A Time Series Platform For The Tidyverse

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About Business Science

- We are applications people that build tools to solve tough problems
- We serve the data science community
- We empower data scientists via education

Business Science University

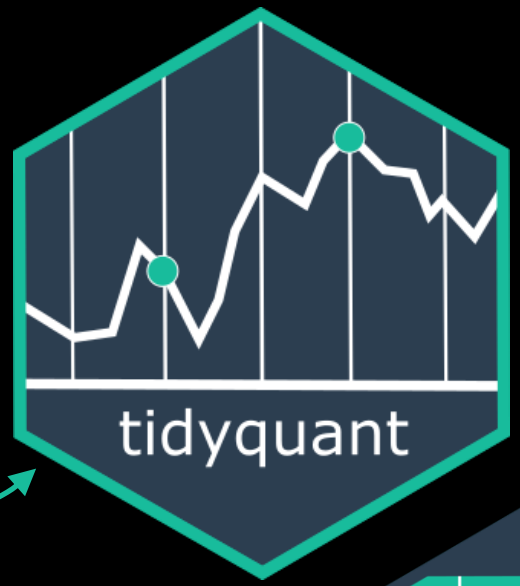
- Data Science For Business
  - BSPF
  - Tidy Eval
  - H2O
  - LIME

Real World
CHURN Problem!

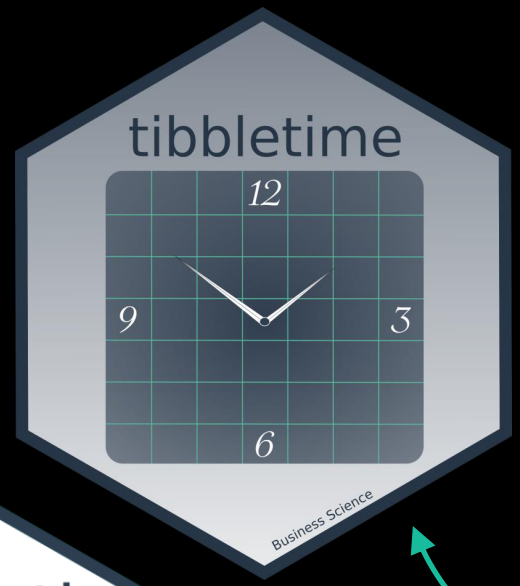
- Enrollment
  - Student Satisfaction Rating: **9.1 / 10**
  - **DS4B_15** (15% OFF in June)
  - university.business-science.io

