

Reproducible Biosurveillance with knitr

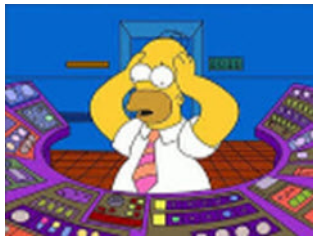
Dec 8, 2015

Motivation for using knitr

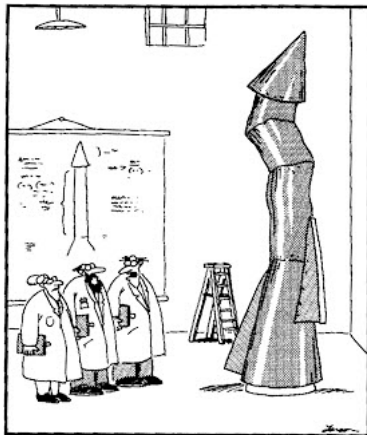
Increase efficiency of own workflow

Don't have to jump back and forth between

Microsoft Word, Microsoft Excel, and R



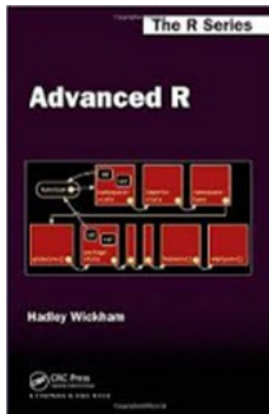
Allows others to verify one's results



"It's time we face reality, my friend. ... We're not exactly rocket scientists."

Everybody makes mistakes: reproducibility enables corrections.

This was made with knitr



Can create various outputs

PDF, Word, HTML, Beamer presentation

```
title: "Reproducible Biosurveillance with knitr"  
fontsize: 10pt  
date: Dec 8, 2015  
output: beamer_presentation
```

For PDF...replace **beamer_presentation** with **pdf_document**

For Word...replace **beamer_presentation** with **word_document**

For HTML...replace **beamer_presentation** with **html_document**

Some RMarkdown syntax

Have to create empty spaces and new lines

The answer is 4.

The
answer
is
4.

Embolden, italicize, change font color

R is free

R is free

R is free

Embed R code

Embed R code with chunks

```
bob=rnorm(100)  
summary(bob)
```

```
##      Min. 1st Qu.  Median    Mean 3rd Qu.    Max.  
## -2.8450 -0.9673 -0.3474 -0.2413  0.5051  1.9780
```

If you have chunks that take a long time to run

Put this below metadata section

```
`r library(knitr)`  
`r opts_chunk$set(cache=TRUE)`
```

Embed R code with inline expressions

The number of days in a week multiplied by the number of hours in a day:
168

Embed equations

Place equation in a sentence

The number of days in a week multiplied by the number of hours in a day:

$$z\text{-score} = \frac{x - \mu_x}{\sigma_x}$$

Make equation the star of a slide

$$z - score = \frac{x - \mu_x}{\sigma_x}$$

For more complicated equations

Download

<http://www.lyx.org/>

Create equation with point-and-click, convert to Latex, then paste in Rmd file

Embed images

Embed images



Making tables

Simple tables with the **printr** package

```
library(printr)
options(digits = 4)
set.seed(123)
x = matrix(rnorm(40), 5)
x = as.data.frame(x)
x
```

V1	V2	V3	V4	V5	V6	V7	V8
-0.5605	1.7151	1.2241	1.7869	-1.0678	-1.6867	0.4265	0.6886
-0.2302	0.4609	0.3598	0.4979	-0.2180	0.8378	-0.2951	0.5539
1.5587	-1.2651	0.4008	-1.9666	-1.0260	0.1534	0.8951	-0.0619
0.0705	-0.6869	0.1107	0.7014	-0.7289	-1.1381	0.8781	-0.3060
0.1293	-0.4457	-0.5558	-0.4728	-0.6250	1.2538	0.8216	-0.3805

Modify table

```
knitr::kable(x, digits = 2, caption = "A table produced by print
```

Table 2:A table produced by print.

V1	V2	V3	V4	V5	V6	V7	V8
-0.56	1.72	1.22	1.79	-1.07	-1.69	0.43	0.69
-0.23	0.46	0.36	0.50	-0.22	0.84	-0.30	0.55
1.56	-1.27	0.40	-1.97	-1.03	0.15	0.90	-0.06
0.07	-0.69	0.11	0.70	-0.73	-1.14	0.88	-0.31
0.13	-0.45	-0.56	-0.47	-0.63	1.25	0.82	-0.38

Just show output

V1	V2	V3	V4	V5	V6	V7	V8
-0.5605	1.7151	1.2241	1.7869	-1.0678	-1.6867	0.4265	0.6886
-0.2302	0.4609	0.3598	0.4979	-0.2180	0.8378	-0.2951	0.5539
1.5587	-1.2651	0.4008	-1.9666	-1.0260	0.1534	0.8951	-0.0619
0.0705	-0.6869	0.1107	0.7014	-0.7289	-1.1381	0.8781	-0.3060
0.1293	-0.4457	-0.5558	-0.4728	-0.6250	1.2538	0.8216	-0.3805

Use Latex or Excel for more complicated tables

Name	Thread pitch (mm)	Minor diameter tolerance	Nominal diameter (mm)	Head shape	Price for 50 screws	Available at factory outlet?	Number in stock	Flat or Phillips head?
M4	0.7	4g	4	Pan	\$10.08	Yes	276	Flat
M5	0.8	4g	5	Round	\$13.89	Yes	183	Both
M6	1	5g	6	Button	\$10.42	Yes	1043	Flat
M8	1.25	5g	8	Pan	\$11.98	No	298	Phillips
M10	1.5	6g	10	Round	\$16.74	Yes	488	Phillips
M12	1.75	7g	12	Pan	\$18.26	No	998	Flat
M14	2	7g	14	Round	\$21.19	No	235	Phillips
M16	2	8g	16	Button	\$23.57	Yes	292	Both
M18	2.1	8g	18	Button	\$25.87	No	664	Both
M20	2.4	8g	20	Pan	\$29.09	Yes	486	Both
M24	2.55	9g	24	Round	\$33.01	Yes	982	Phillips
M28	2.7	10g	28	Button	\$35.66	No	1067	Phillips
M36	3.2	12g	36	Pan	\$41.32	No	434	Both
M50	4.5	15g	50	Pan	\$44.72	No	740	Flat

If you choose the path of Latex

`http://www.tablesgenerator.com/`

Compile directly from R scripts

Compile directly from R scripts

```
rmarkdown::render("example.R", "pdf_document")
```

To learn more

Visit this website

`http://rmarkdown.rstudio.com/`

Download cheat sheet

`http://www.rstudio.com/wp-content/uploads/2015/02/rmarkdown-cheatsheet.pdf`

Walk through some Rmd files that you can take home

Walk through some Rmd files that you can take home

- ▶ R Markdown.Rmd (for this presentation)
- ▶ overview.Rmd
- ▶ Shiny_Intro.Rmd