



R conference 2024

# Introduction to Quarto



**Dr Muhammad Saufi Abdullah**

Doctor of Public Health (Epidemiology) Candidate  
Department of Community Medicine  
Universiti Sains Malaysia

# Speaker

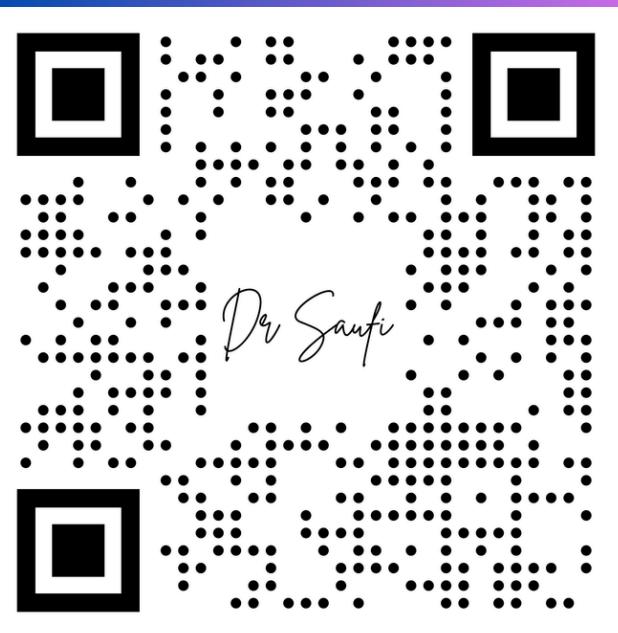


**Medical Officer | Public Health | Epidemiology |  
Statistical Analysis | Public Speaking |  
Speaker & Author**

Currently a candidate in the Doctor of Public Health (Epidemiology) program.

Experienced in delivering talks and workshops on epidemiology, statistical analysis, and public health.

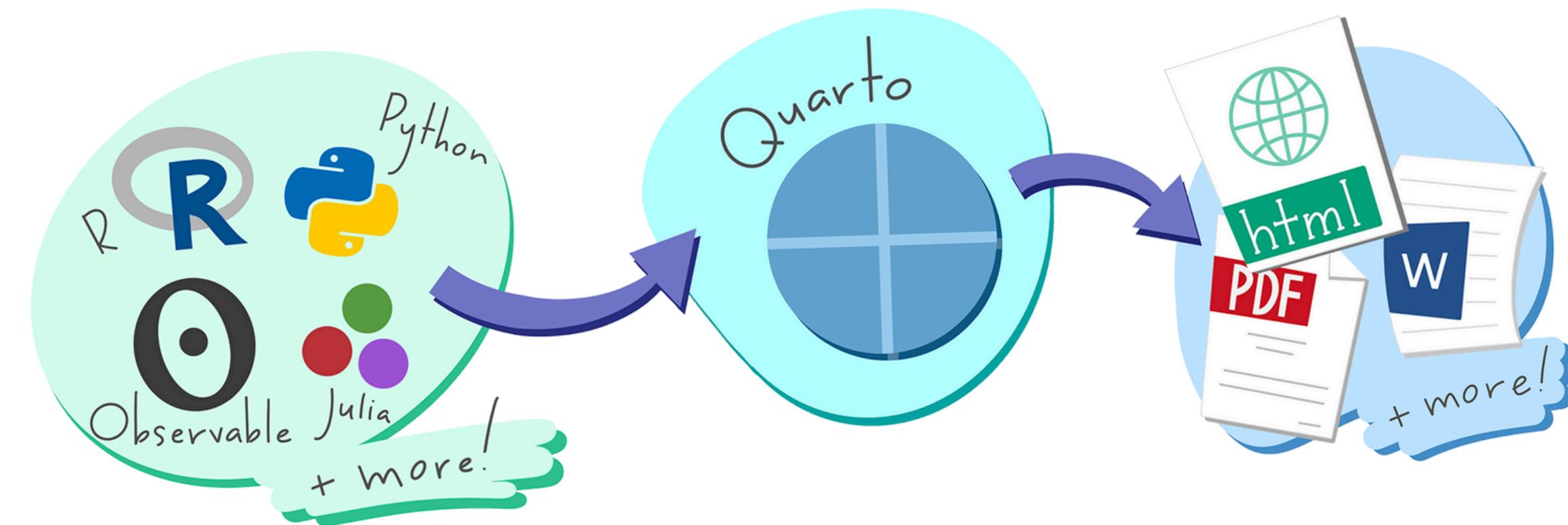
Passionate about teaching and sharing knowledge with everyone.



[drsaufi.github.io](https://drsaufi.github.io)

# Quarto

Open-source, scientific and technical publishing system



Artwork from “Hello, Quarto” keynote by Julia Lowndes and Mine Çetinkaya-Rundel, presented at RStudio Conference 2022. Illustrated by Allison Horst.

