Jude Children's Research Hospital | DNB Bioinformatics core

Automation and Reproducibility in Computational Biology: "Best practices"

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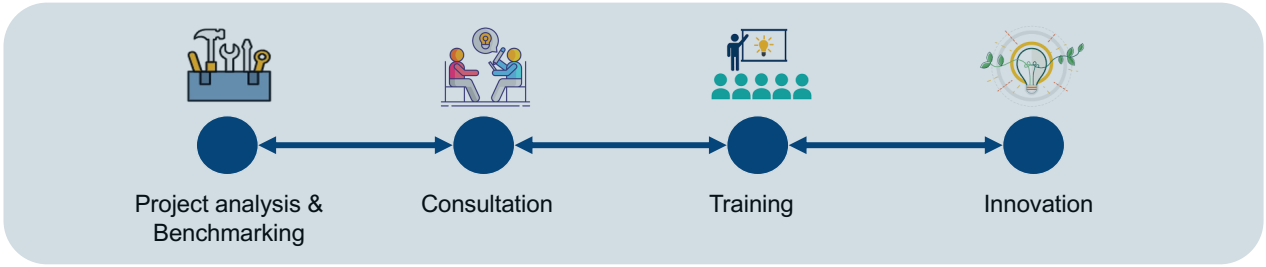
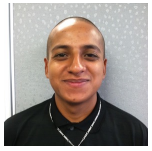
Bioinformatics core, Department of Developmental Neurobiology

GitHub

Providing advanced bioinformatic services for investigators to leverage omics data





