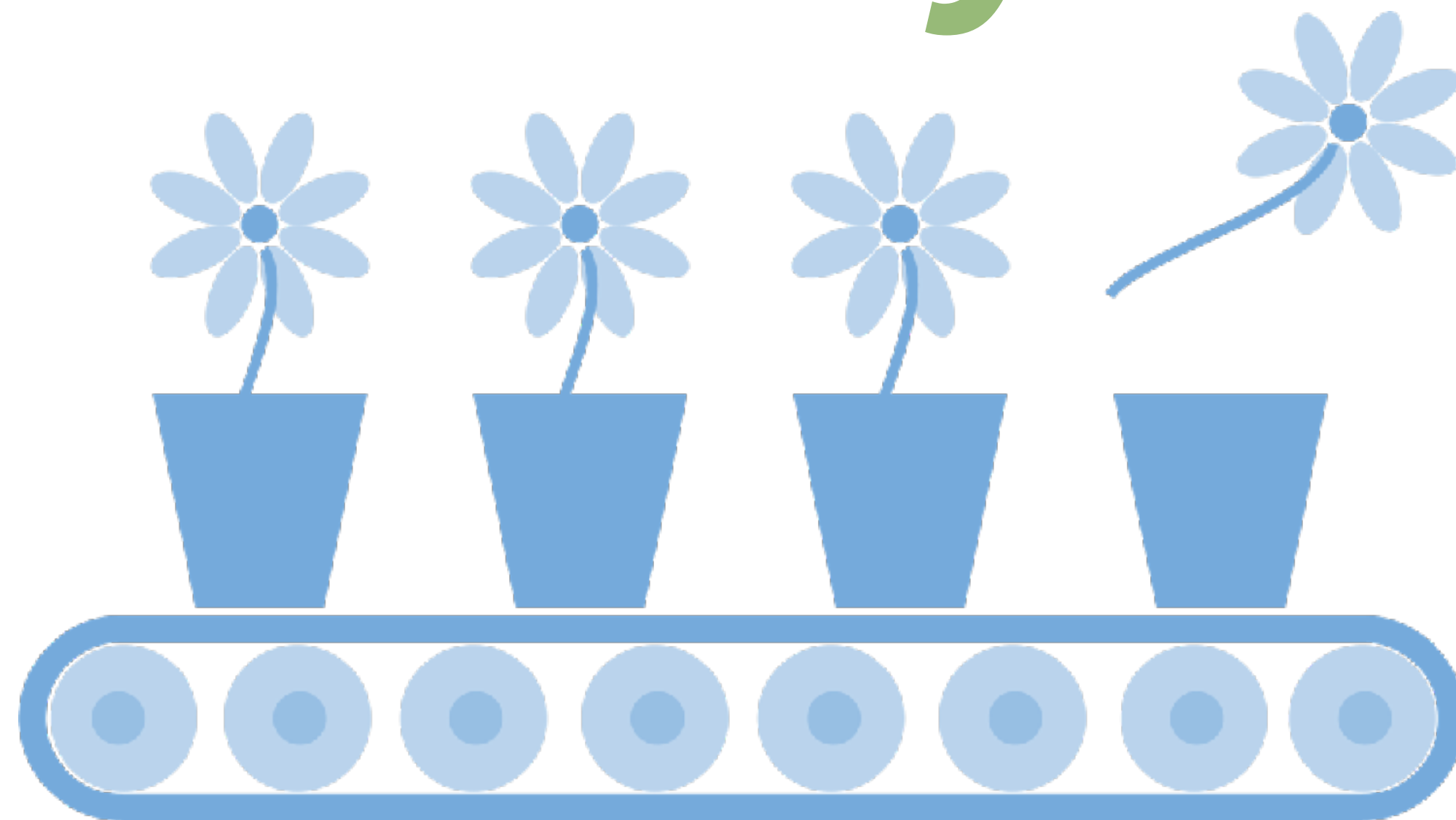


# From reproducibility to interactivity



---

minebocek 

mine-cetinkaya-rundel 

cetinkaya.mine@gmail.com 

61

45

4

94

12

3



```
# set.seed  
set.seed(20190314)
```

```
# generate 8 random numbers between 0 and 99  
runif(8, 0, 99) %>% round()
```