# Quarto



A digital notebook



Sharing the report



Collaboration

# R Script

```
# Setting Up the Environment -----
library(palmerpenguins) # To use dataset for analysis.
library(tidyverse) # For data manipulation and visualization.
library(DT) # To create interactive data tables.
library(ggplot2) # For creating customizable visualizations.

# Summary of Dataset -----
data("penguins")
summary(penguins)

# Descriptive Tables -----
datatable(penguins, filter = "top")

# Data Visualization -----
mass_flipper <- ggplot(data = penguins, aes(x = flipper_length_mm, y = body_mass_g)) +
  geom_point(aes(
    color = species,
    shape = species
  ), size = 3, alpha = 0.8) +
  scale_color_manual(values = c("darkorange", "purple", "cyan4")) +
  labs(
    title = "Penguin size, Palmer Station LTER", subtitle = "Flipper length and body mass for Adelie, Chinstrap and Gentoo Penguins",
    x = "Flipper length (mm)", y = "Body mass (g)", color = "Penguin species", shape = "Penguin species"
  ) +
  theme(
    legend.position = c(0.2, 0.7), plot.title.position = "plot", plot.caption = element_text(hjust = 0, face = "italic"),
    plot.caption.position = "plot"
  )
mass_flipper
```

# Quarto Document

```
---
```

title: "Data Analysis of Palmer Penguins Dataset"  
author: "Dr Muhammad Saufi Abdullah"  
date: last-modified  
format: html  
editor: visual

```
--
```

## # Introduction

The objective of this report is to demonstrate a \*\*data analysis workflow\*\* using the `palmerpenguins` package, which offers an excellent dataset for data \*exploration\* and \*visualization\*.

## ## Palmer Penguins

The package contains data on \*344 penguins\* across three species, collected from three different islands in the \*\*Palmer Archipelago, Antarctica\*\*<sup>[The Palmer Archipelago is a group of islands located off the northwestern coast of the Antarctic Peninsula.]</sup>. The data was gathered by \*\*Dr. Kristen Gorman\*\* and the \*\*Palmer Station, Antarctica LTER\*\*<sup>[The Long Term Ecological Research (LTER) network is a collaborative program that conducts long-term studies to monitor and understand ecological processes. The Palmer Station in Antarctica is part of this network, conducting critical research on the region's unique ecosystem.]</sup>.

## ## Setting Up the Environment

This analysis requires several packages. The following packages will be used throughout the report for data \*manipulation\*, \*visualization\*, and \*data analysis\*.

```
```{r}  
library(palmerpenguins)  
library(tidyverse)  
library(DT)  
library(ggplot2)  
```
```

## Data Analysis of Palmer Penguins Dataset

Dr Muhammad Saufi Abdullah  
October 19, 2024

Contents

- 1 Introduction
  - 1.1 Palmer Penguins
  - 1.2 Setting Up the Environment
- 2 Exploratory Data Analysis
- 3 Data Visualization

[Please Read >](#)

[Disclaimer >](#)

## 1 Introduction

The objective of this report is to demonstrate a **data analysis workflow** using the `palmerpenguins` package, which offers an excellent dataset for data *exploration* and *visualization*.

### 1.1 Palmer Penguins

The package contains data on 344 *penguins* across three species, collected from three different islands in the **Palmer Archipelago, Antarctica**<sup>1</sup>. The data was gathered by **Dr. Kristen Gorman** and the **Palmer Station, Antarctica LTER**<sup>2</sup>.

A colorful illustration of three penguins standing on a white surface. From left to right: a Chinstrap penguin on a purple background, a Gentoo penguin on a green background, and an Adélie penguin on an orange background. Each penguin has its name written above it in a stylized font.

# Headings

```
---  
title: "Data Analysis of Palmer Penguins Dataset"  
author: "Dr Muhammad Saufi Abdullah"  
date: last-modified  
format: html  
editor: visual  
---  
  
# Introduction  
  
## Palmer Penguins  
  
## Setting Up the Environment  
  
# Exploratory Data Analysis  
  
## Summary of Dataset  
  
## Descriptive Tables  
  
# Data Visualization  
  
## Penguin Mass vs. Flipper Length  
  
## Flipper Length vs. Bill Length  
  
## Bill Length vs. Bill Depth
```

# Titles

## Data Analysis of Palmer Penguins Dataset

AUTHOR

Dr Muhammad Saufi Abdullah

PUBLISHED

October 27, 2024

### Introduction

### Palmer Penguins

### Setting Up the Environment

### Exploratory Data Analysis

### Summary of Dataset

### Descriptive Tables

### Data Visualization

#### Penguin Mass vs. Flipper Length

#### Flipper Length vs. Bill Length

#### Bill Length vs. Bill Depth

# Headings

```
---
```

```
title: "Data Analysis of Palmer Penguins Dataset"
author: "Dr Muhammad Saufi Abdullah"
date: last-modified
format:
  html:
    number-sections: true
editor: visual
---  
  
# Introduction  
  
## Palmer Penguins  
  
## Setting Up the Environment  
  
# Exploratory Data Analysis  
  
## Summary of Dataset  
  
## Descriptive Tables  
  
# Data Visualization  
  
## Penguin Mass vs. Flipper Length  
  
## Flipper Length vs. Bill Length  
  
## Bill Length vs. Bill Depth
```