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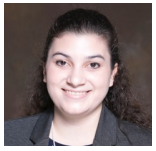
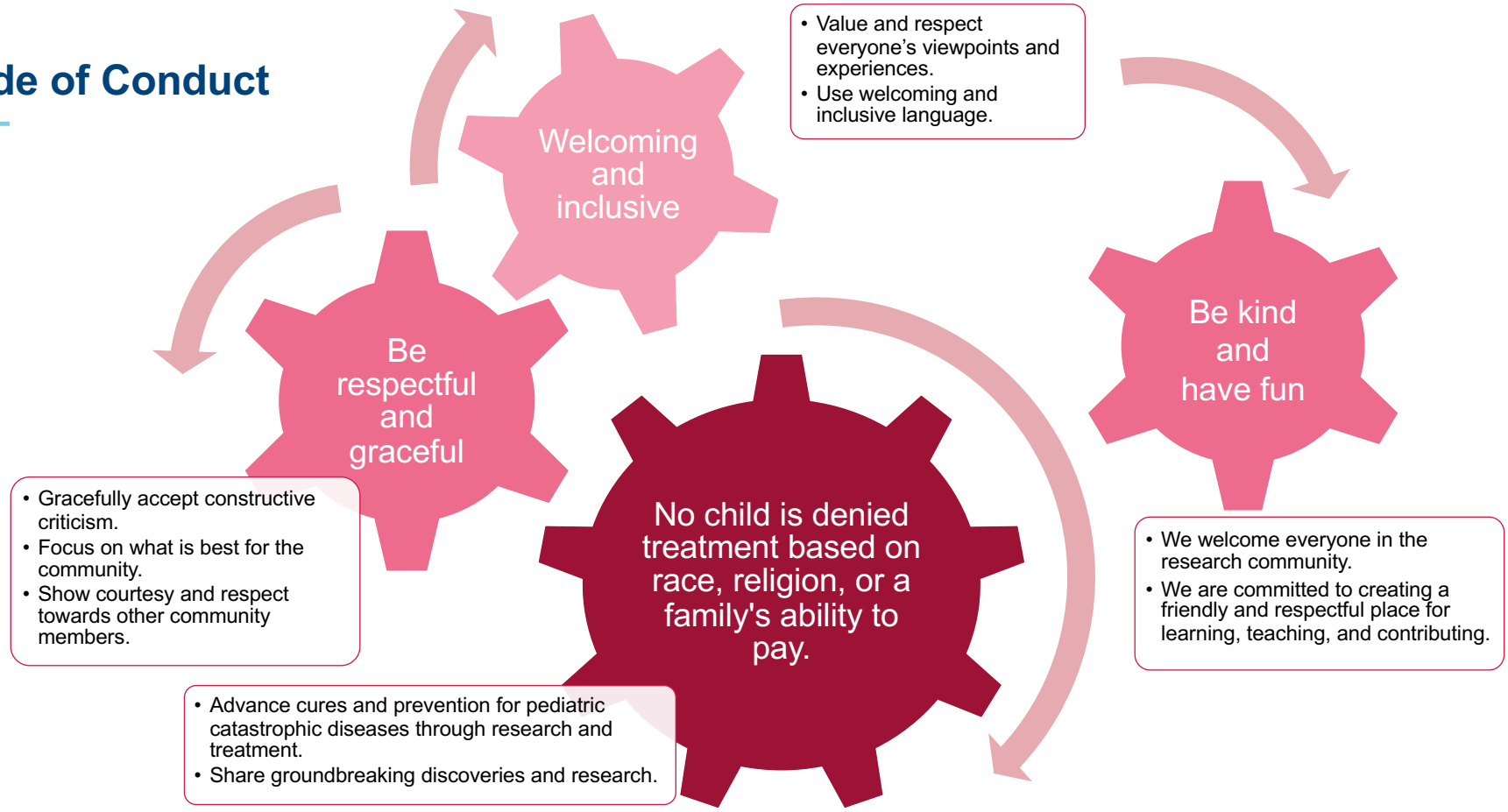
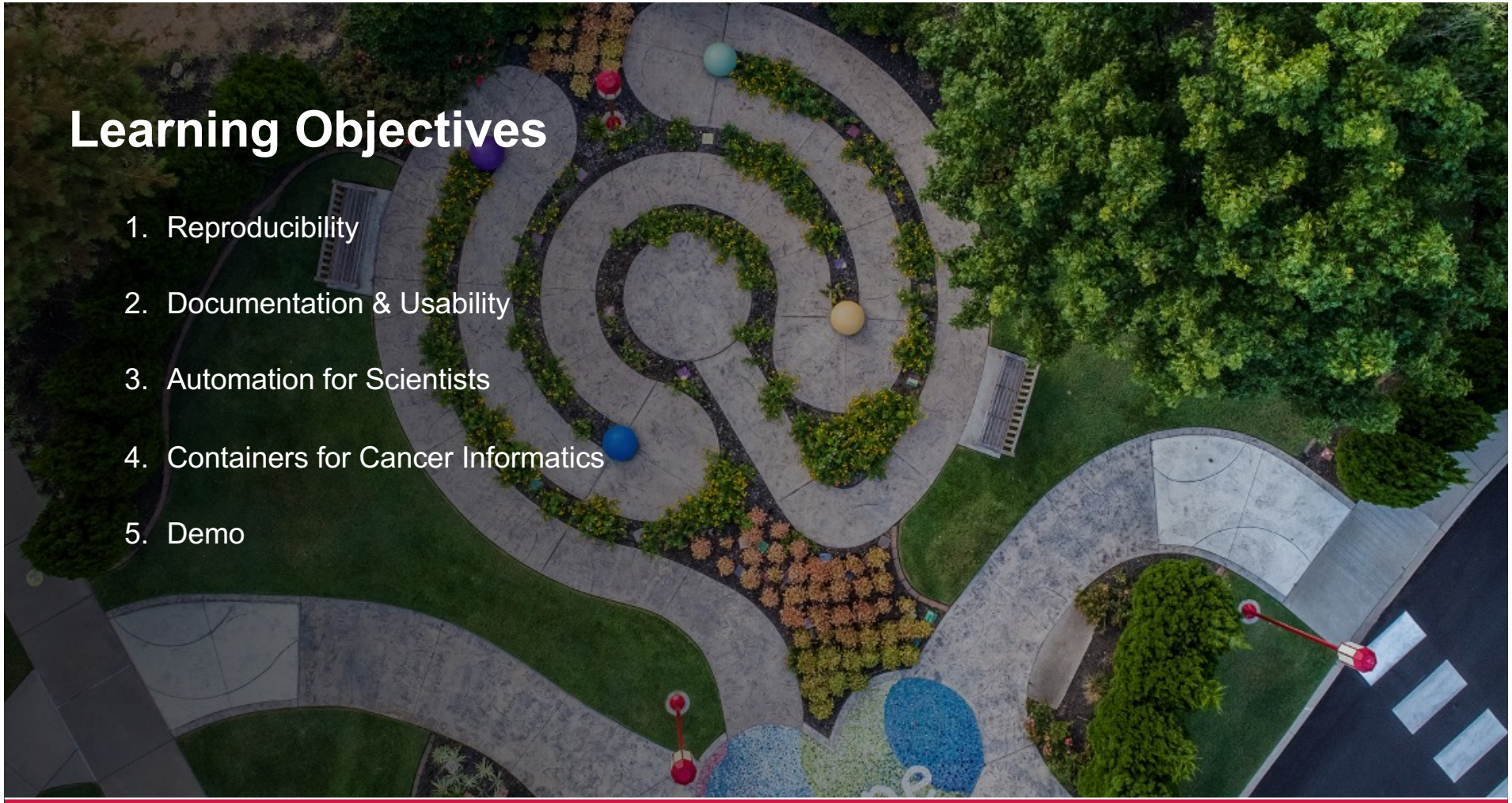