20

44

more than **70** percent

have tried and **failed** to reproduce  
**another** scientist's experiments

more than **50** percent

have tried and **failed** to reproduce  
their **own** experiments

Google Scholar yields

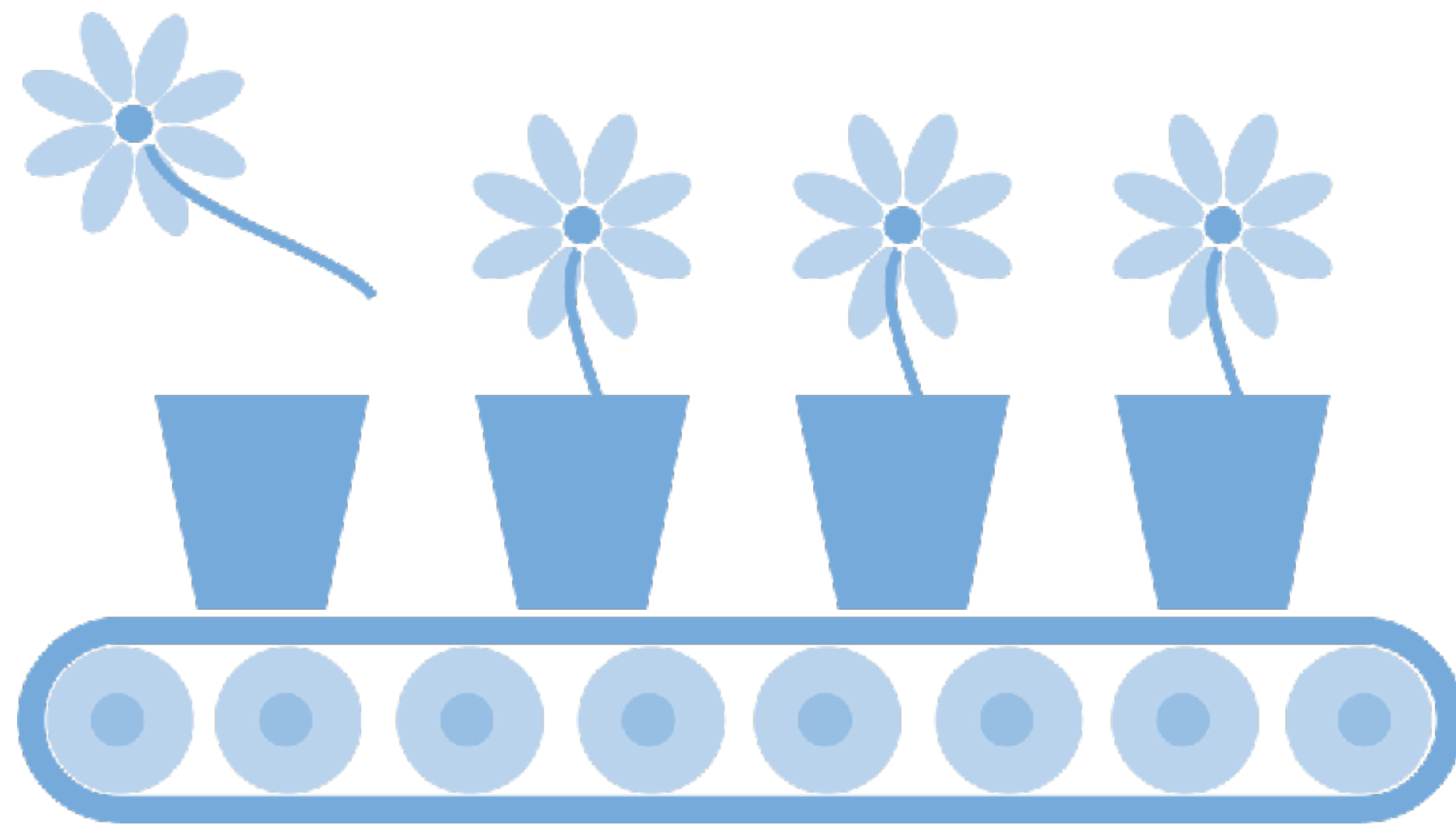
715

results containing the term **reproducibility crisis**  
just in **2019**

# Computational Documents







# Authors

Generate reports  
efficiently



# Users

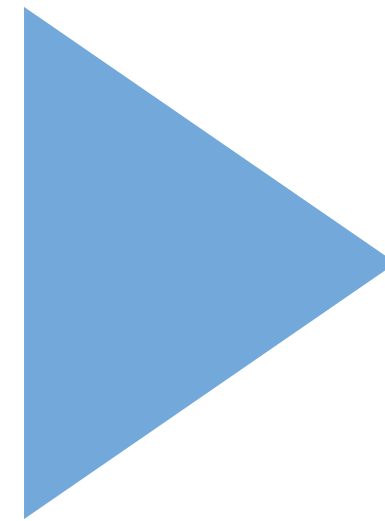
Interact with  
content



# Outline

1. Computational Documents
2. R Markdown
3. Tips
4. Thinking about Interactivity

# R Markdown



02-rmd.Rmd

# rmarkdown.rstudio.com/formats

## RStudio Formats

R Markdown formats from RStudio (see below for additional formats created by the R community)

### Documents

<a href="#">Notebook</a>	Interactive R Notebooks
<a href="#">HTML</a>	HTML document w/ Bootstrap CSS
<a href="#">PDF</a>	PDF document (via LaTeX template)
<a href="#">Word</a>	Microsoft Word document (docx)
<a href="#">ODT</a>	OpenDocument Text document
<a href="#">RTF</a>	Rich Text Format document
<a href="#">Markdown</a>	Markdown document (various flavors)

