

Is science broken?

What is reproducible
writing?

Why should I write
my paper in a
reproducible
manner?

How to do it?

Style sheets

Reproducible paper writing

Some practical recommendations

Sebastian Sauer Christoph Kurz

FOM, Helmholtz Zentrum

September 22, 2016

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Echo in academia press

The Hardest Science

Everything is fucked: The syllabus

PNAS News | Aug 28, 2012

Samir Sisodia

PNAS News | Wed Mar 28, 2012 2:09pm EDT

cancer science, many "discoveries" don't

nature

Home | News & Comment | Research | Careers & Jobs | Current Issue | Archive | Audio & Video | For Authors

Archive | Volume 519 | Issue 7544 | Research Highlights: Social Selection | Article

Online debate erupts to ask: is science broken?

Panel discussion about the shortcomings of science sparks

Chris Woolston

20 March 2012

Open access, freely available online

ROBUST SCIENCE

FUNDERS JOURNALS RESEARCHERS

SCIENTIST

Essay

Why Most Published Research Findings Are False

John P. A. Ioannidis

Factors that influence this problem and some solutions thereof.

Modulating the Framework for False

is characteristic of this field and can vary a lot depending on whether the field targets highly likely relationships

NATURE | NEWS

Over half of psychology studies fail reproducibility test

Largest replication study to date casts doubt on many published positive results.

Monya Baker

27 August 2015

REPRODUCIBILITY CRISIS?

significant crisis

1,576 researchers surveyed

38% Yes, a slight crisis

Dodgy results are fuelling flawed policy decisions and undermining medical advances. They could even make us lose faith in science. **New Scientist** investigates

Echo in non-academia press

The Independent: Übersicht | INDEPENDENT News Voices Culture Lifestyle Tech Sport Olympics Daily Edition

The Economist: Problems with scientific research | How science goes wrong | Scientific research has changed the world. Now it needs to change itself | Oct 19th 2013 | From the print edition | Timekeeper | Like 29K | Tweet

The New York Times: SCIENCE | The New York Times | By BENEDICT CAREY | JUNE 15, 2015 | Video: Ganze Sendung "Krise in den Wissenschaften? Ist Wissenschaft ein Mythos geworden?"

Süddeutsche Zeitung: 17. Juli 2016, 14:15 Uhr | Wissenschaftsethik | "Es mussten unbedingt bahnbrechende Ergebnisse produziert werden..." | Süddeutsche Zeitung SZ.de Zeitung Magazin

Reproducible
paper writing

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Write plain text with computer code included

```
my_cool_paper.Rmd x
ABC Knit ...
```

```
1+ ---
2 title: "My cool paper"
3 author: "The Dude"
4 output: pdf_document
5 ---
6
7+ ## Text
8
9 This is an R Markdown document. Markdown is a simple
10 formatting syntax for authoring HTML, PDF, and MS Word documents.
11
12 For more details on using R Markdown
13 see <http://rmarkdown.rstudio.com>.
14
15+ ## R code
16
17+ ```{r cars}
18 summary(cars)}
19 ...
20
21+ ## Including Plots
22
23 You can also embed plots, for example:
24
25+ ```{r pressure, echo=FALSE}
26 plot(pressure)
27 ...
```

My cool paper
The Dude

Text

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

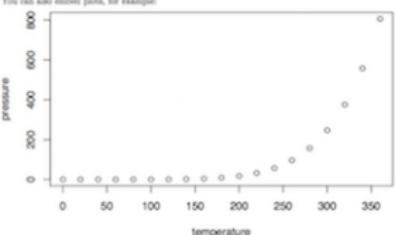
R code

```
summary(cars)
```

```
## # speed      dist
## Min. : 4.0  Min. : 2.00
## 1st Qu.: 14.0  1st Qu.: 26.00
## Median :15.0  Median :36.00
## Mean   :15.4  Mean   :43.98
## 3rd Qu.:19.0  3rd Qu.:56.00
## Max.  :28.0  Max.  :120.00
```

Including Plots

You can also embed plots, for example:



A scatter plot showing the relationship between temperature and pressure. The x-axis is labeled "temperature" and ranges from 0 to 350. The y-axis is labeled "pressure" and ranges from 0 to 800. The data points show a positive correlation, with pressure increasing as temperature increases.

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Why should I write my paper in a reproducible manner?

Re-do analysis with no pain

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Dude,

I sent you the wrong data. Find attached new dataset. Re-do all analyses. Did I mention we submit tomorrow?

Regards,

C. Kirk

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Match R code to results in paper easily

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Paper with ~1,000 lines of wild R code.

In results section:

“After some wild computation, we found accuracy to be
78%...”