Open Source Packages

NEW!!
Anomaly
Detection



Most Popular
Financial Data
Stock/Portfolio
Analysis

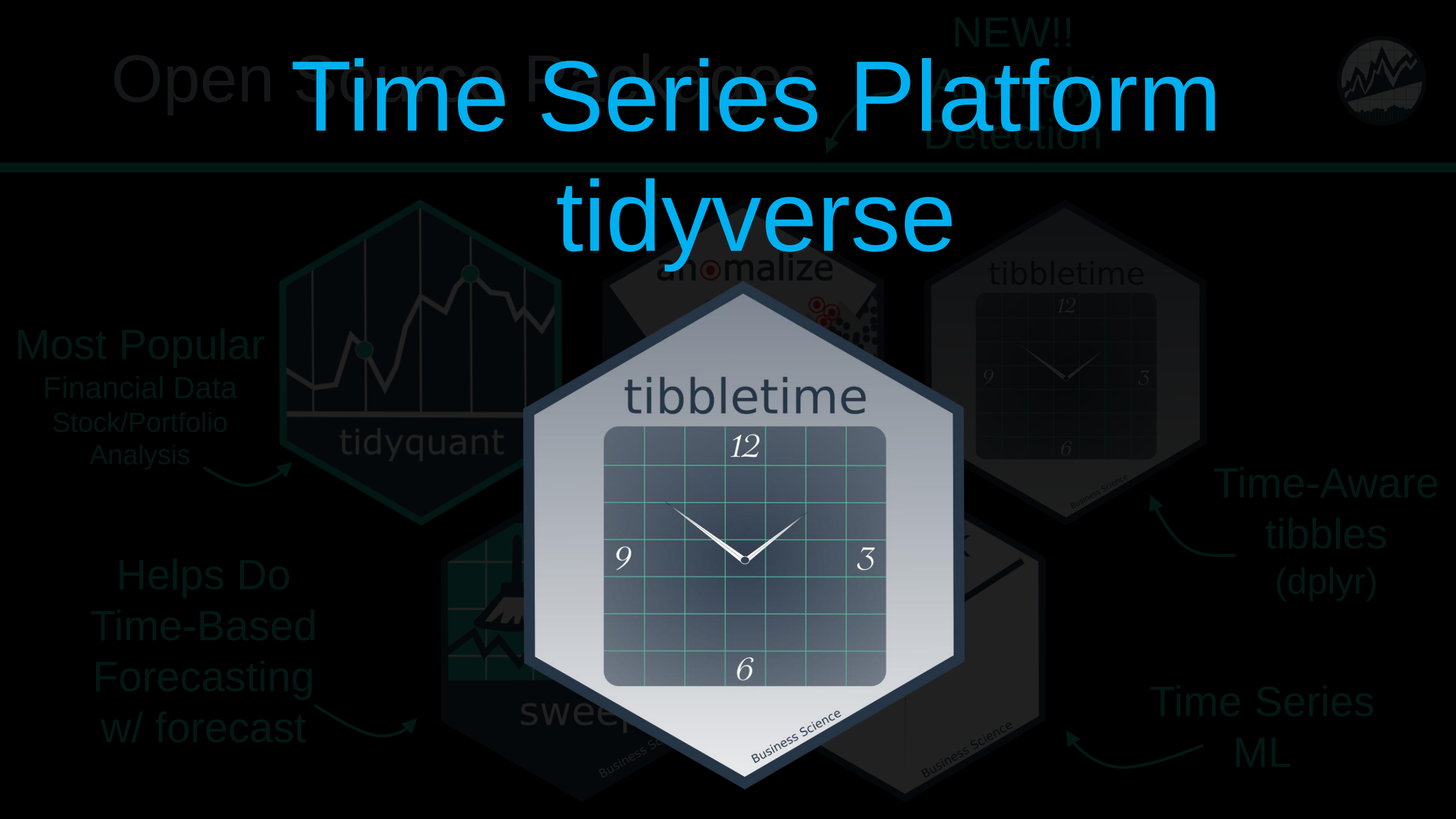


Time-Aware
tibbles

Helps Do
Time-Based
Forecasting
w/ forecast

Time Series
ML

Time Series Platform tidyverse



What Is tibbletime?

```
library(tibbletime)
library(dplyr)

# library(tidyquant)
# FANG <- tidyquant::tq_get(c("FB", "AMZN", "NFLX", "GOOG"))
data(FANG)

FANG_time <- FANG %>%
  tbl_time(date) %>%
  group_by(symbol)

FANG_time
```

Set up a time-aware tibbletime object

```
> FANG_time
# A time tibble: 4,032 x 8
# Index:  date
# Groups: symbol [4]
   symbol date        open  high   low close    volume adjusted
   <chr>  <date>     <dbl> <dbl> <dbl> <dbl>     <dbl>    <dbl>
 1 FB     2013-01-02  27.4  28.2  27.4  28    69846400     28
 2 FB     2013-01-03  27.9  28.5  27.6  27.8  63140600     27.8
 3 FB     2013-01-04  28.0  28.9  27.8  28.8  72715400     28.8
 4 FB     2013-01-07  28.7  29.8  28.6  29.4  83781800     29.4
 5 FB     2013-01-08  29.5  29.6  28.9  29.1  45871300     29.1
 6 FB     2013-01-09  29.7  30.6  29.5  30.6 104787700     30.6
 7 FB     2013-01-10  30.6  31.5  30.3  31.3  95316400     31.3
 8 FB     2013-01-11  31.3  32.0  31.1  31.7  89598000     31.7
 9 FB     2013-01-14  32.1  32.2  30.6  31.0  98892800     31.0
10 FB     2013-01-15  30.6  31.7  29.9  30.1 173242600     30.1
# ... with 4,022 more rows
```