# Numbered Titles / Sections

## Data Analysis of Palmer Penguins Dataset

AUTHOR

Dr Muhammad Saufi Abdullah

PUBLISHED

October 27, 2024

### 1 Introduction

#### 1.1 Palmer Penguins

#### 1.2 Setting Up the Environment

### 2 Exploratory Data Analysis

#### 2.1 Summary of Dataset

#### 2.2 Descriptive Tables

### 3 Data Visualization

#### 3.1 Penguin Mass vs. Flipper Length

#### 3.2 Flipper Length vs. Bill Length

#### 3.3 Bill Length vs. Bill Depth

# Headings

```
---
```

```
title: "Data Analysis of Palmer Penguins Dataset"
author: "Dr Muhammad Saufi Abdullah"
date: last-modified
format:
html:
  number-sections: true
  toc: true
  toc-title: Contents
  toc-location: left
  toc-depth: 3
  toc-expand: 1
editor: visual
---  
  


```
# Introduction
## Palmer Penguins
## Setting Up the Environment
```


```
# Exploratory Data Analysis
## Summary of Dataset
## Descriptive Tables
```


```
# Data Visualization
## Penguin Mass vs. Flipper Length
## Flipper Length vs. Bill Length
## Bill Length vs. Bill Depth
```


```

# Table of Contents

## Contents

- 1 Introduction
- 2 Exploratory Data Analysis
- 3 Data Visualization
  - 3.1 Penguin Mass vs. Flipper Length
  - 3.2 Flipper Length vs. Bill Length
  - 3.3 Bill Length vs. Bill Depth

## Data Analysis of Palmer Penguins Dataset

### AUTHOR

Dr Muhammad Saufi Abdullah

### PUBLISHED

October 27, 2024

## 1 Introduction

### 1.1 Palmer Penguins

### 1.2 Setting Up the Environment

## 2 Exploratory Data Analysis

### 2.1 Summary of Dataset

### 2.2 Descriptive Tables

## 3 Data Visualization

### 3.1 Penguin Mass vs. Flipper Length

### 3.2 Flipper Length vs. Bill Length

### 3.3 Bill Length vs. Bill Depth

# Data Analysis of Palmer Penguins Dataset

**AUTHOR**

Dr Muhammad Saufi Abdullah

**PUBLISHED**

October 27, 2024

## 1 Introduction

The objective of this report is to demonstrate a **data analysis workflow** using the `palmerpenguins` package, which offers an excellent dataset for data *exploration* and *visualization*.

### 1.1 Palmer Penguins

The package contains data on 344 *penguins* across three species, collected from three different islands in the **Palmer Archipelago, Antarctica**. The data was gathered by **Dr. Kristen Gorman** and the **Palmer Station, Antarctica LTER**.

### 1.2 Setting Up the Environment

This analysis requires several packages. The following packages will be used throughout the report for data *manipulation*, *visualization*, and *data analysis*.

```
library(palmerpenguins)
library(tidyverse)
library(DT)
library(ggplot2)
```

# Data Analysis of Palmer Penguins Dataset

AUTHOR

Dr Muhammad Saufi Abdullah

PUBLISHED

October 27, 2024

## Please Read

This report has been created as a learning exercise on how to generate *interactive* and *engaging* reports using **Quarto**.

It demonstrates the integration of various **R packages** for data *exploration*, *visualization*, and *data analysis*, with a focus on creating a **dynamic** and **user-friendly** report layout.

The use of interactive elements, such as *tabs*, *tables*, and *visualizations*, is emphasized to showcase the versatility of **Quarto** in producing polished and professional reports.

## Disclaimer

This report is intended solely for educational purposes. The analyses and interpretations provided here are based on the **Palmer Penguins** dataset and serve as examples to practice data analysis and visualization techniques.

## 1 Introduction

The objective of this report is to demonstrate a **data analysis workflow** using the **palmerpenguins** package, which offers an excellent dataset for data *exploration* and *visualization*.

### 1.1 Palmer Penguins

The package contains data on 344 penguins across three species, collected from three different islands in the **Palmer Archipelago, Antarctica**. The data was gathered by **Dr. Kristen Gorman** and the **Palmer Station, Antarctica LTER**.

## Note

Note that there are five types of callouts, including: **note**, **tip**, **warning**, **caution**, and **important**.

