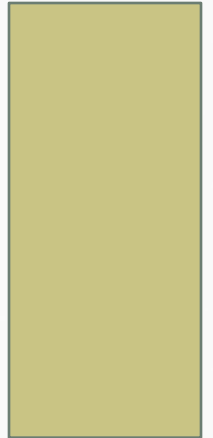


BIOLOGICAL DATA ANALYSIS

**THE RIGHT WAY
JULY 10-14, 2017**



BOOT CAMP

- Monday: Perspectives on Data Reproducibility
- Tuesday: Software Carpentry
- Wednesday: Statistical Analysis
- Thursday: Reproducible Research with Galaxy
-
- Friday: Summaries and Reviews

MONDAY

PERSPECTIVES ON DATA REPRODUCIBILITY

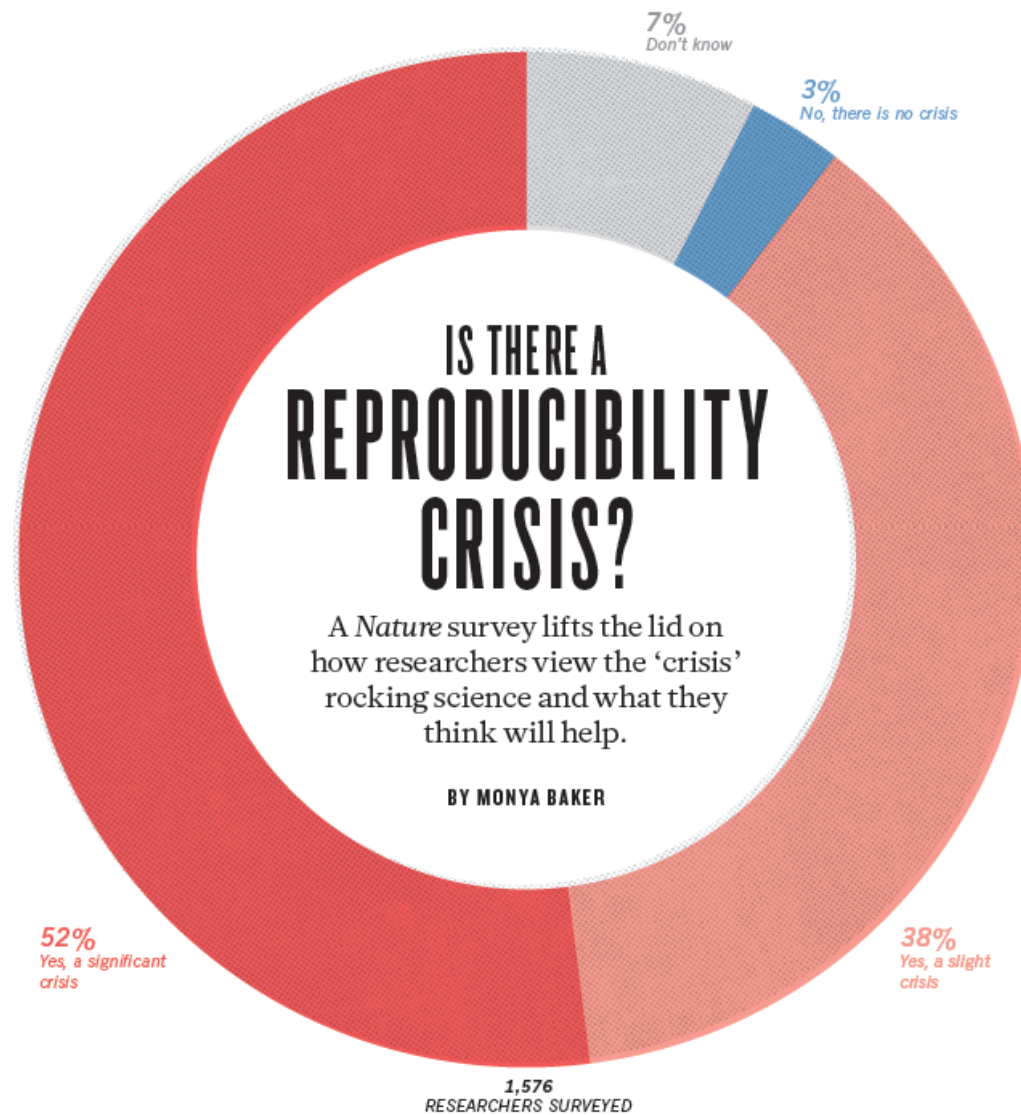
- 8:30 – 8:45 - Coffee and light breakfast
- 8:45 - 9:15 - Introductions by **Dr. Cooduvali Shashikant**
- 9:15 – 10:00 - Lecture by **Dr. Ken Weiss**
- 10:00 - 10:45 - Lecture by **Dr. Ross Hardison**
- 10:45 - 11:05 - Coffee break
- 11:05 - 11:50 - Lecture by **Dr. Rick Gilmore**
- 12:00 - 1:30 - Lunch
- 1:30 - 2:15 - Lecture by **Dr. Vasant Honavar**
- 2:15 - 3:00 - Lecture by **Dr. James Rosenberger**
- 3:00 - 3:20 - Coffee break
- 3:20-4:05 Lecture by **Dr. Cheryl Keller**
- 4:05 – 5:00 – Software review and installation: TAs and Instructors
- 7:30-9:00PM-Review of R (Optional): TAs.