Sharon Freshour, PhD
Bioinformatics Research Scientist
St. Louis, Missouri

Asha Jacob Jannu, PhD
Bioinformatics Research Scientist
Indianapolis, Indiana

Code of Conduct

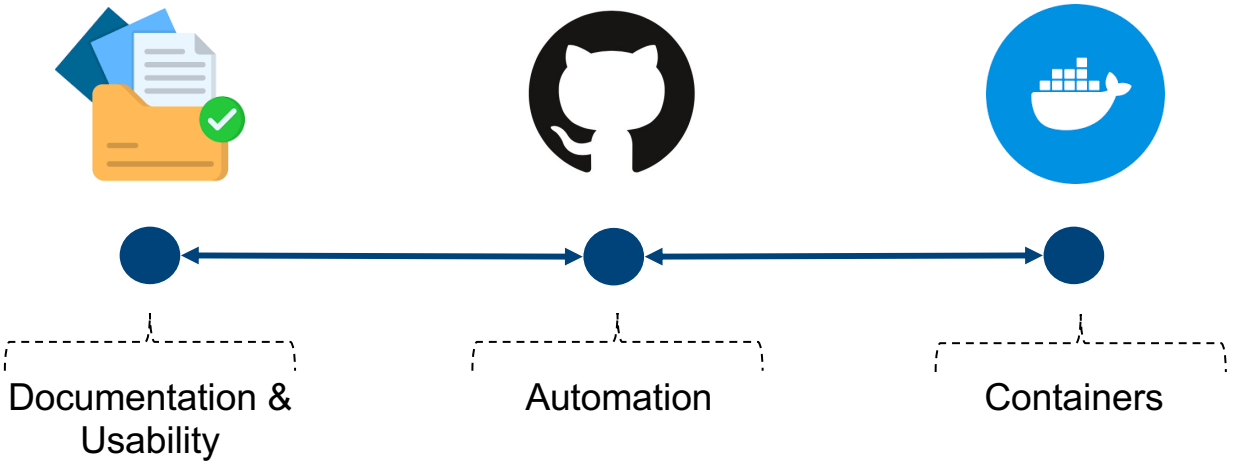




Learning Objectives

1. Reproducibility
2. Documentation & Usability
3. Automation for Scientists
4. Containers for Cancer Informatics
5. Demo