## Tip

This is an example of an tip callout

## Caution

This is an example of an caution callout

## Warning

This is an example of an warning callout

## Important

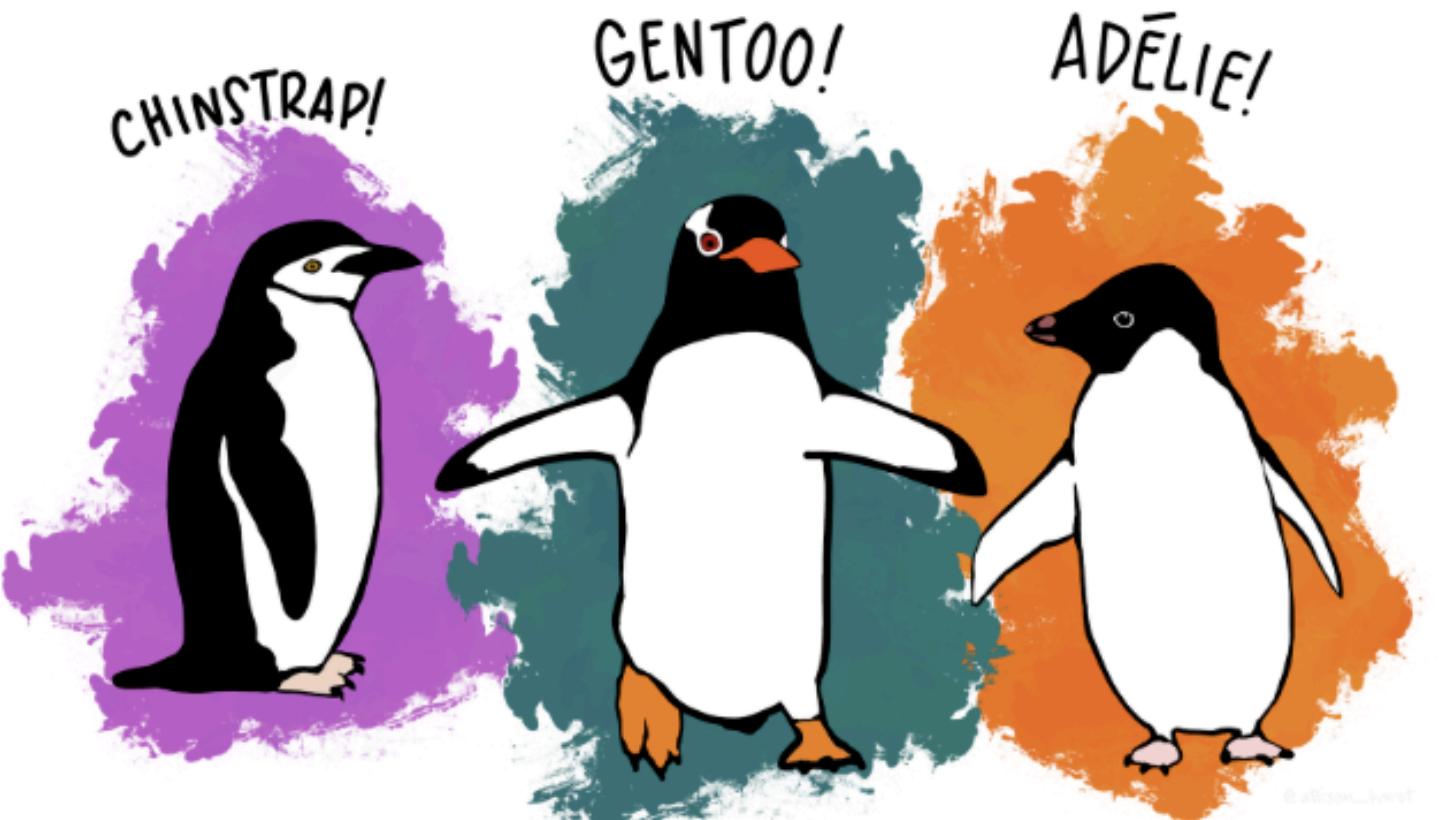
This is an example of an important callout

## 1 Introduction

The objective of this report is to demonstrate a **data analysis workflow** using the `palmerpenguins` package, which offers an excellent dataset for *data exploration and visualization*.

### 1.1 Palmer Penguins

The package contains data on *344 penguins* across three species, collected from three different islands in the **Palmer Archipelago, Antarctica**. The data was gathered by **Dr. Kristen Gorman** and the **Palmer Station, Antarctica LTER**.