INSTRUCTORS

- Dr. Shaun Mahony, Assistant Professor of Biochemistry and Molecular Biology
- Dr. Qunhua Li, Assistant Professor of Statistics
- Dr. Anton Nekrutenko, Professor of Biochemistry and Molecular Biology

CONTACTS

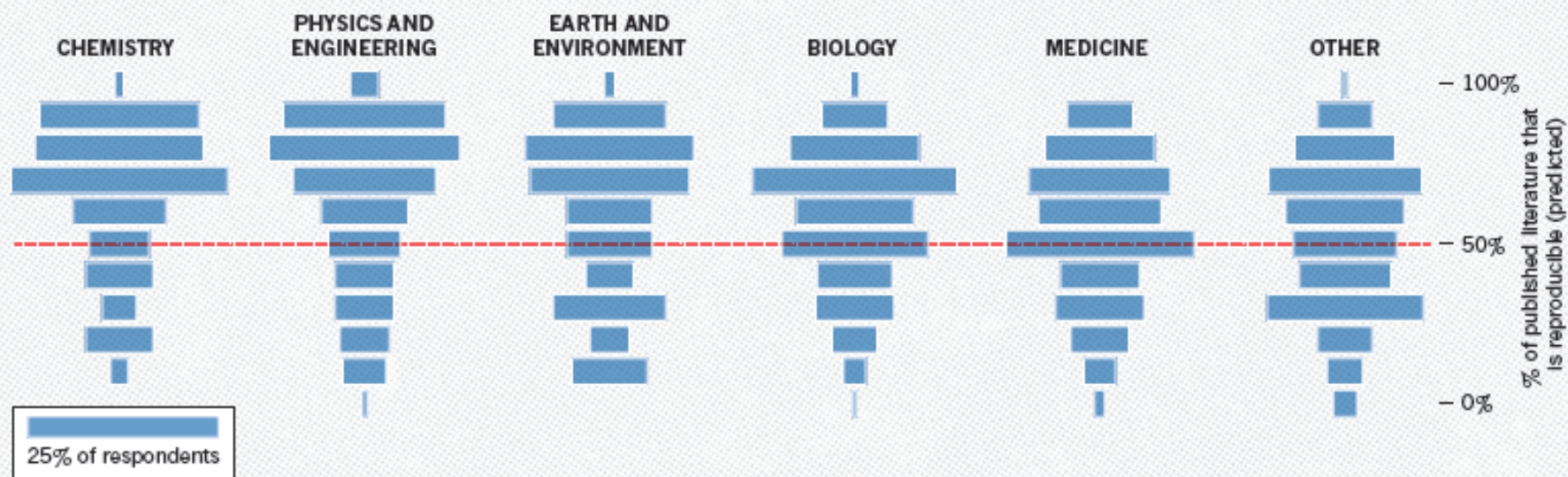
- Di Bruce Chen
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<http://www.nature.com.ezaccess.libraries.psu.edu/news/1-500-scientists-lift-the-lid-on-reproducibility-1.19970>