### Presentations

<a href="#">ioslides</a>	HTML presentation with ioslides
<a href="#">reveal.js</a>	HTML presentation with reveal.js
<a href="#">Slidy</a>	HTML presentation with W3C Slidy
<a href="#">Beamer</a>	PDF presentation with LaTeX Beamer
<a href="#">PowerPoint</a>	PowerPoint presentation

### Journals

<a href="#">jss_article</a>	Journal of Statistical Software (JSS)
<a href="#">acm_article</a>	Association for Computing Machinery (ACM)
<a href="#">acs_article</a>	American Chemical Society (ACS) Journal
<a href="#">ctex</a>	Documents based on the LaTeX package ctex
<a href="#">elsevier_article</a>	Submissions to Elsevier journals

### More

<a href="#">flexdashboard</a>	Interactive dashboards
<a href="#">bookdown</a>	HTML, PDF, ePub, and Kindle books
<a href="#">Websites</a>	Multi-page websites
<a href="#">blogdown</a>	Customizable websites and blogs
<a href="#">pkgdown</a>	Package documentation websites
<a href="#">Tuftes Handout</a>	Handouts in the style of Edward Tufte
<a href="#">Package Vignette</a>	R package vignette (HTML)
<a href="#">Github Document</a>	GitHub Flavored Markdown document.

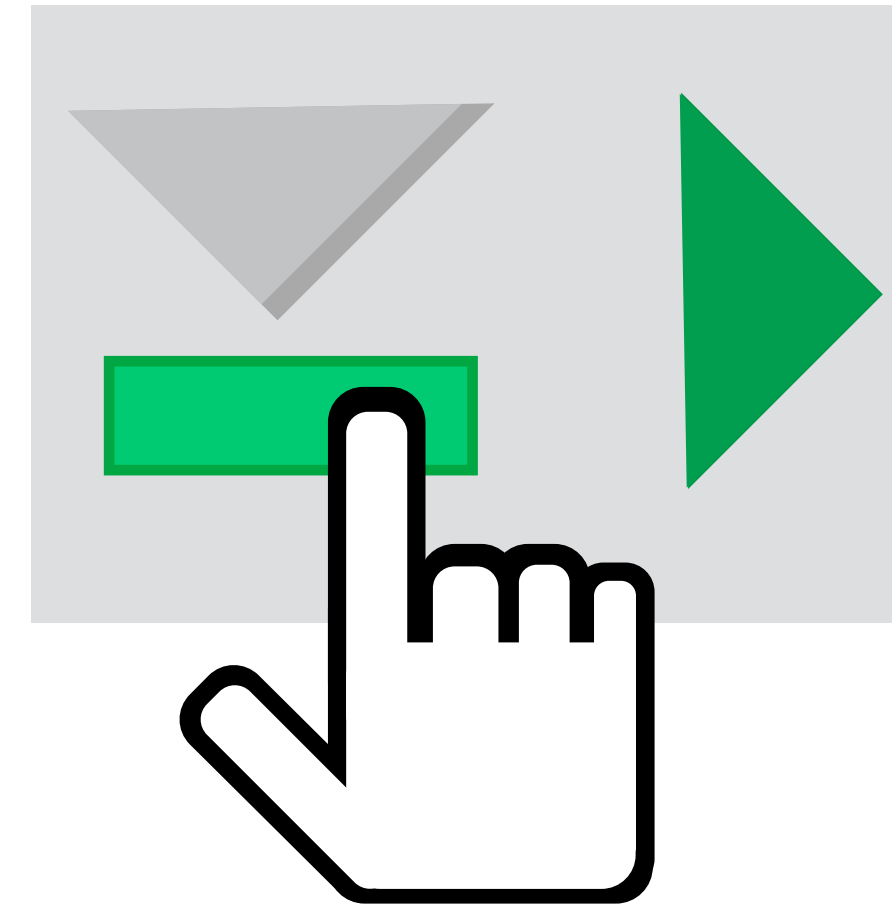
# Recap



Plain text  
files



Embedded  
code



Notebook  
interface



Generate  
reports

# Tips



# rmarkdown.rstudio.com/lesson-1.html

Introduction

How It Works

Code Chunks

Inline Code

Code Languages

Parameters

Tables

Markdown Basics

Output Formats

Notebooks

Slide Presentations

Dashboards

Websites

Interactive Documents

Cheatsheets

## Introduction

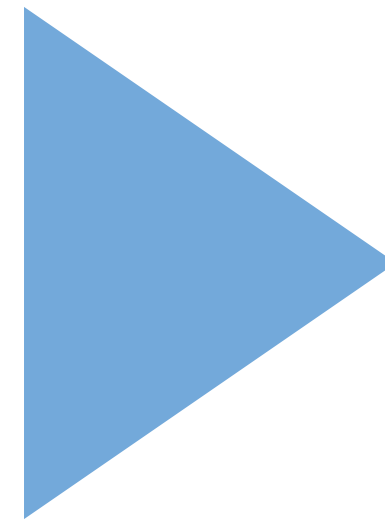
### Overview

R Markdown provides an authoring framework for data science. You can use a single R Markdown file to both

