

SARAS WINDECKER @SMWINDECKER

**GOLD STAR REPRODUCIBILITY:
STRAIGHTFORWARD CONTAINERISATION**

NULLIUS IN VERBA

TAKE NOBODY'S WORD FOR IT.

NATURE | NEWS FEATURE

1,500 scientists lift the lid on reproducibility

Survey sheds light on the 'crisis' rocking research.

Monya Baker

25 May 2016 | Corrected: [28 July 2016](#)

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25 May 2016

THE CONVERSATION

Academic rigour, journalistic flair

Arts + Culture Business + Economy Cities Education Environment + Energy Health + Medicine Politics +

The science 'reproducibility crisis' – and what can be done about it

March 15, 2017 8.49pm AEDT

IRREPRODUCIBLE RESULTS... WHY?

Fidler F, Chee YE, Wintle BC, Burgman MA, McCarthy MA, Gordon A. Metaresearch for Evaluating Reproducibility in Ecology and Evolution. *Bioscience*. 2017;67(3):282-289. doi:10.1093/biosci/biw159

IRREPRODUCIBLE RESULTS... WHY?

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1. PUBLICATION BIAS
2. QUESTIONABLE RESEARCH PRACTICES
IN 'PUBLISH OR PERISH' CULTURE
3. INADEQUATE DATA REPORTING
4. INSUFFICIENT INCENTIVES FOR
SHARING CODE & DATA