What Is tibbletime?

```
FANG_time %>%
  collapse_by(period = "year") %>%
  group_by(symbol, date) %>%
  summarise(mean_adj = mean(adjusted))
```

Work with time index using tidyverse infrastructure

```
# A time tibble: 16 x 3
# Index:  date
# Groups: symbol [?]
   symbol date       mean_adj
   <chr>  <date>        <dbl>
 1 AMZN   2013-12-31    298.
 2 AMZN   2014-12-31    333.
 3 AMZN   2015-12-31    478.
 4 AMZN   2016-12-30    700.
 5 FB     2013-12-31     35.5
 6 FB     2014-12-31     68.8
 7 FB     2015-12-31     88.8
 8 FB     2016-12-30    117.
 9 GOOG   2013-12-31    442.
10 GOOG   2014-12-31    561.
11 GOOG   2015-12-31    602.
12 GOOG   2016-12-30    743.
13 NFLX   2013-12-31     35.3
14 NFLX   2014-12-31     57.5
15 NFLX   2015-12-31     91.9
16 NFLX   2016-12-30    102.
```

What Is tibbletime?

- Scalable grouped analysis
  at your fingertips

- Popular functions:
  - collapse_by()
  - rollify()
  - filter_time()
  - as_period()

Documentation:
https://business-science.github.io/tibbletime/

```
# A time tibble: 16 x 3
# Index:  date
# Groups: symbol [?]
   symbol date       mean_adj
   <chr>  <date>        <dbl>
 1 AMZN   2013-12-31    298.
 2 AMZN   2014-12-31    333.
 3 AMZN   2015-12-31    478.
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```
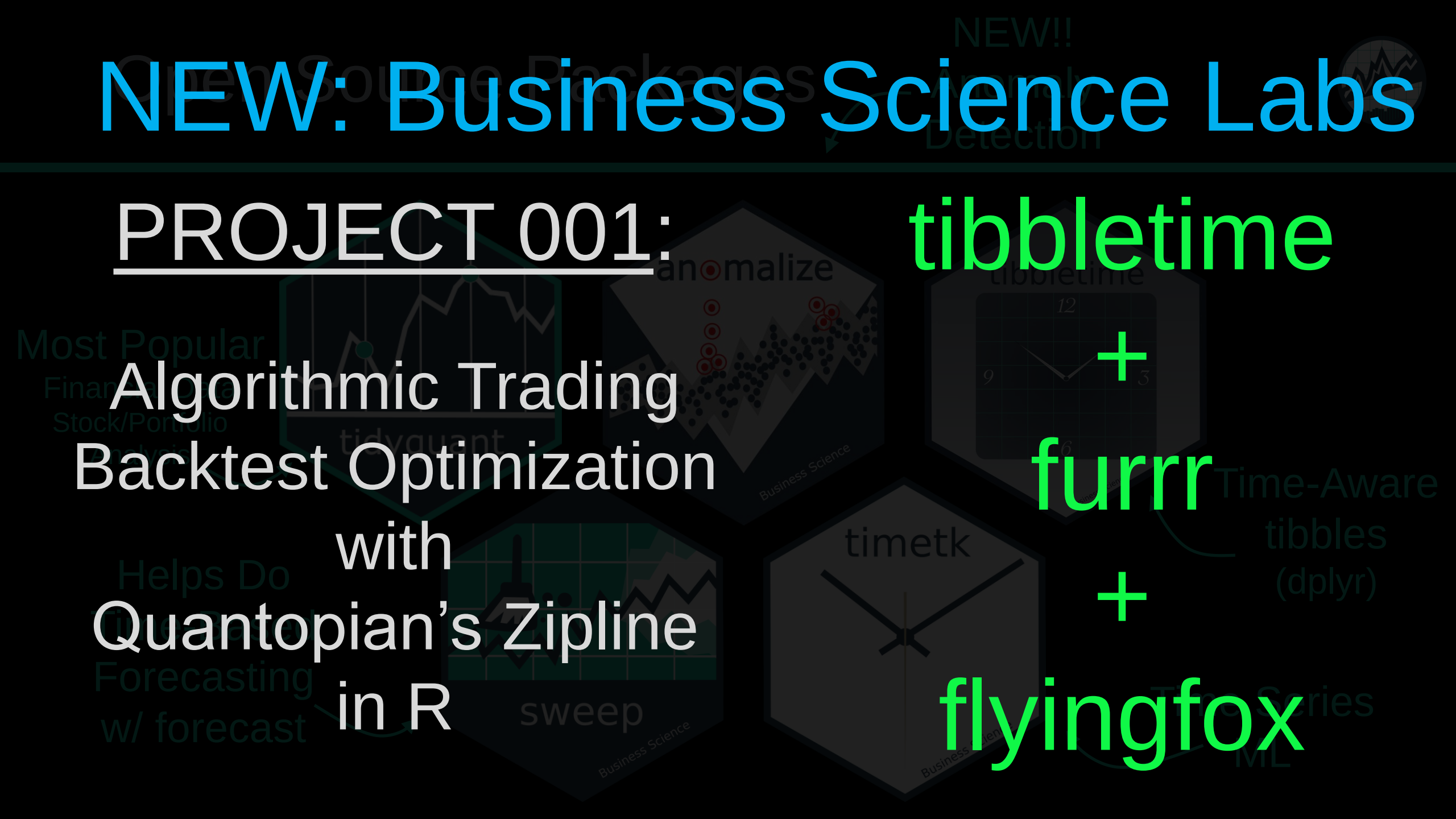

NEW: Business Science Labs

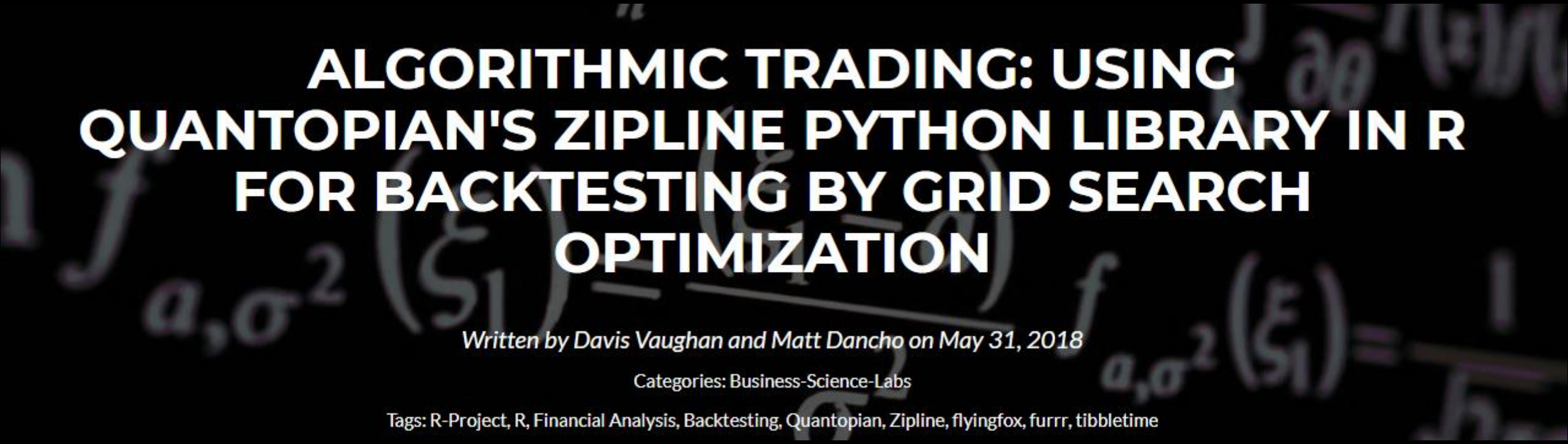
PROJECT 001:

Algorithmic Trading
Backtest Optimization
with
Quantopian's Zipline
in R

tibbletime
+
furrr
+
flyingfox



Companion Blog Article



http://www.business-science.io/business-science-labs/2018/05/31/backtesting-quantopian-zipline-tibbletime-furrr-flyingfox.html

What Is furrr?

- furrr = future + purrr
- future
  - Parallel Processing
- purrr
  - Iteration
- furrr
  - Parallel Iteration