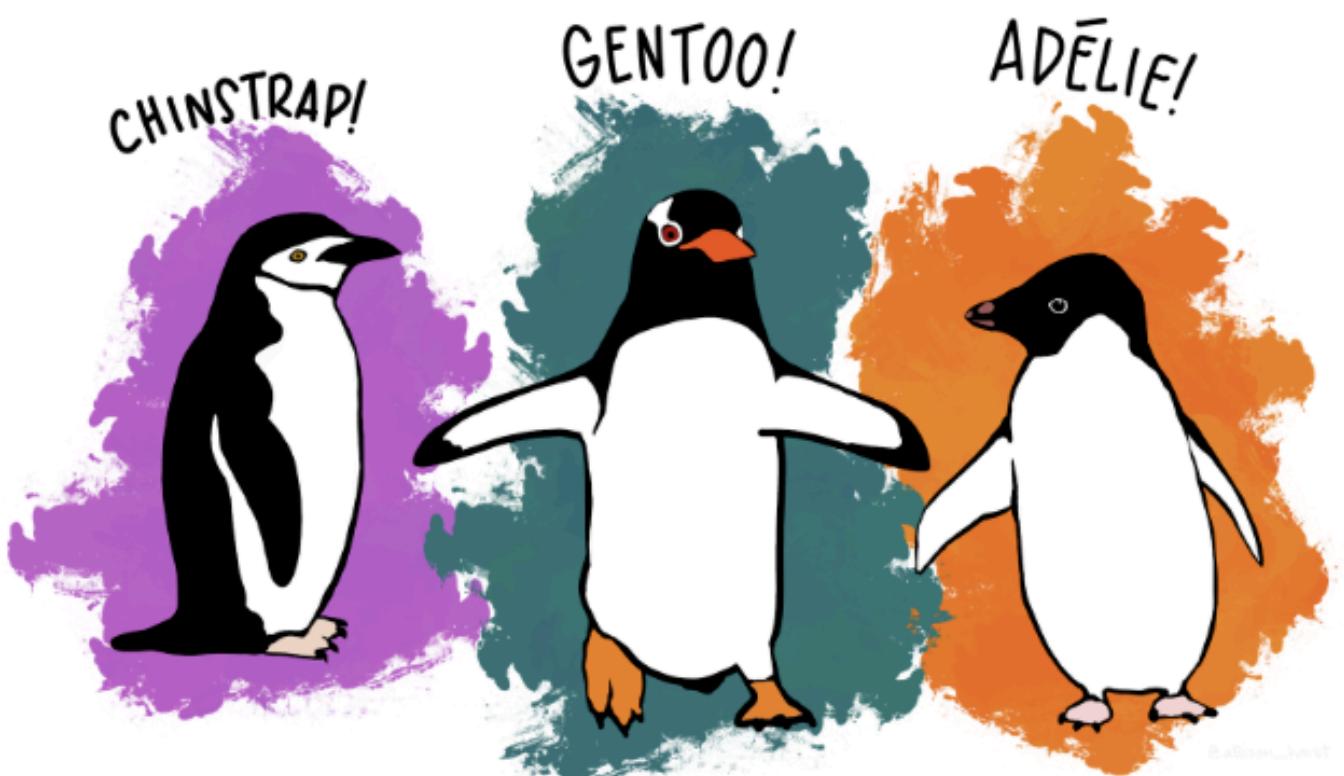
These beautifully crafted illustrations were designed by Allison Horst. Visit her page [here](#).

## 1 Introduction

The objective of this report is to demonstrate a **data analysis workflow** using the `palmerpenguins` package, which offers an excellent dataset for *data exploration and visualization*.

### 1.1 Palmer Penguins

The package contains data on 344 *penguins* across three species, collected from three different islands in the **Palmer Archipelago, Antarctica**<sup>1</sup>. The data was gathered by **Dr. Kristen Gorman** and the **Palmer Station, Antarctica LTER**<sup>2</sup>.



Artwork by Allison Horst

#### Footnotes

1. The Palmer Archipelago is a group of islands located off the northwestern coast of the Antarctic Peninsula. [🔗](#)
2. The Long Term Ecological Research (LTER) network is a collaborative program that conducts long-term studies to monitor and understand ecological processes. The Palmer Station in Antarctica is part of this network, conducting critical research on the region's unique ecosystem. [🔗](#)

## 1.2 Setting Up the Environment

This analysis requires several packages. The following packages will be used throughout the report for data *manipulation*, *visualization*, and *data analysis*.

▼ Code

```
library(palmerpenguins)
library(tidyverse)
library(DT)
library(ggplot2)
```

## 2 Exploratory Data Analysis

Let's dive deeper into the `penguins` dataset to explore its *features* and *structure*.

### 2.1 Summary of Dataset

▼ Code

```
data("penguins")
summary(penguins)
```

## 1.2 Setting Up the Environment

This analysis requires several packages. The following packages will be used throughout the report for data *manipulation*, *visualization*, and *data analysis*.

► Code

## 2 Exploratory Data Analysis

Let's dive deeper into the `penguins` dataset to explore its *features* and *structure*.