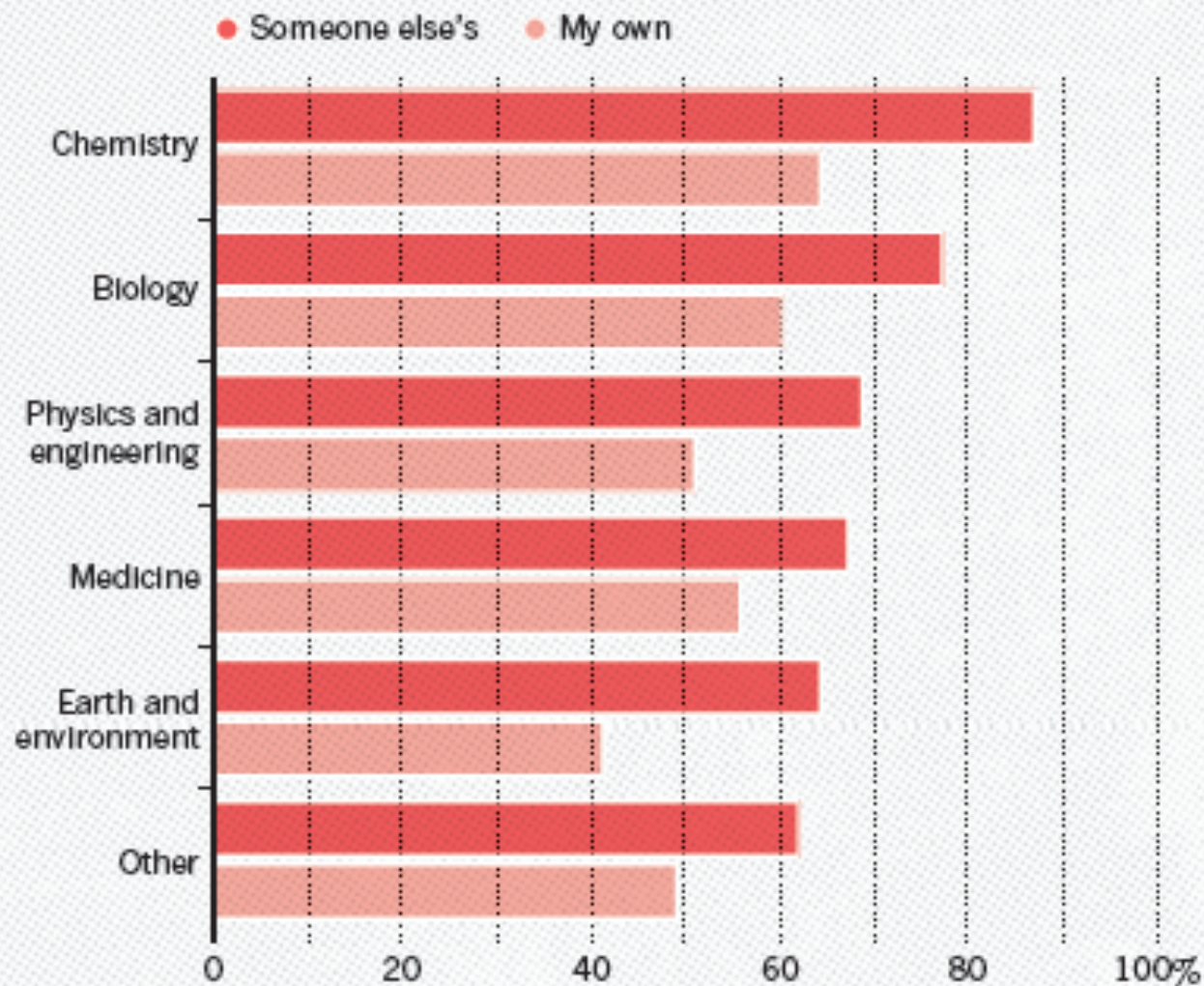
HOW MUCH PUBLISHED WORK IN YOUR FIELD IS REPRODUCIBLE?