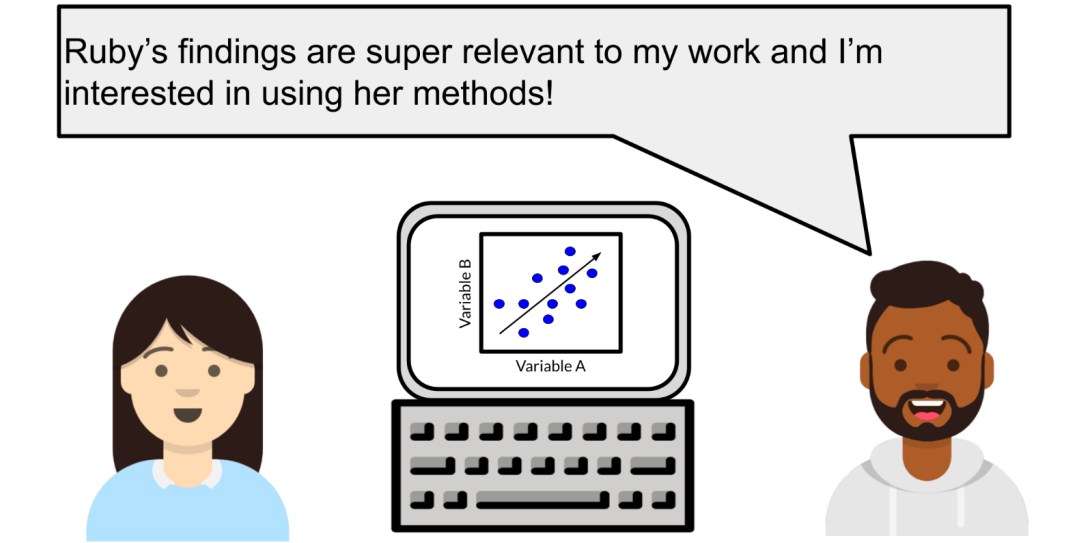
Best practices for reproducibility 🎉



Have you ever had problems reproducing…

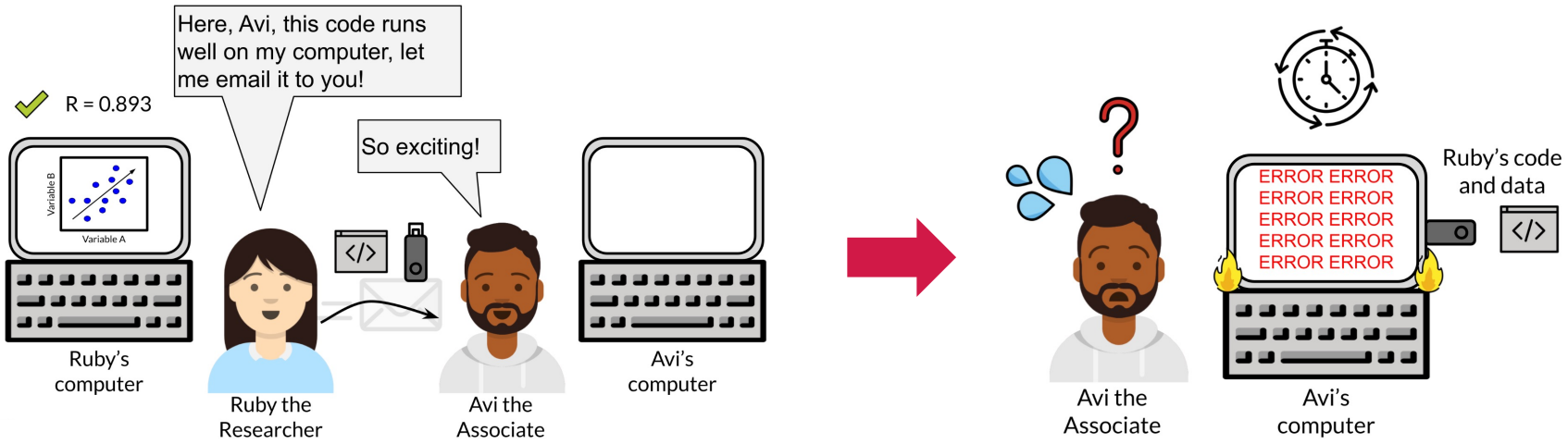
- Someone else's research?
- Your research?
- Both?