- save and execute code
- generate high quality reports that can be shared with an audience

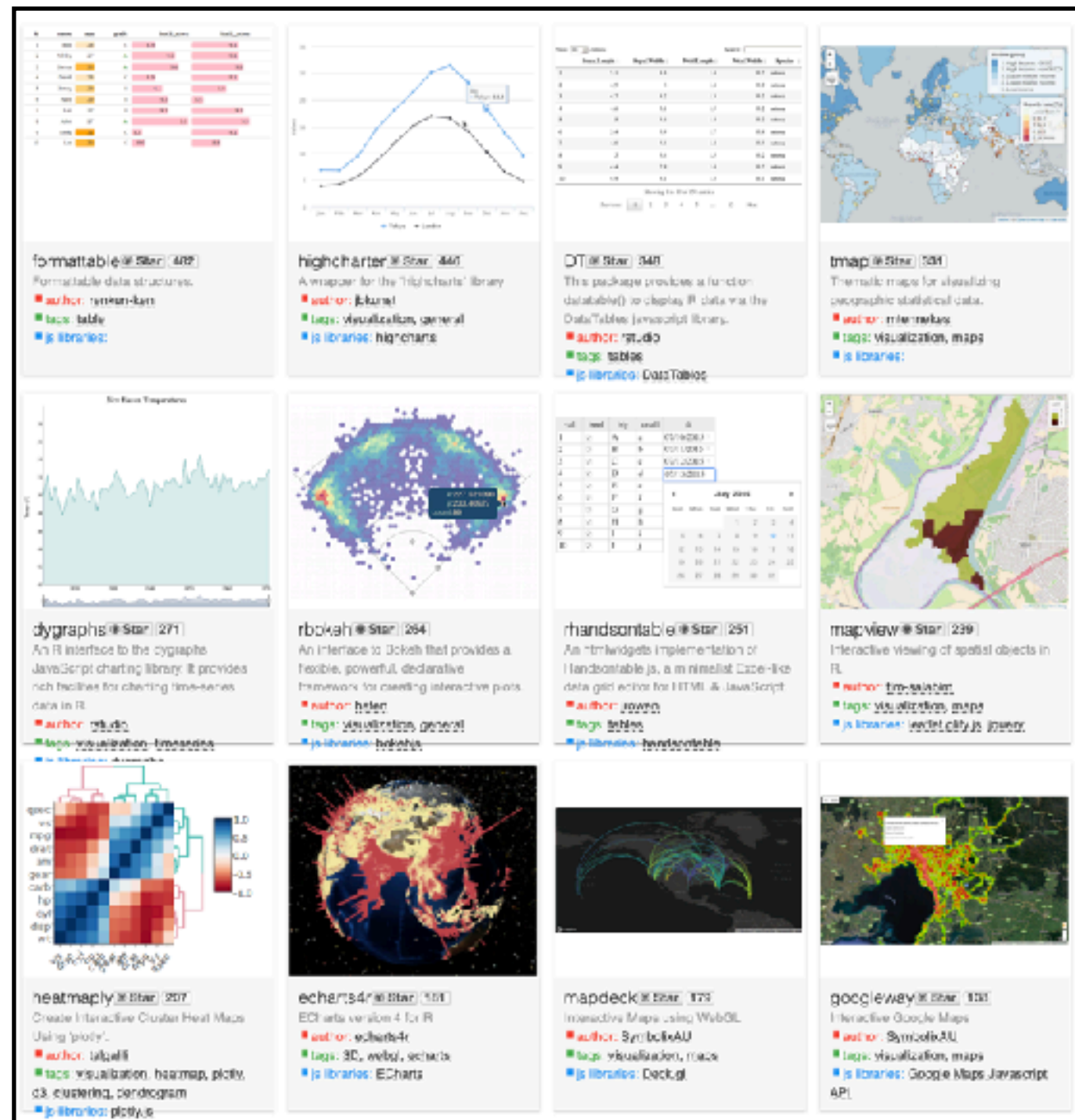
R Markdown documents are fully reproducible and support dozens of static and dynamic output formats. This 1-minute video provides a quick tour of what's possible with R Markdown:





02-rmd.Rmd

03-rmd-with-parameters.Rmd



# htmlwidgets

Self-contained  
interactive widgets



# Shiny

Interactive GUI  
to a live R session

# www.htmlwidgets.org

htmlwidgets for R

Home

Showcase

Develop ▾

Flexdashboard

Crosstalk

Gallery

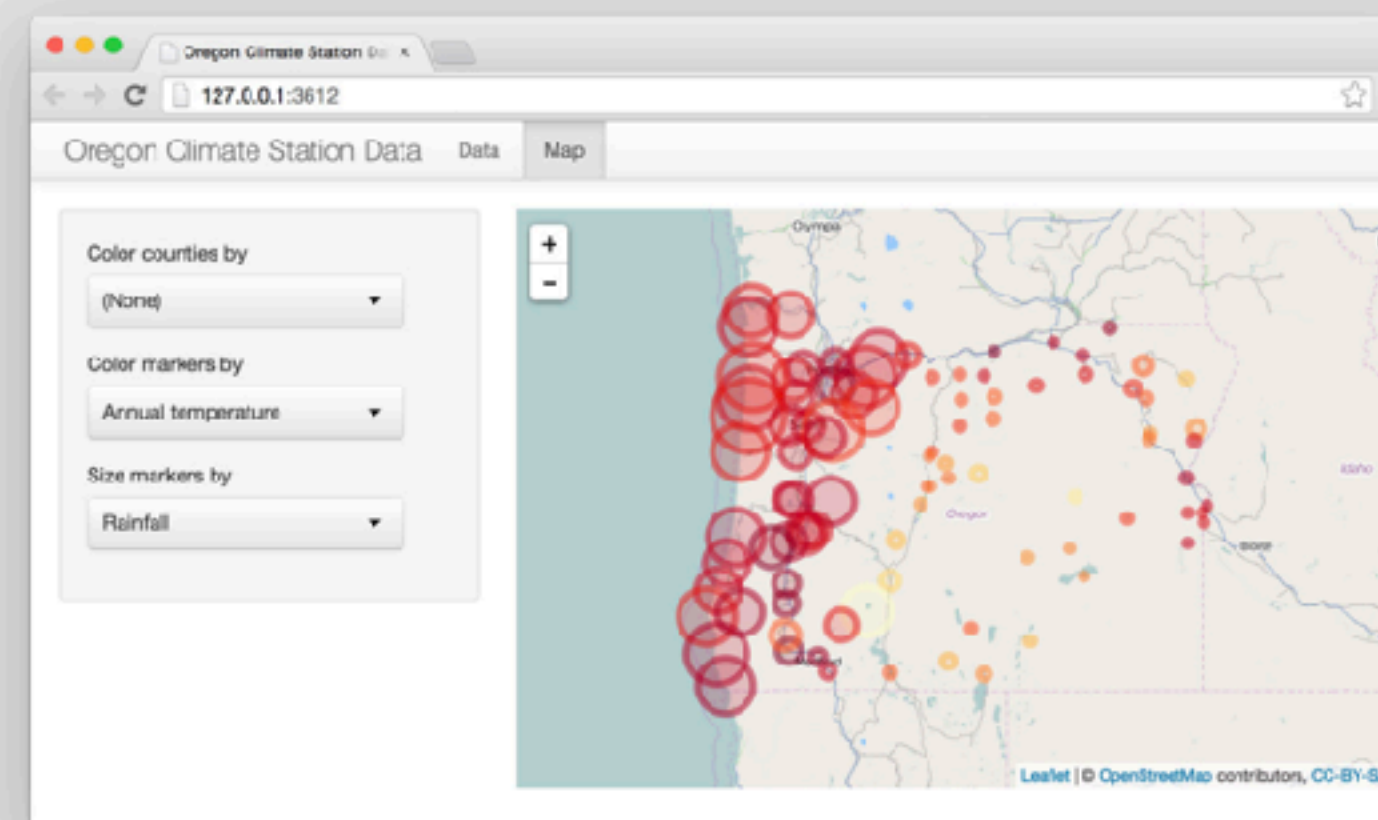
GitHub

## Bring the best of JavaScript data visualization to R

Use JavaScript visualization libraries at the R console, just like plots

Embed widgets in R Markdown documents and Shiny web applications

Develop new widgets using a framework that seamlessly bridges R and JavaScript

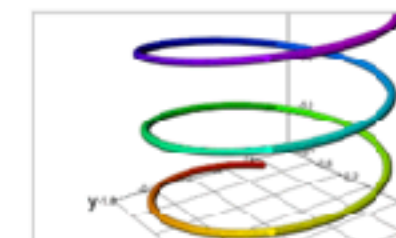
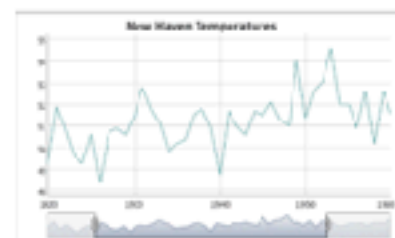


At the R console

In R Markdown docs

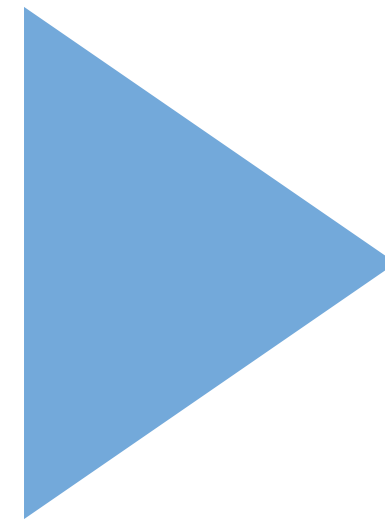
In Shiny apps

## Widgets in action



Just a line or two of R code can be used to create interactive visualizations. See the featured widgets in the [showcase](#) and browse over 50 available widgets in the [gallery](#).