### 2.1 Summary of Dataset

► Code

# Visualization

# Interactive Map

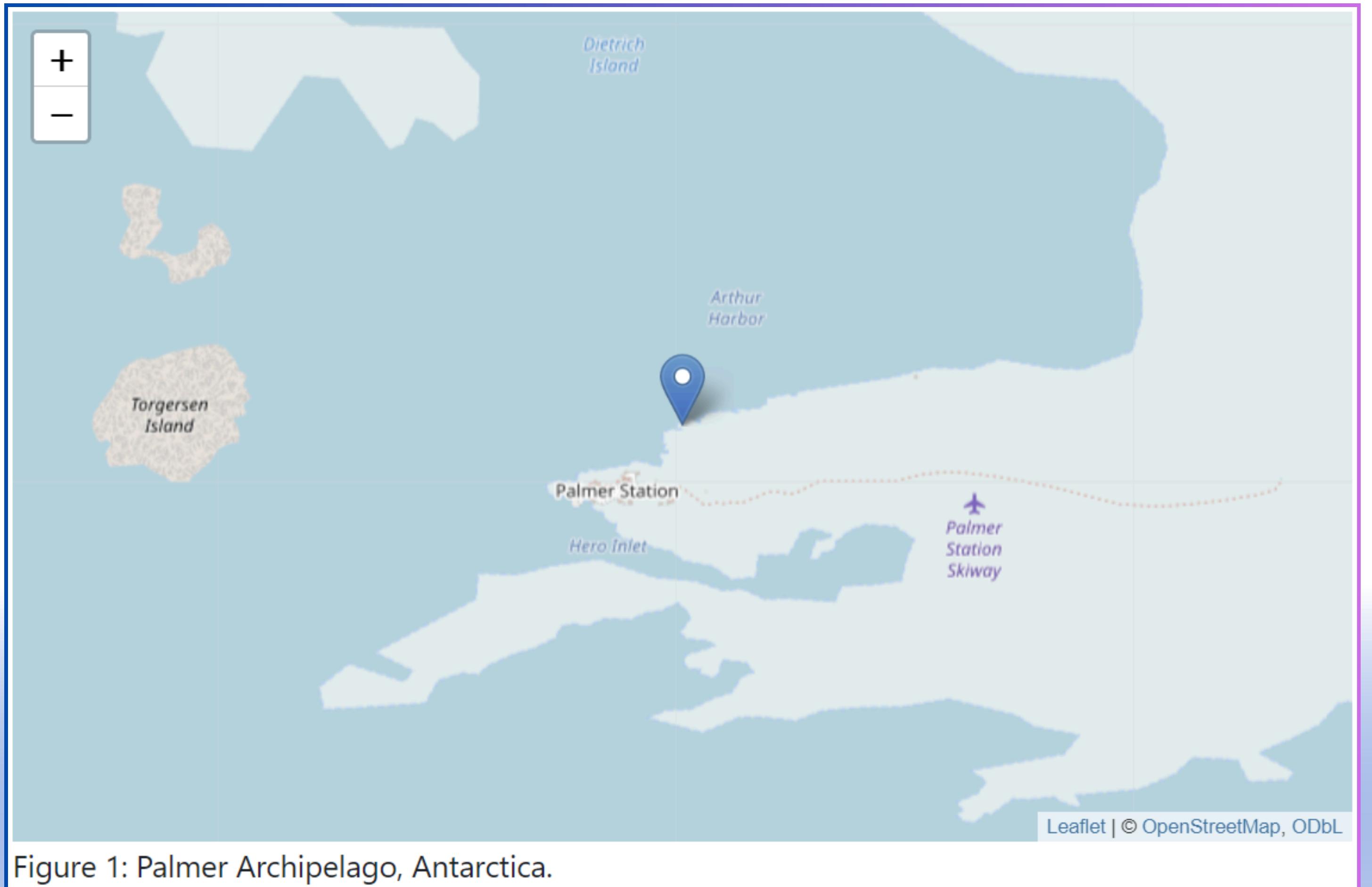


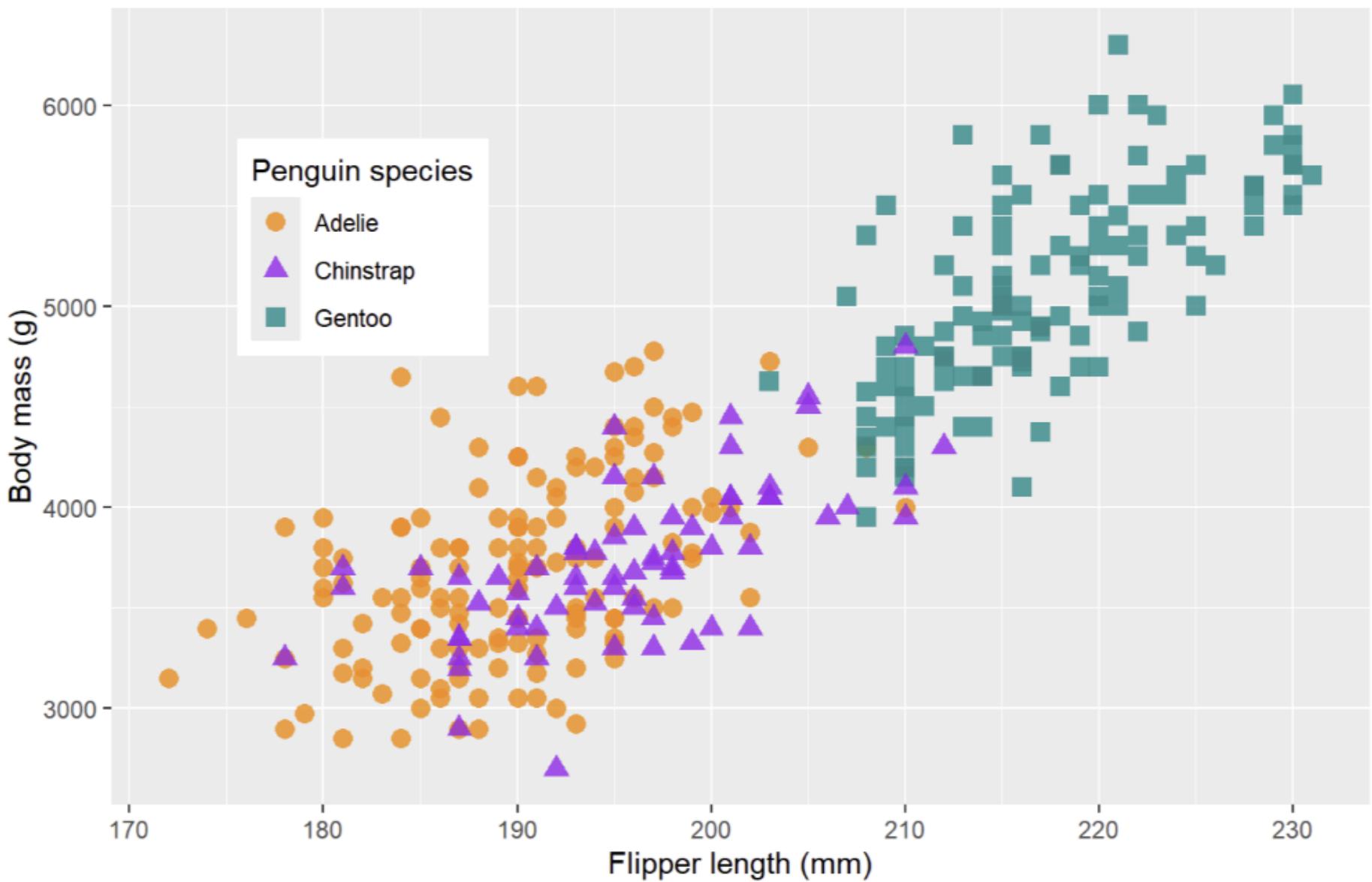
Figure 1: Palmer Archipelago, Antarctica.

### 3.1 Penguin Mass vs. Flipper Length

► Code

Penguin size, Palmer Station LTER

Flipper length and body mass for Adelie, Chinstrap and Gentoo Penguins



See in Full Screen

## 3.4 Using Tabs for Multiple Graphs

Including **multiple graphs** in a report can sometimes make it feel *cluttered*. By organizing the graphs into **tabs**, we give readers the *flexibility* to easily navigate and view only the visualizations they are interested in. This approach keeps the report *clean* and more *user-friendly*, allowing for a better browsing experience.