Reproducibility



Source by Advanced Reproducibility in Cancer Informatics

Reproducibility



Source by Advanced Reproducibility in Cancer Informatics

Reproducibility vs replication

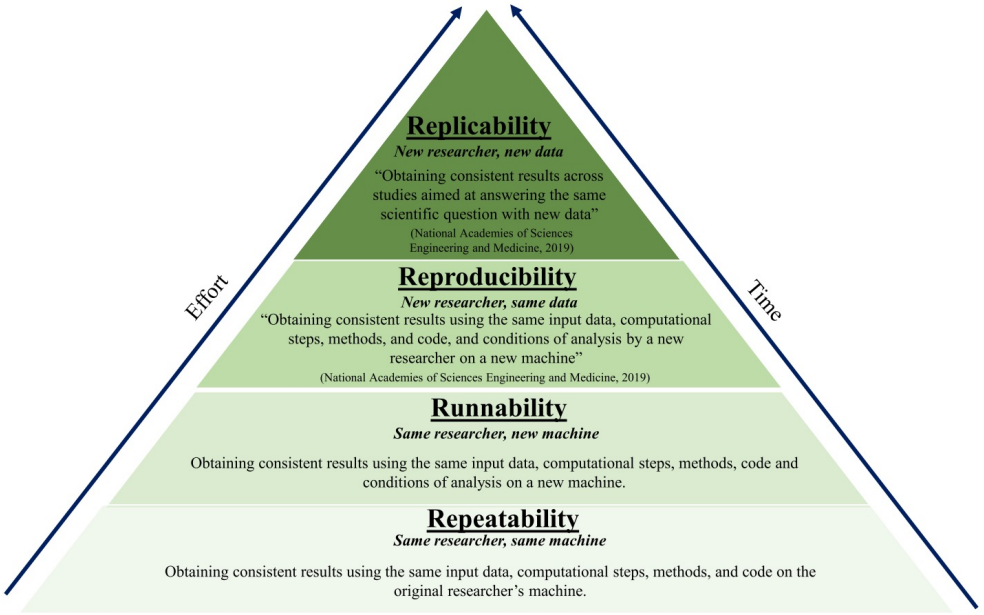
- Reproducibility
  - Authors provide all the necessary data and computer code to re-run the analysis and re-create the results
  - The exact same data/code are used to re-derive the exact same results
- Replication
  - A separate study arrives at the same scientific findings as another study
  - New data/code and analyses are performed that identify consistent results with previous work

	Same data	**Different data**
Same methods	Reproducibility	Replicability
Different methods	Robustness	Generalizability

Source by Data Lab Reproducibility Workshop

Why do we like reproducible science?

- Reproducibility supports…
  - You!
  - Your collaborators and team!
  - Your community!
  - The scientific endeavor!
- Reproducibility makes your funders and journals happy.



Essawy *et al.*, 2020. Environmental Modelling & Software.

Source by Data Lab Reproducibility Workshop

Reproducibility is a tortoise's game – it is an incremental and slow process, but it has high payoffs!

