

# Shiny Overview

Nanocourse Lecture 1, 8/4/25

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TAs: Sriya & Ermis!

# Nanocourse Intro

## Goal

Everyone gets a cool app built in the next 2 days!

## Scope

Introduce core Shiny concepts quickly & catalyze further independent learning.



# Nanocourse schedule

- Day 1
  - Overview
  - UI side
  - Server side
  - Project time
- Day 2
  - Interactive plots & extras
  - Deployment
  - Project time
  - Project presentations!



# Shiny Showcase

1. [Kmeans](#)
2. [Classic dashboard](#)
3. [Fancy external example](#)
4. [TO design](#)

[Shiny Gallery](#)



# What are Shiny use cases?

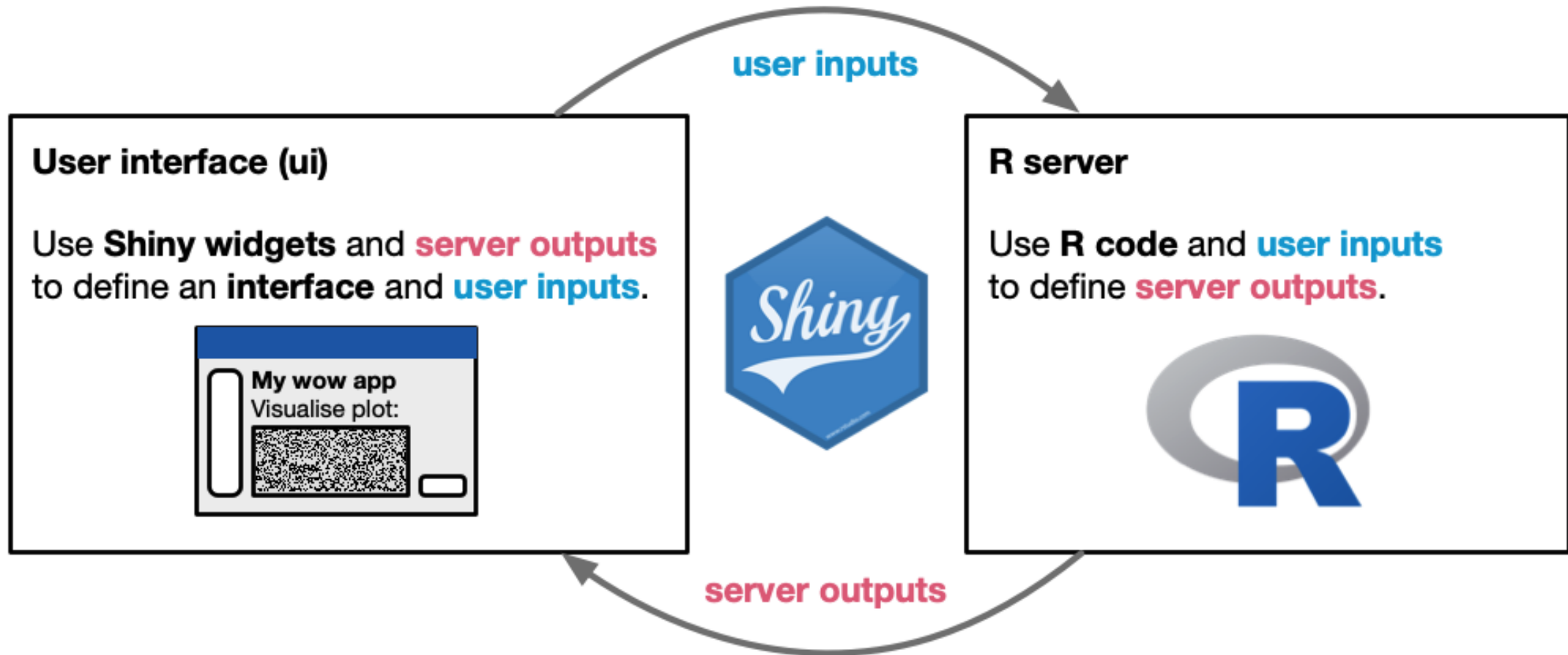
- Exploring complex data (for yourself)
- Sharing data
- Teaching quantitative concepts

# 5 min brainstorm



Without any code,  
what do you want your  
project app to do?  
Draw it!

# Shiny = server + interface



# Warning: Shiny coding may seem weird...

| Programming Styles |   |
|--------------------|---|
| Imperative         | <ul style="list-style-type: none"><li>• What we use in data analysis</li><li>• Load data, wrangle, visualize, model, save</li><li>• Functions written – do this now<ul style="list-style-type: none"><li>• “Make me a sandwich”</li></ul></li><li>• Specific commands executed immediately</li><li>• Code executed in top to bottom order</li></ul> |
| Declarative        | <ul style="list-style-type: none"><li>• What we use in Shiny apps</li><li>• Express higher-level goals</li><li>• Functions written – done when needed<ul style="list-style-type: none"><li>• “Ensure that there is a sandwich in the refrigerator whenever I look inside”</li></ul></li><li>• Code executed when new input available</li></ul>      |



# Hello World

Rstudio > File > New File > Shiny web app

```
# UI

plotOutput(outputId = "distPlot")

sliderInput("bins", min = 1, max = 50)
```

```
# Server

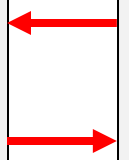
output$distPlot <- renderPlot({
  bins <- seq(min, max, input$bins)

  hist(..., breaks = bins)

})

# Run app

shinyApp(ui = ui, server = server)
```

A diagram consisting of two red arrows. The first arrow points from the `output$distPlot` line in the Server code block to the `plotOutput` line in the UI code block. The second arrow points from the `input$bins` line in the Server code block to the `sliderInput` line in the UI code block.