Physicists and chemists were most confident in the literature.



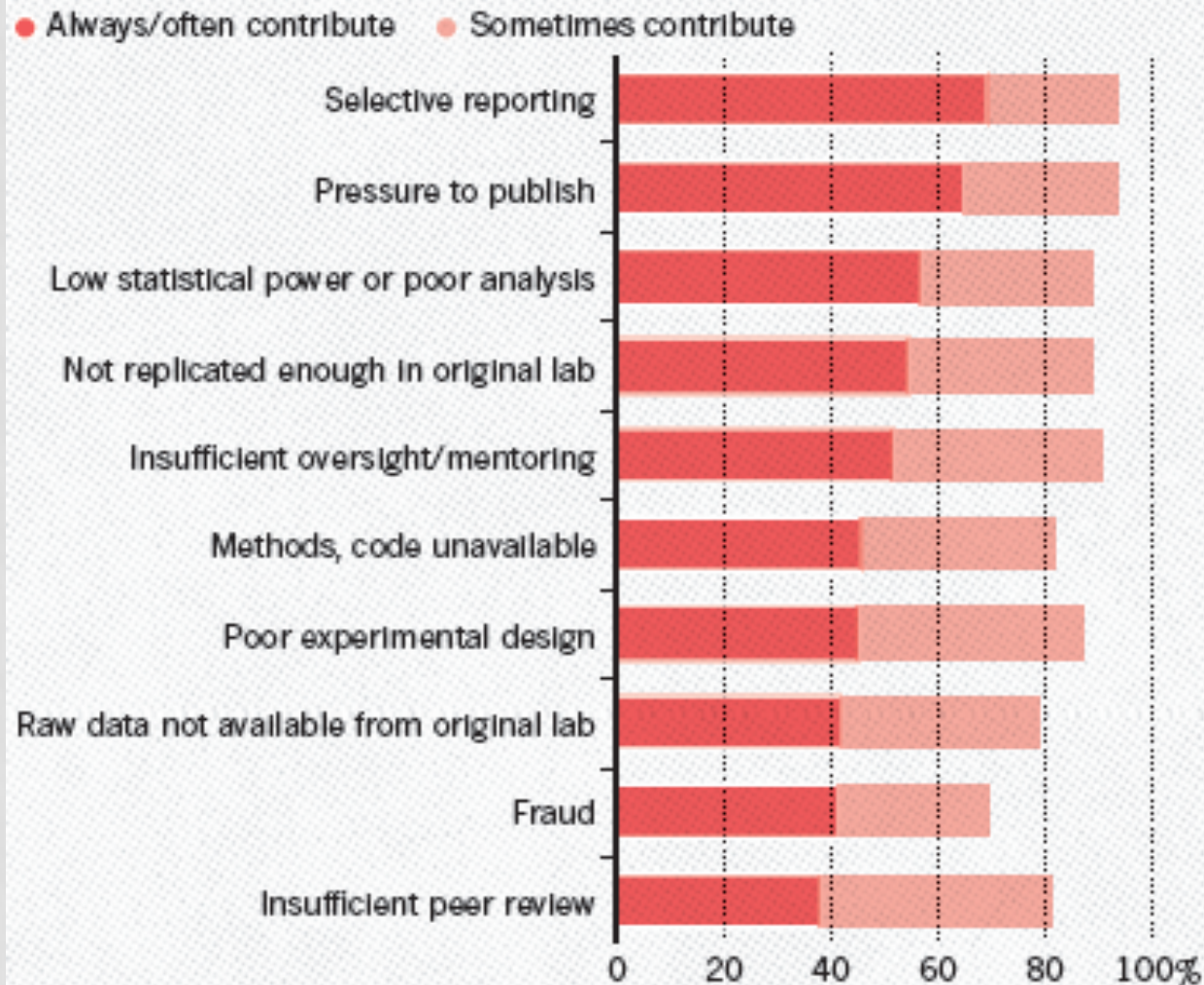
HAVE YOU FAILED TO REPRODUCE AN EXPERIMENT?