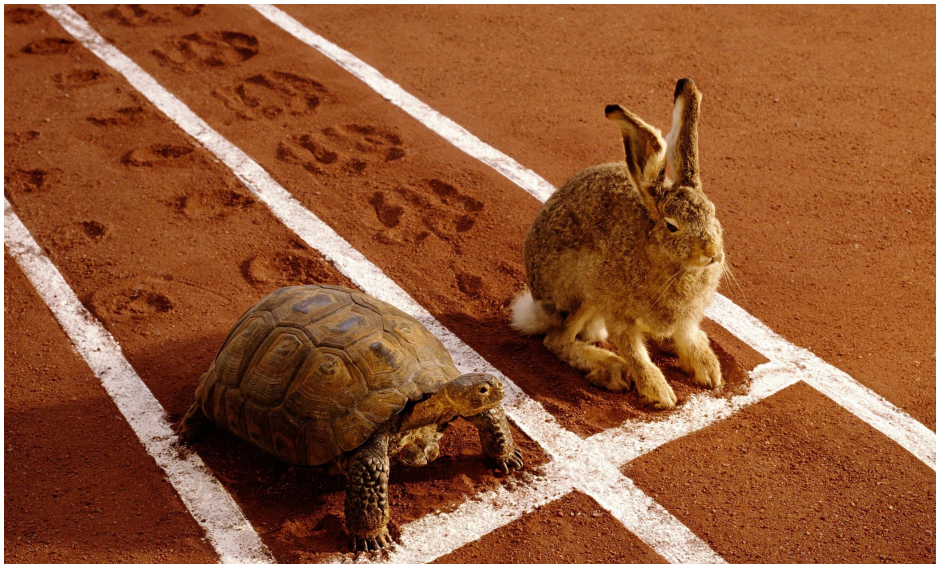
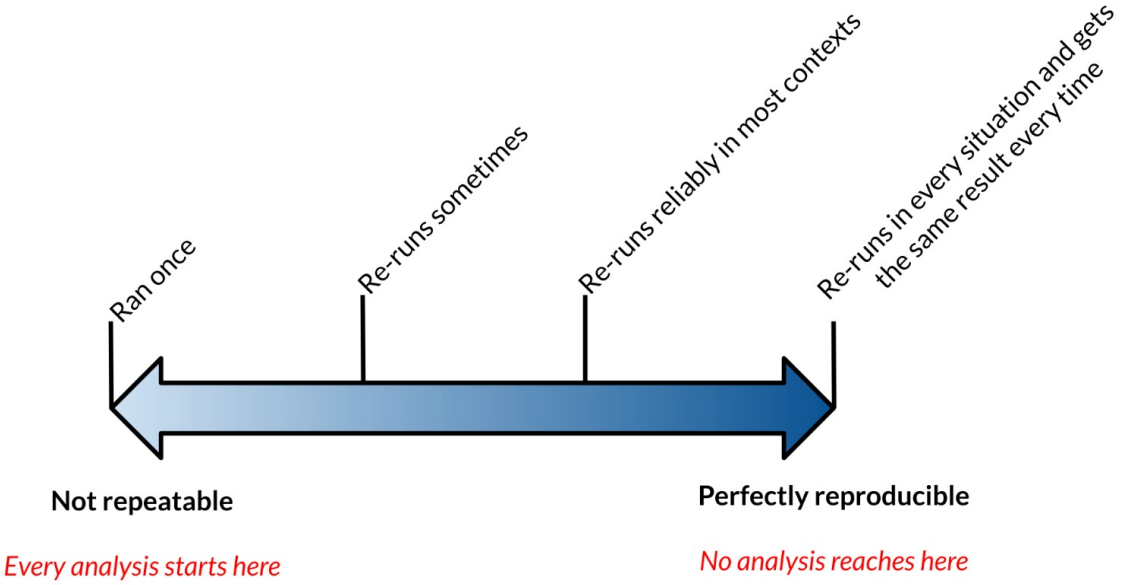


Figure from https://edwinsjournal.com/the-rabbit-and-the-tortoise-reimagined/

Reproducibility exists on a continuum!



Source by Advanced Reproducibility in Cancer Informatics

More resources 🎉

- Advanced Reproducibility in Cancer Informatics
- Elements of Style
- Building reproducible analytic pipelines in R
- Working reproducibly with others on OpenScPCA