An Agile Widget Engine for Real-time, Dynamic Visualizations: The **switchboard** Package for R [BETA]

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University of South Florida, October 7th 2021 (vignette v. 0.1 for switchboard v. 0.1)

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Purpose of the switchboard package

The **switchboard** package for R is an agile widget engine for creating dynamic, real-time dashboards for iterative simulations (e.g., for/while loops). It contains a growing, unsorted collection of visualization widgets rendered in a Tcl/Tk GUI–these include progress bars, counters, eavesdroppers, injectors, switches, and sliders. Below is a brief tutorial to get started on creating your own dashboards.

Updates to this vignette will be posted on our research webpage at USF.

For the source code of **switchboard** see: http://cran.r-project.org/web/packages/juicr/index.html or https://github.com/mjlajeunesse/switchboard.

How to cite? TBA, but for this beta version maybe:

Lajeunesse, M.J. (2021) Creating dynamic, real-time dashboards with the **switchboard** package for *R*. R package, v. 0.1.
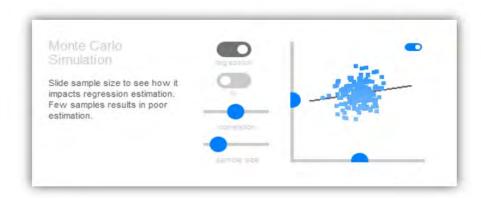
Report a bug? Have comments or suggestions?

Please email me any bugs, comments, or suggestions and I'll try to include them in future releases: lajeunesse@usf.edu. Also try to include **switchboard** in the subject heading of your email. Finally, I'm open to almost anything, but expect a lag before I respond and/or new additions are added.

Video tutorials on YouTube (click on switchboard hex to visit or https://www.youtube.com/c/lajeunesselab**)**

Quick Monte Carlo simulation

Here is how you would script a small Monte Carlo simulation exploring the effects of sample size on linear regression estimation:

Tcl/Tk window generated by switchboard: *Monte Carlo Simulation 1*

```r
library(switchboard)
library(MASS)

pop_rho <- 0
pop_X <- 0
pop_Y <- 0
pop_forget <- 400 #milliseconds
ctrl_regression <- FALSE
ctrl_N <- FALSE

for(i in 1:1e5) {

  cov_XY <- matrix(c(1, pop_rho, pop_rho, 1), nrow = 2, ncol = 2)
  sample_XY <- MASS::mvrnorm(1, mu = c(pop_X, pop_Y), Sigma = cov_XY)

  switchboard() %>%
    caption(c("Monte Carlo Simulation",
              "Slide sample size to see how it impacts regression estimation.
              Few samples results in poor estimation."),
              placeOnGrid = c(1,1), size = 2) %>%
    control_switch_pair(c("ctrl_regression", "ctrl_N"),
                        label = c("regression line", "plot N"), placeOnGrid = c(1,3)) %>%
    control_slider_pair(c("pop_rho","pop_forget"),
                        minimum = c(-1, 4), maximum = c(1, 3000),
                        label = c("correlation", "sample size"),
                        placeOnGrid = c(2,3)) %>%
    injector_2D(c(sample_XY[1], sample_XY[2]),
                inject = c("pop_X", "pop_Y"),
                minimum = c(-5,-5), maximum = c(5,5),
                plotRegression = ctrl_regression, plotSampleSize = ctrl_N, size = 2,
                forget = pop_forget, placeOnGrid = c(1,4), switch = TRUE)

}
switchboard_close()
```