Most scientists have experienced failure to reproduce results.



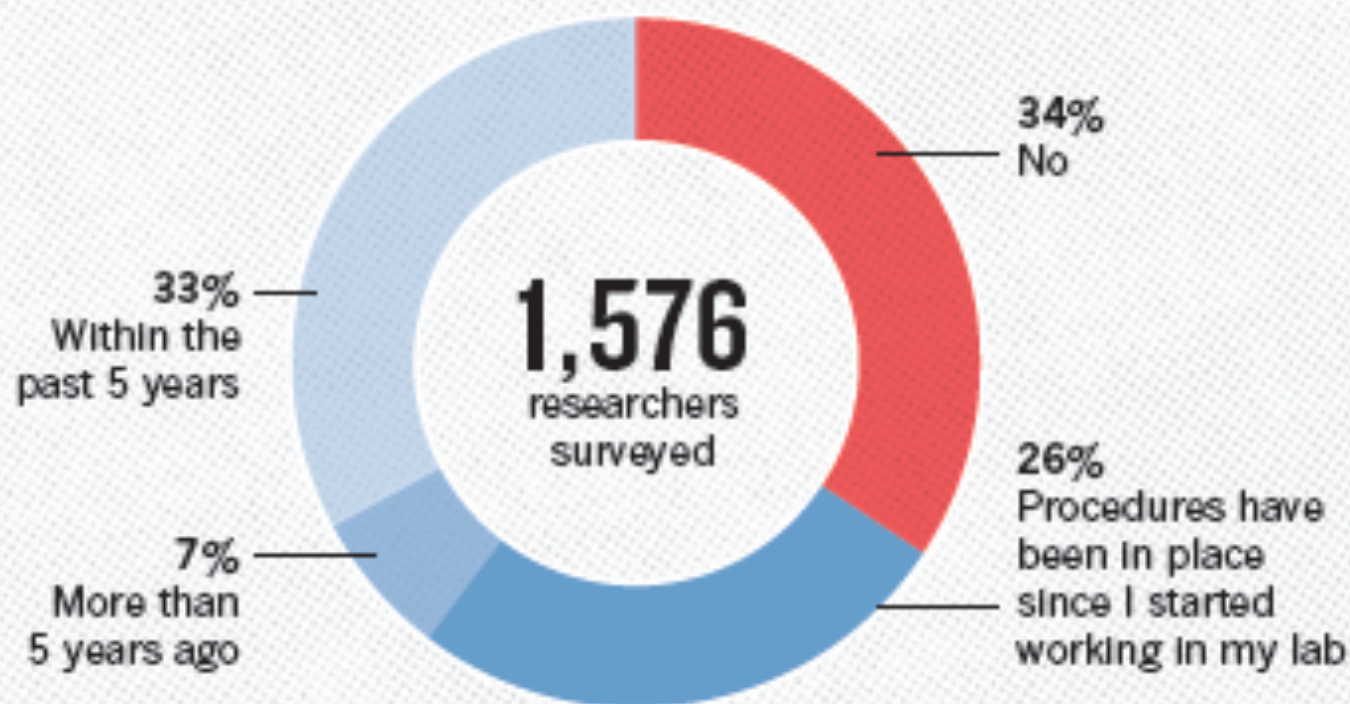
WHAT FACTORS CONTRIBUTE TO IRREPRODUCIBLE RESEARCH?