[See the showcase »](#)





`04-rmd-with-htmlwidget.Rmd`



# shiny.rstudio.com

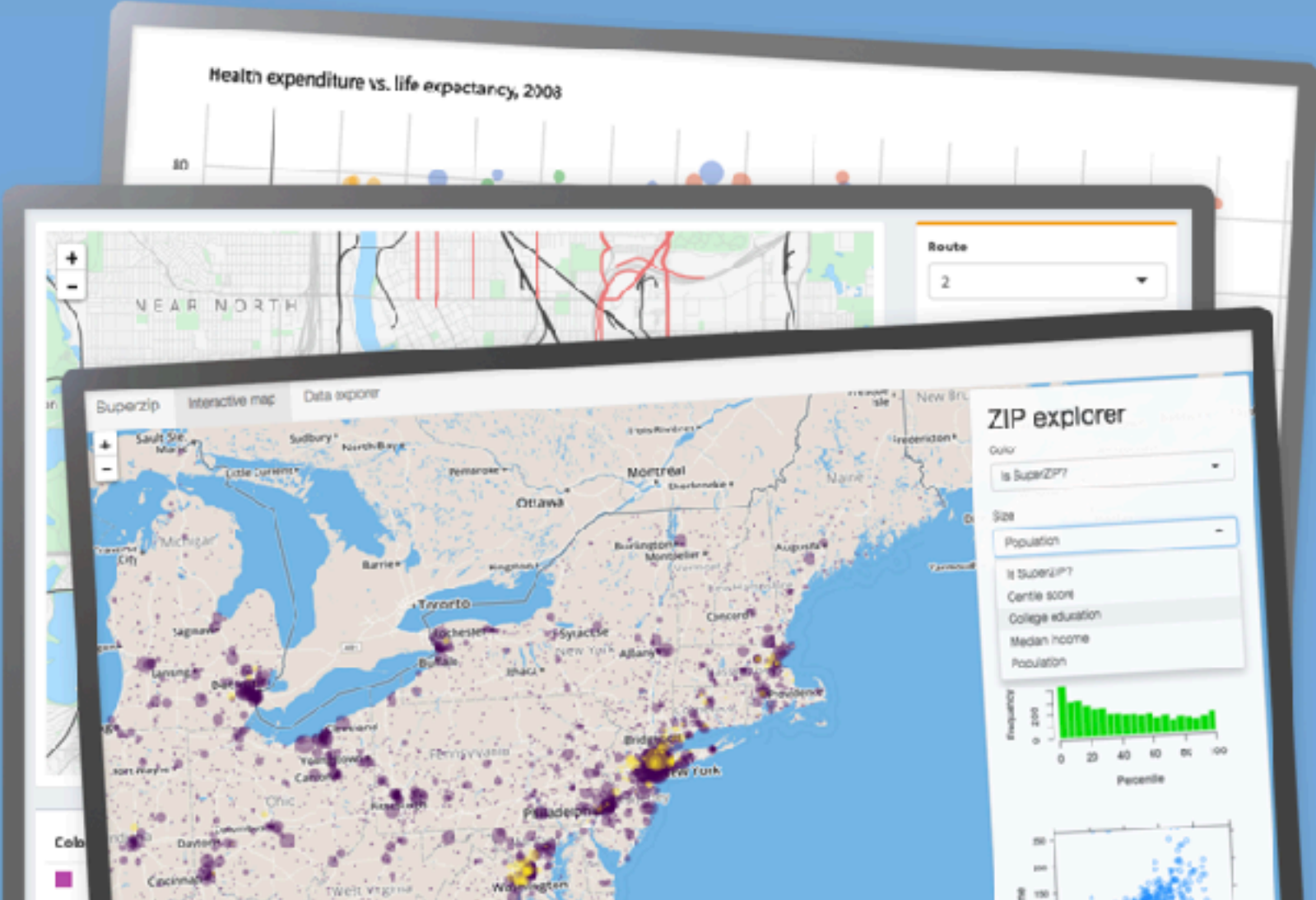
## Shiny

from  Studio

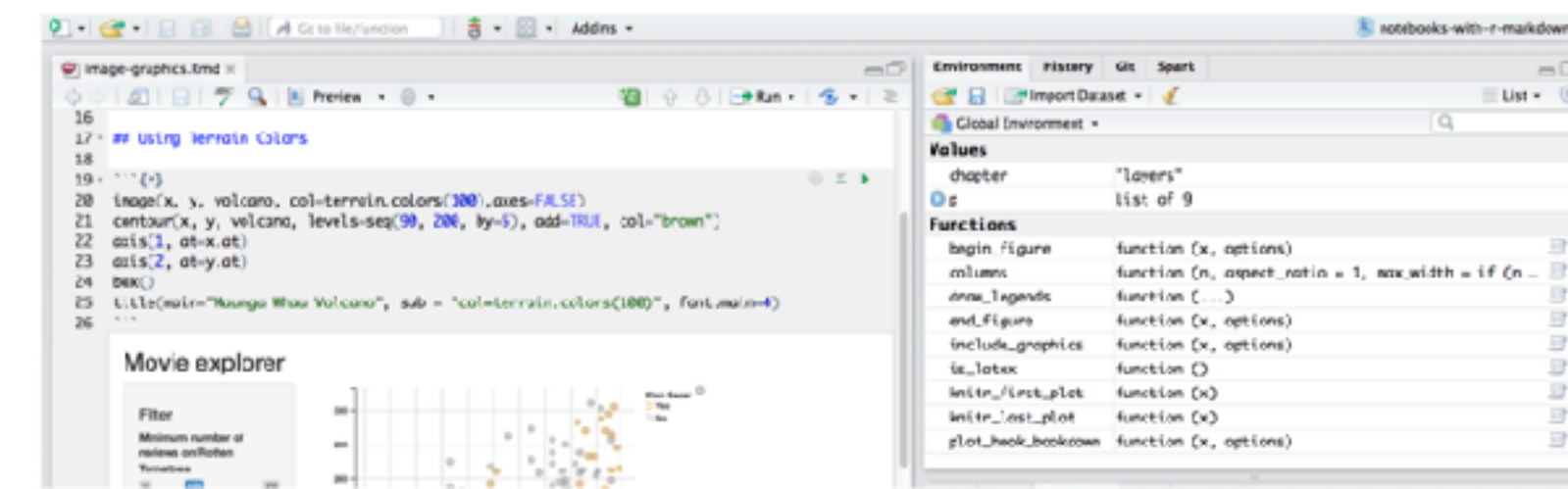
[Get Started](#) [Gallery](#) [Articles](#) [Reference](#) [Deploy](#) [Help](#) [Contribute](#) 

Interact. Analyze. Communicate.

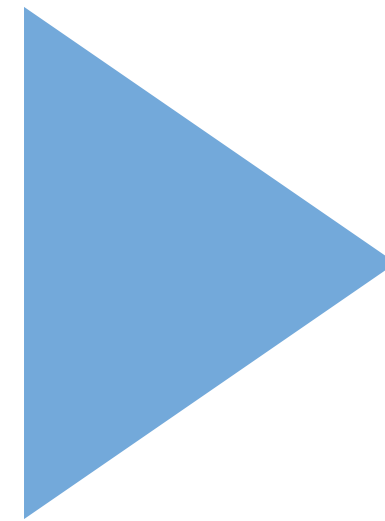
Take a fresh, interactive approach to telling your data story with Shiny. Let users interact with your data and your analysis. And do it all with R.



Shiny is an R package that makes it easy to build interactive web apps straight from R. You can host standalone apps on a webpage