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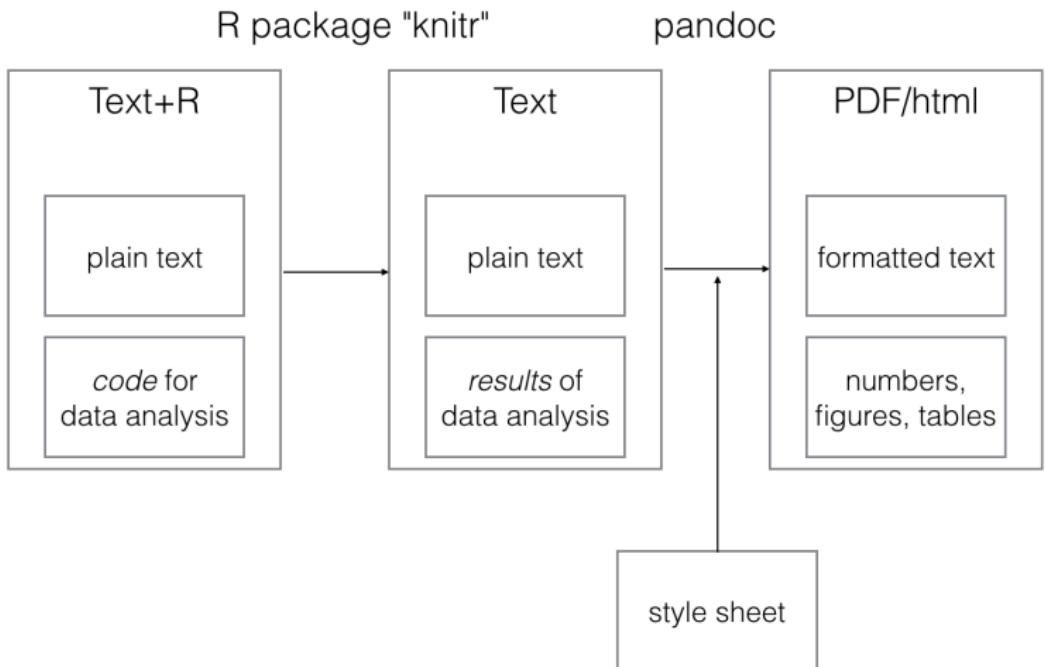
Style sheets

How to do it?

Process of repro paper writing

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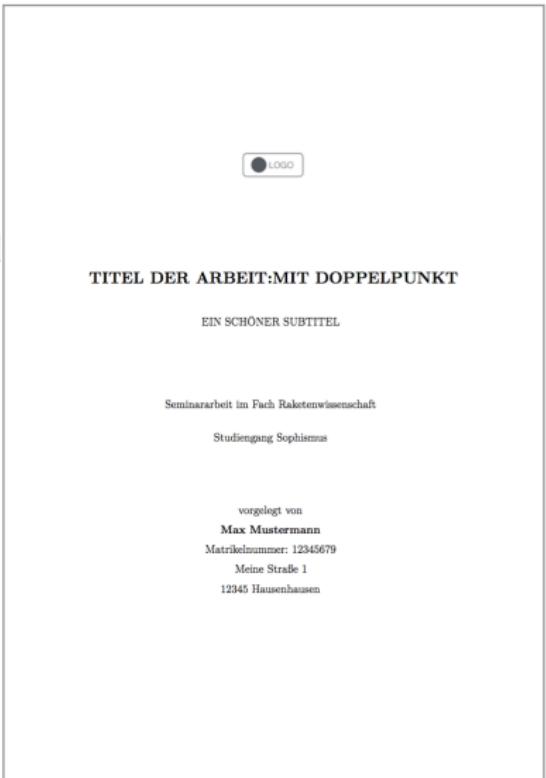
Style sheets

Style sheet for thesis/assignment

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Christoph Kurz

```
1 - ---  
2 title: "Titel der Arbeit:mit Doppelpunkt"  
3 subtitle: Ein schöner Subtitel  
4 referee: Prof. Dr. I. Weiß-Ois  
5 course: Seminararbeit im Fach Raketenwissenschaft  
6 field: Studiengang Sophismus  
7 author: Max Mustermann  
8 ID: "Matrikelnummer: 12345679"  
9 street: Meine Straße 1  
10 zipcity: 12345 Hausehausen  
11 date: 13. Mai 2016  
12 graphics:  
13 toc: true  
14 lof: true  
15 lot: true  
16 lang: de-De  
17 bibliography: Literatur.bib  
18 logo: logo.png  
19 documentclass: scrartcl  
20 highlight-style: kate  
21 output:  
22   pdf_document:  
23     number_sections: true
```



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Style sheet for APA papers

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Install PAPAJA and open new APA template in RStudio

```
---
```

```
title: "How to use papaja: An Example Manuscript Including Basic Instructions"
shorttitle: "How to use papaja"
author:
  - name: Frederik Aust
    affiliation: 1
    corresponding: yes    # Define only one corresponding author
    department:
    address: "Department Psychology, University of Cologne, Herbert-Lewin-Str. 2, 50931
Köln, Germany"
    email: "frederik.aust@uni-koeln.de"
affiliation:
  - id: 1
    institution: "University of Cologne"

abstract: |
  This manuscript demonstrates how to use R Markdown and papaja to
  create an APA conform manuscript. papaja builds on R Markdown, which
  uses pandoc to turn Markdown into PDF or Word documents. The conversion
  to Word documents currently supports only a limited set of features.

autor_note: |
  `papaja` has not yet been submitted to CRAN; a development version is available at
  https://github.com/crsh/papaja

keywords: "APA style, knitr, R, R markdown, papaja"
```

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Acknowledgments/ more infos

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Christoph Kurz

- ▶ Yihui Xie for knitr more
[\(https://yihui.org/knitr/\)](#)
- ▶ John Gruber & Aaron Swartz for markdown more
[\(https://daringfireball.net/projects/markdown/\)](#)
- ▶ John MacFarlane for pandoc more
[\(https://pandoc.org/\)](#)
- ▶ RStudio team for RStudio more
[\(https://rstudio.com/\)](#)
- ▶ R community for R [more]
[\(https://cran.r-project.org\)](#)
- ▶ Frederik Aust for papaja [more]
[\(https://github.com/crsh/papaja\)](#)
- ▶ Get my thesis template here
[\(https://gitlab.com/frederik.aust/thesis\)](#)
- ▶ Github team for github more
[\(https://github.com/\)](#)
- ▶ Steven V. Miller for this beamer template
[\(https://www.math.uconn.edu/~jmiller/math5550/beamer/\)](#)
- ▶ The unkown God

That's all free stuff!

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