Many top-rated factors relate to intense competition and time pressure.



HAVE YOU ESTABLISHED PROCEDURES FOR REPRODUCIBILITY?

Among the most popular strategies was having different lab members redo experiments.



THE NIH INITIATIVE

- 'NIH has become increasingly concerned that students may not be receiving adequate training early in graduate school in experimental design and other skills related to conducting rigorous and reproducible research'

NEW GRANT GUIDELINES

what you need to know

WHY UPDATE THE GUIDELINES?

The updates focus on four areas deemed important for enhancing rigor and transparency:

1

PREMISE

The scientific premise forming the basis of the proposed research

2

DESIGN

Rigorous experimental design for robust and unbiased results

3

VARIABLES

Consideration of relevant biological variables

4

AUTHENTICATION

Authentication of key biological and/or chemical resources

Send inquiries to
reproducibility@nih.gov

See also NIH Notice NOT-OD-16-011

<http://grants.nih.gov/grants/guide/notice-files/NOT-OD-16-011.html>

WHAT ARE THE UPDATES?

1 UPDATES TO RESEARCH STRATEGY GUIDANCE

The research strategy is where you discuss the significance, innovation, and approach of your research plan. Let's look at an R01, for example:



Introduction to resubmission and revision applications



Specific aims



Research strategy



Commercialization plan



Biographical sketch

The new research strategy guidelines require that you:

- State the strengths and weakness of published research or preliminary data crucial to the support of your application
- Describe how your experimental design and methods will achieve robust and unbiased results
- Explain how biological variables, such as sex, are factored into research design and provide justification if only one sex is used

2 NEW ATTACHMENT FOR AUTHENTICATION OF KEY BIOLOGICAL AND/OR CHEMICAL RESOURCES

From now on, you must briefly describe methods to ensure the identity and validity of key biological and/or chemical resources used in the proposed studies.

These include, but are not limited to:

CELL LINES

ANTIBODIES

SPECIALTY CHEMICALS

OTHER BIOLOGICS

Standard laboratory reagents that are not expected to vary do not need to be included in the plan. Examples are buffers and other common biologicals or chemicals.



DO NOT put experimental methods or preliminary data in this section



DO focus on authentication and validation of key resources

3 NEW REVIEWER GUIDELINES

Here are the additional criteria the reviewers will be asked to use:



Is there a **strong scientific premise** for the project?



Have the investigators presented adequate plans to address **relevant biological variables**, such as sex, for studies in vertebrate animals or human subjects?



Have the investigators presented strategies to ensure a **robust and unbiased approach**, as appropriate for the work proposed?



Reviewers will also be asked to comment on that new attachment (see Update 2)!

<http://grants.nih.gov/reproducibility/index.htm>

TRAINING GRANTS

- Training grants, Career Development and Individual fellowships will require formal instructions in
 - Rigorous experimental design
 - Transparency to enhance reproducibility
- Boot camp supported under 'Administrative supplements to NIGMS Predoctoral Training Grants (PA-15-136)'
- PSU commitment to conduct boot camp for next five years

ENHANCING REPRODUCIBILITY

- Francis Collins and Lawrence Tabak
 - <http://www.nature.com/news/policy-nih-plans-to-enhance-reproducibility-1.14586>
- NIGMS site:
 - <http://grants.nih.gov/reproducibility/index.htm>
 - http://grants.nih.gov/grants/policy/rigor/NIH_Policy_Rigor_For_Reviewers/presentation.html
- Nature collection of articles
 - <http://www.nature.com/news/reproducibility-1.17552>