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nature
ecology & evolution

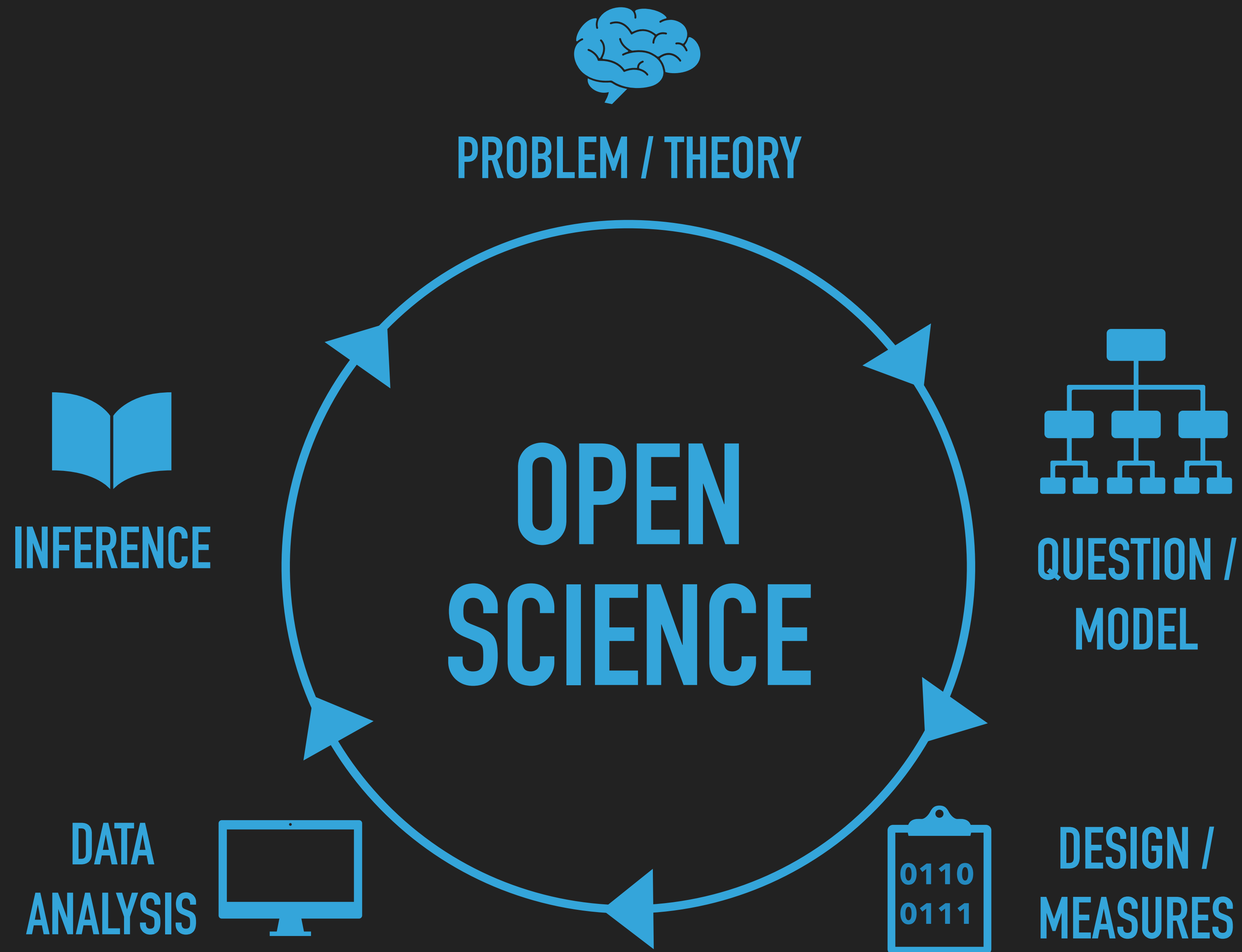
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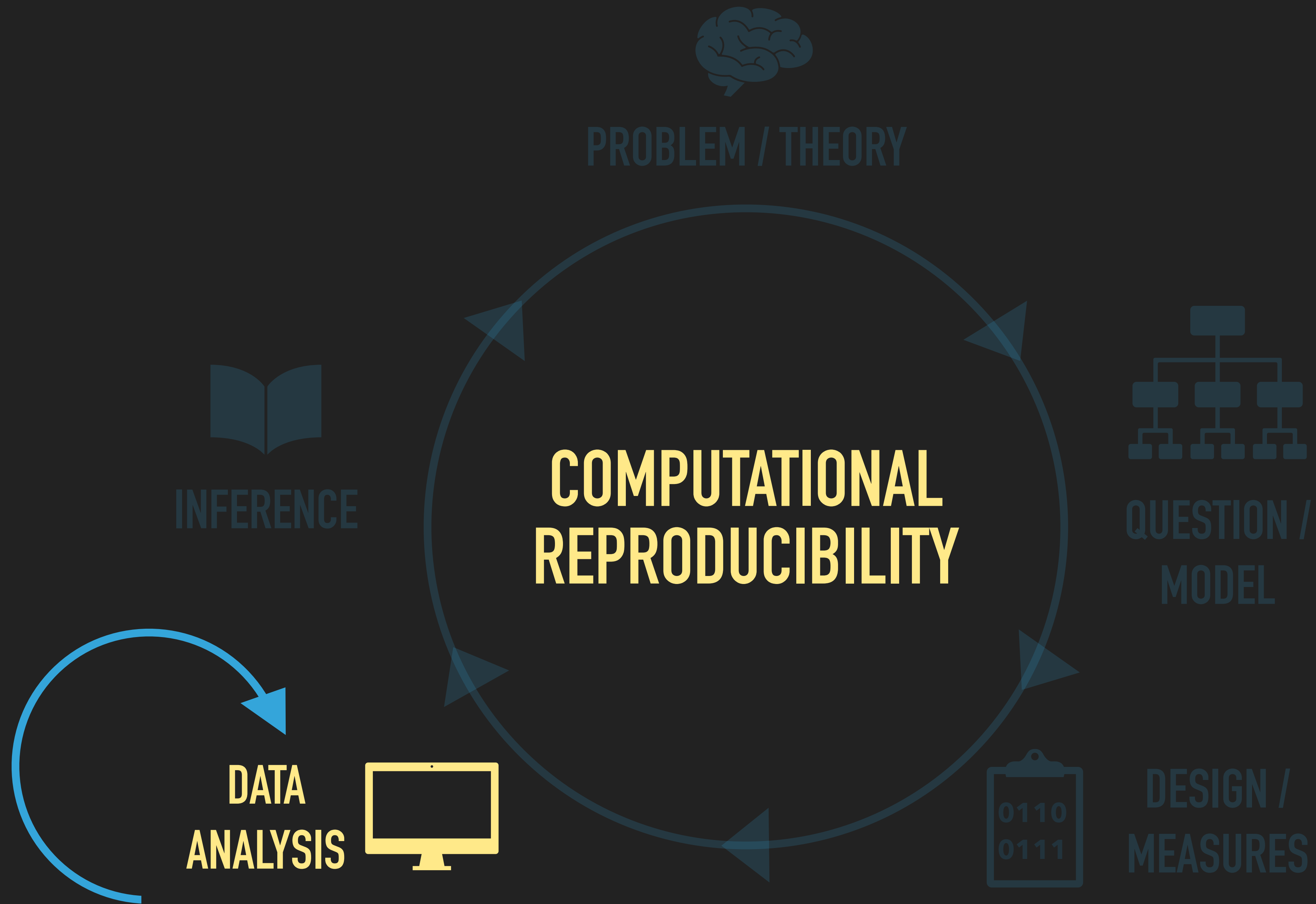
March 15, 2017 8.49p

Perspective | Published: 23 May 2017

Our path to better science in less time using open data science tools

Julia S. Stewart Lowndes , Benjamin D. Best, Courtney Scarborough, Jamie C. Afflerbach, Melanie R. Frazier, Casey C. O'Hara, Ning Jiang & Benjamin S. Halpern





COMPENDIUM:

- ▶ ORGANISATION SYSTEM FOR THE DIFFERENT ELEMENTS THAT MAKE UP A RESEARCH PROJECT
- ▶ AS A MEANS FOR DISTRIBUTING, MANAGING AND UPDATING THE COLLECTION

ORGANISATION

SEPARATE DATA AND CODE

DOCUMENTATION

SPECIFY DEPENDENCIES

AUTOMATION

MASTER SCRIPT

DISSEMINATION

SHARE!