# Shiny inputs

## Inputs

Inputs allow users to interact with the webpage by clicking a button, entering text, selecting an option, and more.

The inputs shown here are just a sample of the many inputs available in Shiny. For more, see [awesome Shiny extensions](#).

File Input

Choose a File

Browse...

No file selected

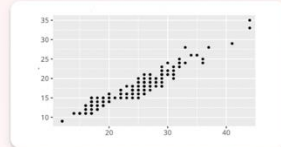
Numeric Input

100

Password Field

Enter password

Plot



Radio Buttons

Never gonna:

☒ Give you up

☐ Let you down

Select (Multiple)

Select (Single)

Choice 1A

Selectize (Multiple)

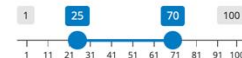
Selectize (Single)

Choice 1A

Slider



Slider Range



Submit Button

Submit

Can you change the old faithful slider to a numeric input?

```
# UI
```

```
numericInput()
```

# Shiny outputs

## Outputs

Outputs create a spot on the webpage to display results from the server, such as text, tables, plots, and more.

The outputs shown here are a small sample of Shiny outputs available in R. For more, see [htmlwidgets](https://htmlwidgets.github.io/).

DataTable

| This  | That  |
|-------|-------|
| And   | The   |
| Other | Thing |

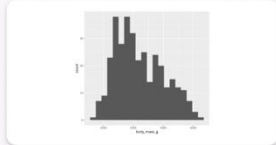
Image



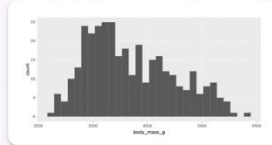
Map (leaflet)



Plot (ggplot2)



Plot (plotly)



Table

| species | island    | bill_length_mm | bill_depth_mm |
|---------|-----------|----------------|---------------|
| Adelie  | Torgersen | 39.10          | 18.70         |
| Adelie  | Torgersen | 39.50          | 17.40         |
| Adelie  | Torgersen | 40.30          | 18.00         |
| Adelie  | Torgersen | NA             | NA            |
| Adelie  | Torgersen | 36.70          | 19.30         |

Table (gt)

| Penguins in the Palmer Archipelago |                |               |                   |             |        |
|------------------------------------|----------------|---------------|-------------------|-------------|--------|
| sex                                | bill_length_mm | bill_depth_mm | flipper_length_mm | body_mass_g | island |
| Biscoe                             |                |               |                   |             |        |
| Adelie                             | female         | 37.75         | 17.75             | 187.0       | 3319.0 |
| Adelie                             | male           | 40.80         | 18.90             | 191.0       | 4020.0 |
| Gentoo                             | female         | 45.50         | 14.25             | 212.0       | 4700.0 |
| Gentoo                             | male           | 49.50         | 15.70             | 221.0       | 5500.0 |

Table (reactable)

| species | island    | bill_length_mm | bill_depth_mm |
|---------|-----------|----------------|---------------|
| Adelie  | Torgersen | 39.1           | 18.7          |
| Adelie  | Torgersen | 39.5           | 17.4          |
| Adelie  | Torgersen | 40.3           | 18            |
| Adelie  | Torgersen | 36.7           | 19.3          |

Text

UI

☒ Show slider

1 2 3 4 5 6 7 8 9 10

Value Box



Verbatim Text

Can you add a Verbatim Text output of the faithful dataset?

```
# UI
```

```
plotOutput(),  
verbatimTextOutput()
```

```
# Server
```

```
renderPrint({faithful})
```

# Coding example: curve fitting

add logistic curve intro



# Day 1

- Shiny Overview (Scott)
- UI side (Sriya)
- Server side (Ermis)
- Projects

# Independent projects

- Start simple!
- Instructors will check in with you. We are here to help!
- Please see us if you don't have data / project ideas.
- Day 1 Goal: Get some part of your app functional!

# Hello World

Rstudio > File > New File > Shiny web app

```
# User interface: -----
ui <- fluidPage(
  # App title:
  titlePanel("The Title"),
  sidebarLayout(
    sidebarPanel(
      # inputs are provided here
    ),
    mainPanel(
      # outputs are shown here
    )
  )
)
```

```
# Server: -----
server <- function(input, output) {
  # R code turning data and inputs
into outputs
}

# Run the app: -----
shinyApp(ui = ui, server = server)
```

# Deployment primer – shinapps.io button in rstudio & shinylive editor



# Interactive curve fitting

- Logistic growth on whiteboard
  - Discuss app vision
  - Set initial goal & plan
- Walk through section 1 of static R analysis (R refresher too)
- Convert Old faithful app to step 1 logistic growth app