```
plan("multiprocess")
```

New

```
results_tbl <- ma_grid_tbl %>%
    mutate(results = future_map(
        .x = f,
        .f = ~ fly_run_algorithm(
            initialize  = fly_initialize,
            handle_data = .x,
            start       = as.Date("2013-01-01"),
            end         = as.Date("2016-01-01")
            )
    ))
```

Replaces map()

What Is flyingfox?

- Quantopian's Zipline
  - Backtesting Library for Algorithmic Trading Strategies
  - Python Only

- reticulate
  - Connects to Python

- flyingfox
  - Connects to Zipline using reticulate
  - Can Backtest ANY R Trading Strategy

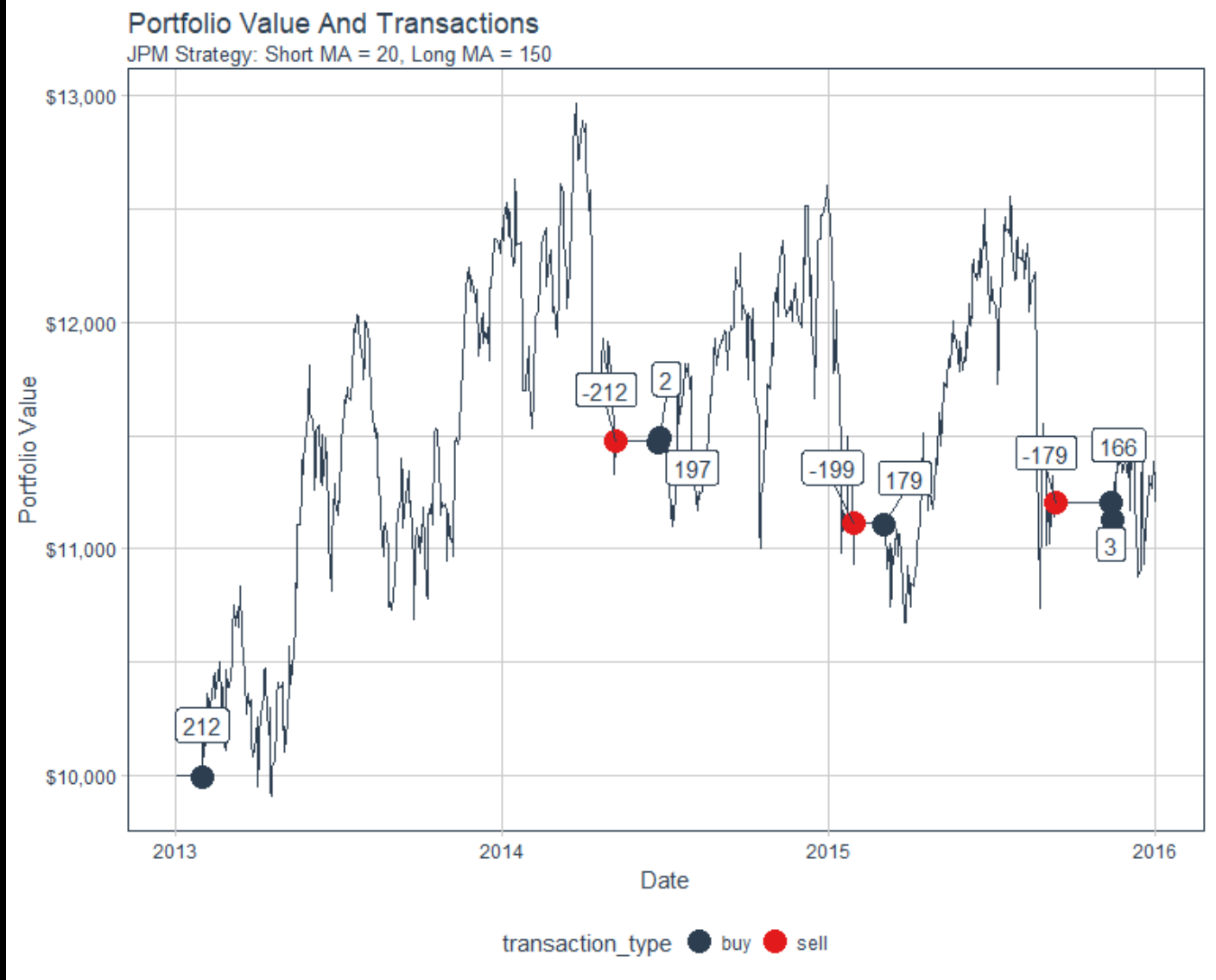
Usage Case:
Backtested Order Optimizations

Zipline in R

JPM

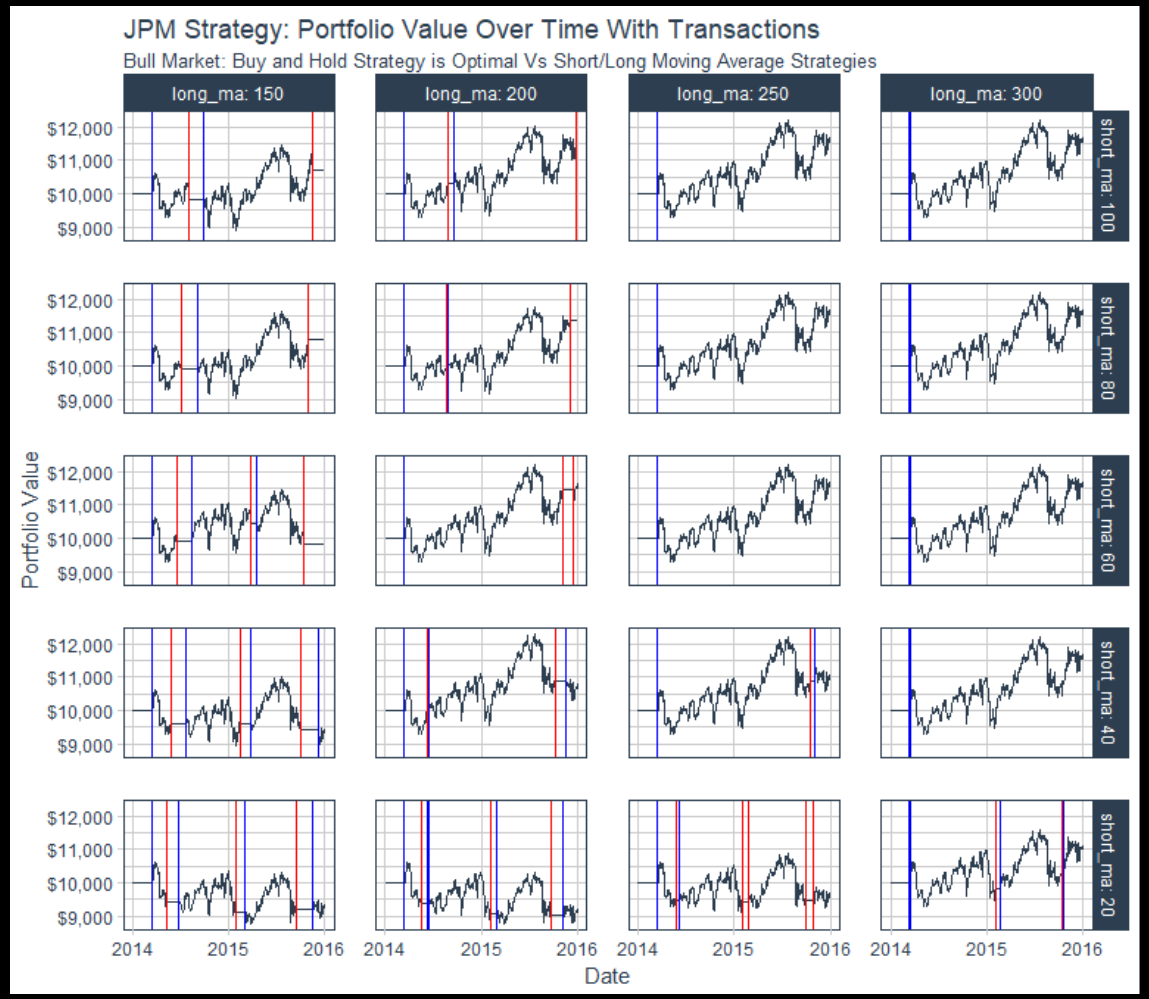
Simple Moving Average Strategy

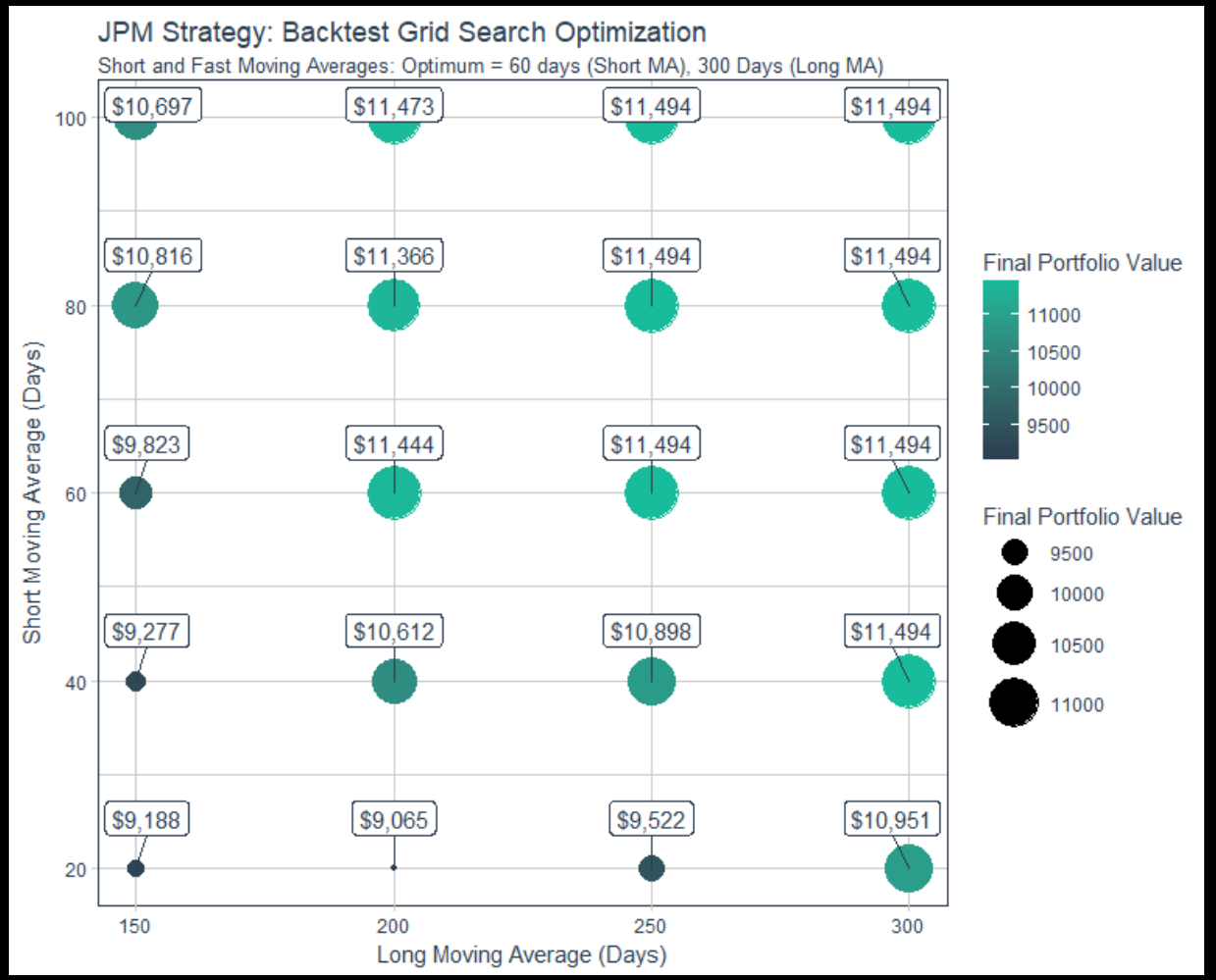
- Short MA = 20 Days
- Long MA = 150 Days



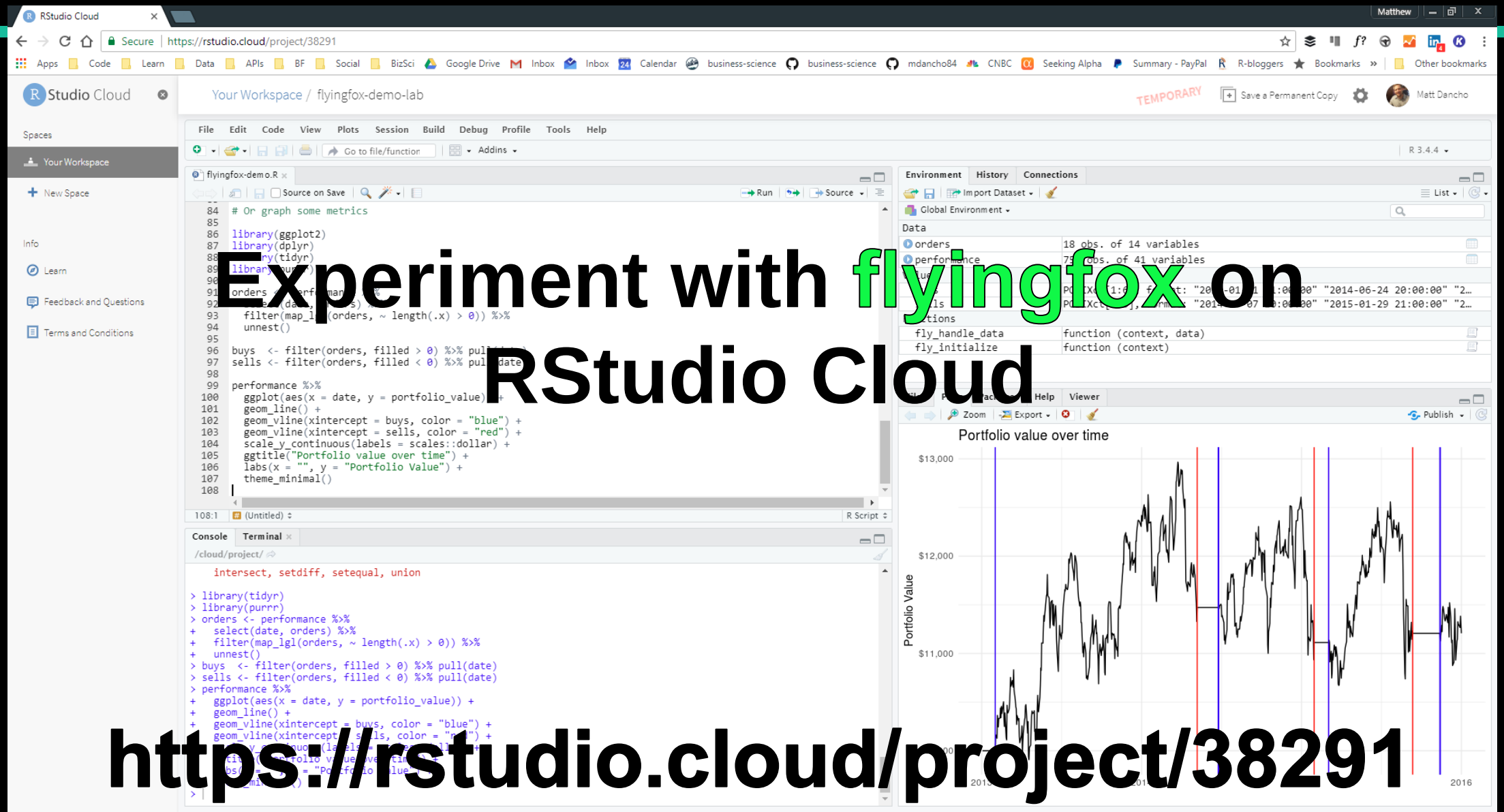
Usage Case:
Backtested Order Optimizations

Optimized Backtests Using Grid Search – Parallelized With furrr





Try Backtesting With flyingfox



Experiment with flyingfox on RStudio Cloud

https://rstudio.cloud/project/38291

Business + Data Science

business-science.io
university.business-science.io
DS4B_15 for 15%-OFF through June