AN EXAMPLE INVOLVING A LONG ANALYSIS OF PLANT DECAY.



MORE THAN A YEAR LATER...



SIX MONTHS (AND AN R UPDATE) LATER...



**WHY WOULDN'T WELL-WRITTEN,
WELL-ORGANISED CODE REPRODUCE?**

BARRIERS TO REPRODUCING CODE

1. SOFTWARE VERSIONS
2. R VERSION
3. OPERATING SYSTEMS
4. ETC.

ORGANISATION

SEPARATE DATA AND CODE

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SPECIFY DEPENDENCIES

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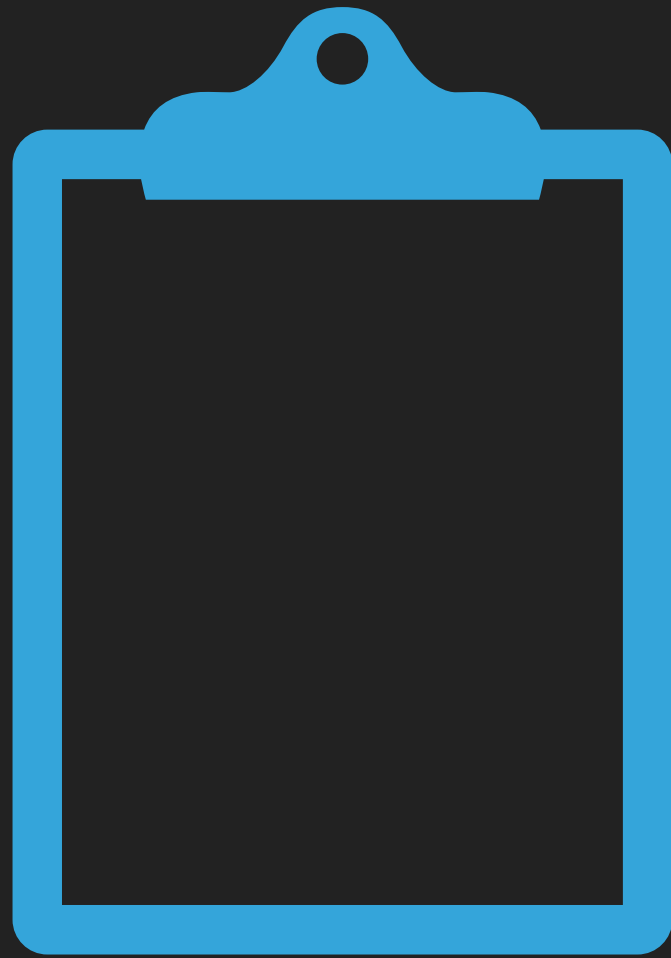
MASTER SCRIPT

DISSEMINATION

SHARE!

CONTAINERISATION TO THE RESCUE!







CONTAINERISATION TO THE RESCUE!

1. A TYPE OF VIRTUALISATION
2. MORE LIGHTWEIGHT THAN A VIRTUAL MACHINE
3. POPULARLY IMPLEMENTED WITH DOCKER

**DOCKER HUB – CONTAINS DOCKERFILES
FOR REFERENCE, AND TO BUILD UPON**

HOLEPUNCH R PACKAGE BY KARTHIK RAM

FLEXIBILITY



DOCKERFILE FROM SCRATCH



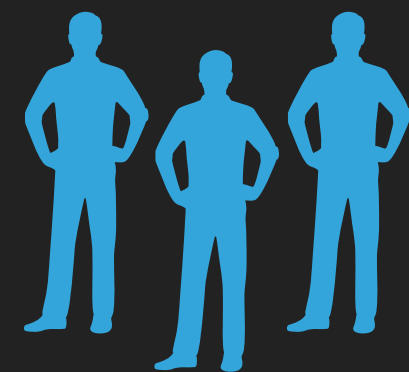
HOLEPUNCH PACKAGE

EASE

HOLEPUNCH HELPS US:



**AUTOMATICALLY PREPARE A
DOCKERFILE**



**LAUNCH CONTAINER WITHOUT
INSTALLING DOCKER**

ULTIMATELY, REPRODUCIBLE CODE HAS:
FEWER MISTAKES & LESS DUPLICATION

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AND SUPPORTS:
MORE RELIABLE AND ROBUST SCIENCE

**THE FIRST PERSON THAT WILL
RERUN YOUR ANALYSIS IS YOU.**

THANK YOU!

KARTHIK RAM FOR HOLEPUNCH
DANIEL FALSTER UNSW
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