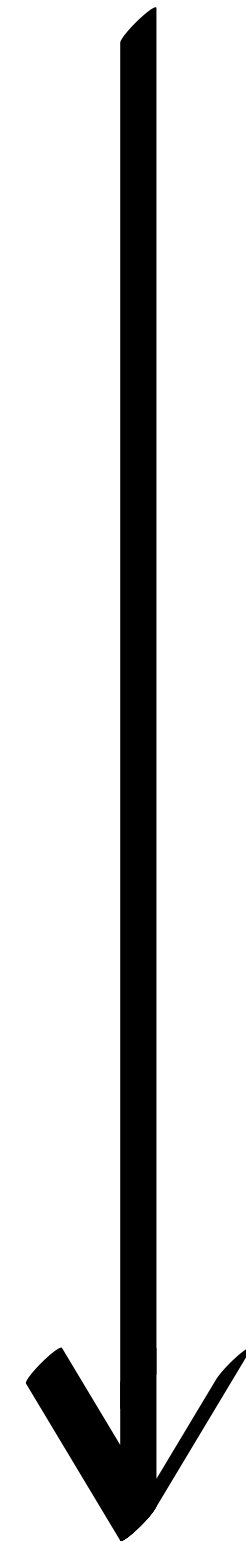




`05-rmd-with-shiny.Rmd`

`06-rmd-dashboard-with-shiny.Rmd`

*More  
interactive*



.Rmd

.Rmd with parameters

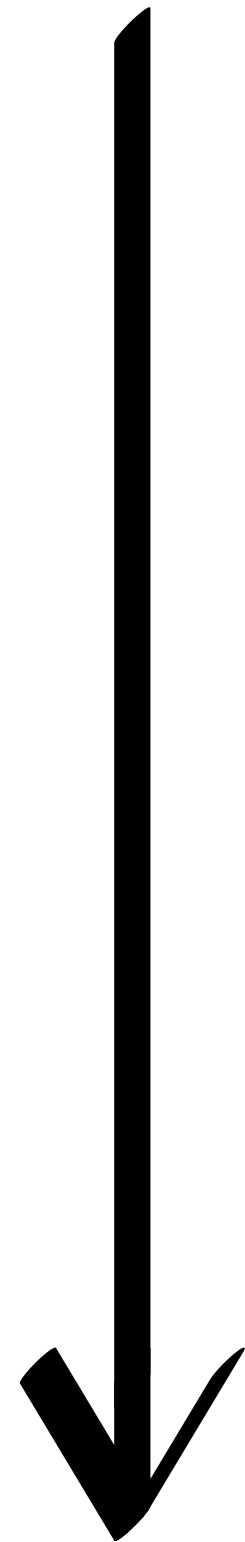
.Rmd with htmlwidgets

.Rmd with Shiny components

**Shiny app**

# Thinking about Interactivity

More  
complicated



.Rmd

.Rmd with parameters

.Rmd with htmlwidgets

.Rmd with Shiny components

**Shiny app**

.Rmd

.Rmd with parameters

.Rmd with htmlwidgets

.Rmd with Shiny components

**Shiny app**

---

*change the data more  
than once per session?*

.Rmd

.Rmd with parameters

.Rmd with htmlwidgets

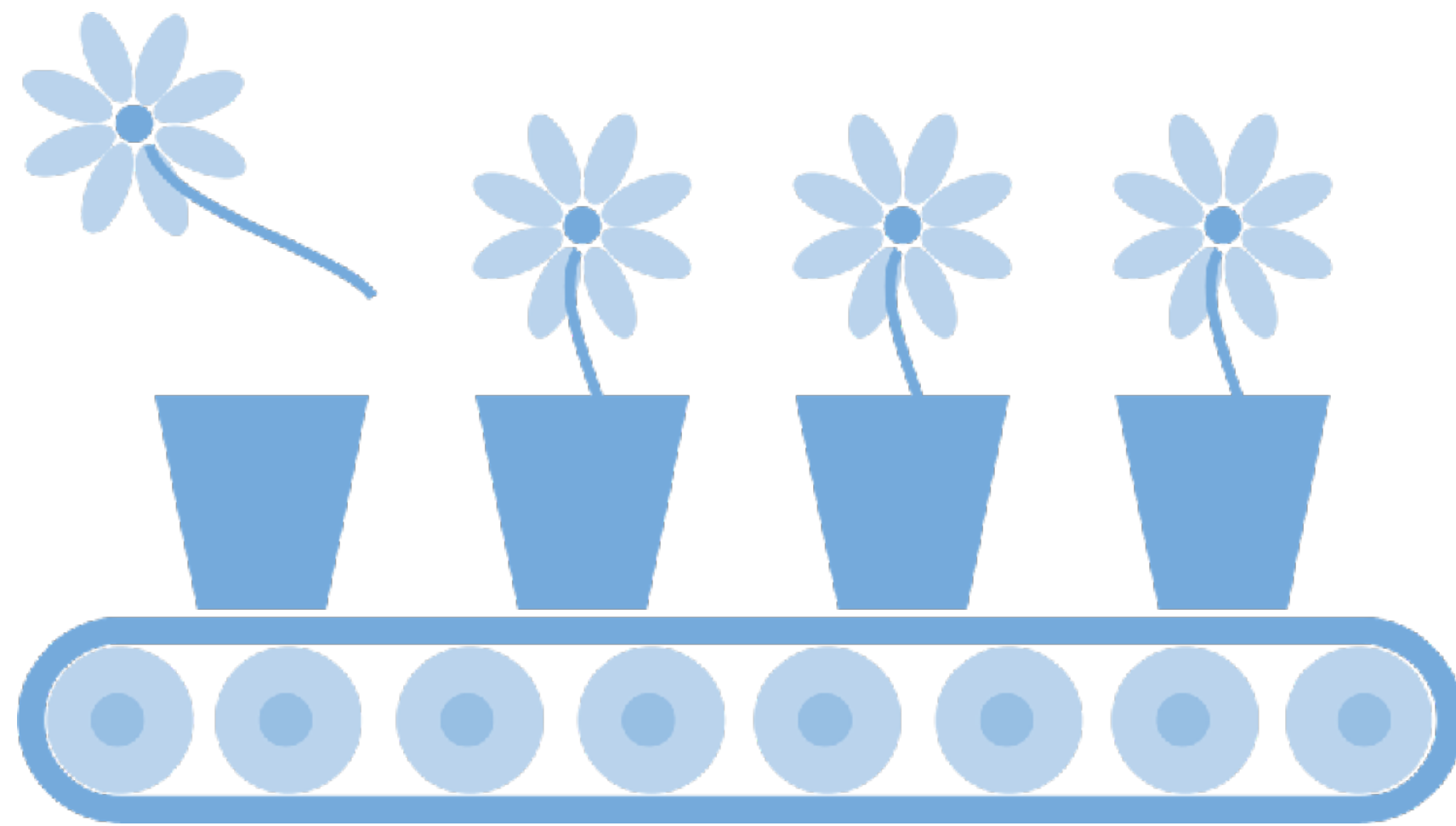
.Rmd with Shiny components

**Shiny app**

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Need more than  
a document or  
dashboard?





# Authors

Generate reports  
efficiently



# Users

Interact with  
content

# From reproducibility to interactivity

 [rstudio.io/repro-to-interact](https://rstudio.io/repro-to-interact)



CC-BY-4.0

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