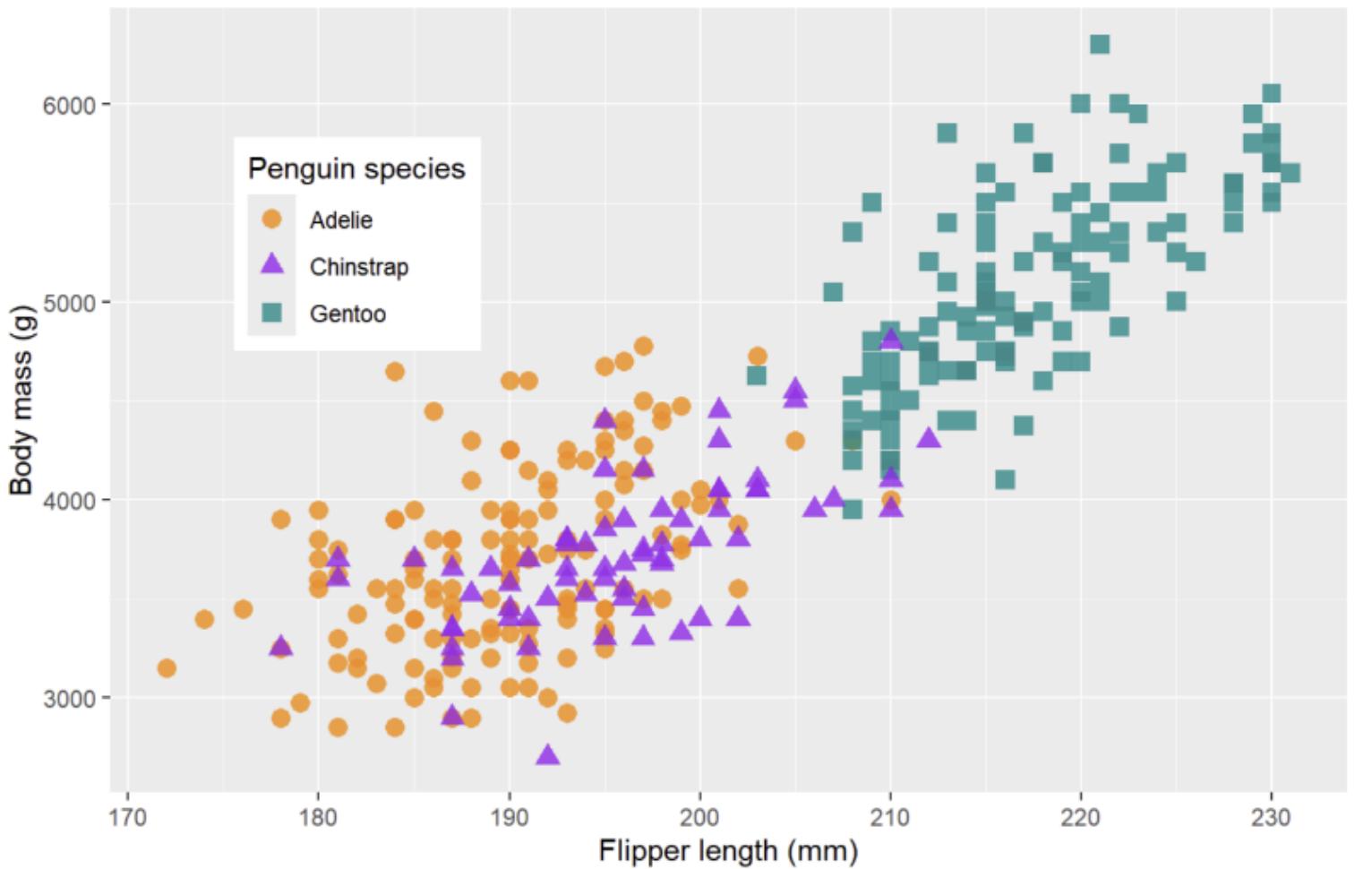
Penguin Mass vs. Flipper Length

Flipper Length vs. Bill Length

Bill Length vs. Bill Depth

Penguin size, Palmer Station LTER

Flipper length and body mass for Adelie, Chinstrap and Gentoo Penguins



# Themes

## Data Analysis of Palmer Penguins Dataset

Dr Muhammad Saufi Abdullah  
October 24, 2024

[Please Read](#)

[Disclaimer](#)

## 1 Introduction

The objective of this report is to demonstrate a **data analysis workflow** using the `palmerpenguins` package, which offers an excellent dataset for *data exploration* and *visualization*.

### 1.1 Palmer Penguins

The package contains data on *344 penguins* across three species, collected from three different islands in the Palmer Archipelago, Antarctica<sup>1</sup>. The data was gathered by Dr. Kristen Gorman and the Palmer Station, Antarctica LTER<sup>2</sup>.

# Dark / Light Modes

## Data Analysis of Palmer Penguins Dataset

Dr Muhammad Saufi Abdullah  
October 24, 2024

[Please Read](#)

[Disclaimer](#)

## 1 Introduction

The objective of this report is to demonstrate a **data analysis workflow** using the `palmerpenguins` package, which offers an excellent dataset for *data exploration* and *visualization*.

### 1.1 Palmer Penguins

The package contains data on *344 penguins* across three species, collected from three different islands in the **Palmer Archipelago, Antarctica**<sup>1</sup>. The data was gathered by **Dr. Kristen Gorman** and the **Palmer Station, Antarctica LTER**<sup>2</sup>.

# Website

The screenshot shows a Quarto-generated website for the Palmer Penguin dataset. At the top, it displays the title "Data Analysis of Palmer Penguins Dataset" and the author's name "Dr Muhammad Saufi Abdullah" along with the date "October 24, 2024". Below the title is a navigation bar with a "Contents" section containing links to "1 Introduction", "1.1 Palmer Penguins", "1.2 Setting Up the Environment", "2 Exploratory Data Analysis", and "3 Data Visualization". There are also two buttons: a light blue "Please Read" button and a red "Disclaimer" button. The main content area starts with a section titled "1 Introduction", which explains the objective of the report and mentions the `palmerpenguins` package. Below this is a section titled "1.1 Palmer Penguins", which describes the package's contents and the data source. A cartoon illustration of three penguins (Chinstrap, Gentoo, and Adélie) is shown at the bottom.

## Data Analysis of Palmer Penguins Dataset

Dr Muhammad Saufi Abdullah  
October 24, 2024

Contents

- 1 Introduction
- 1.1 Palmer Penguins
- 1.2 Setting Up the Environment
- 2 Exploratory Data Analysis
- 3 Data Visualization

Please Read

Disclaimer

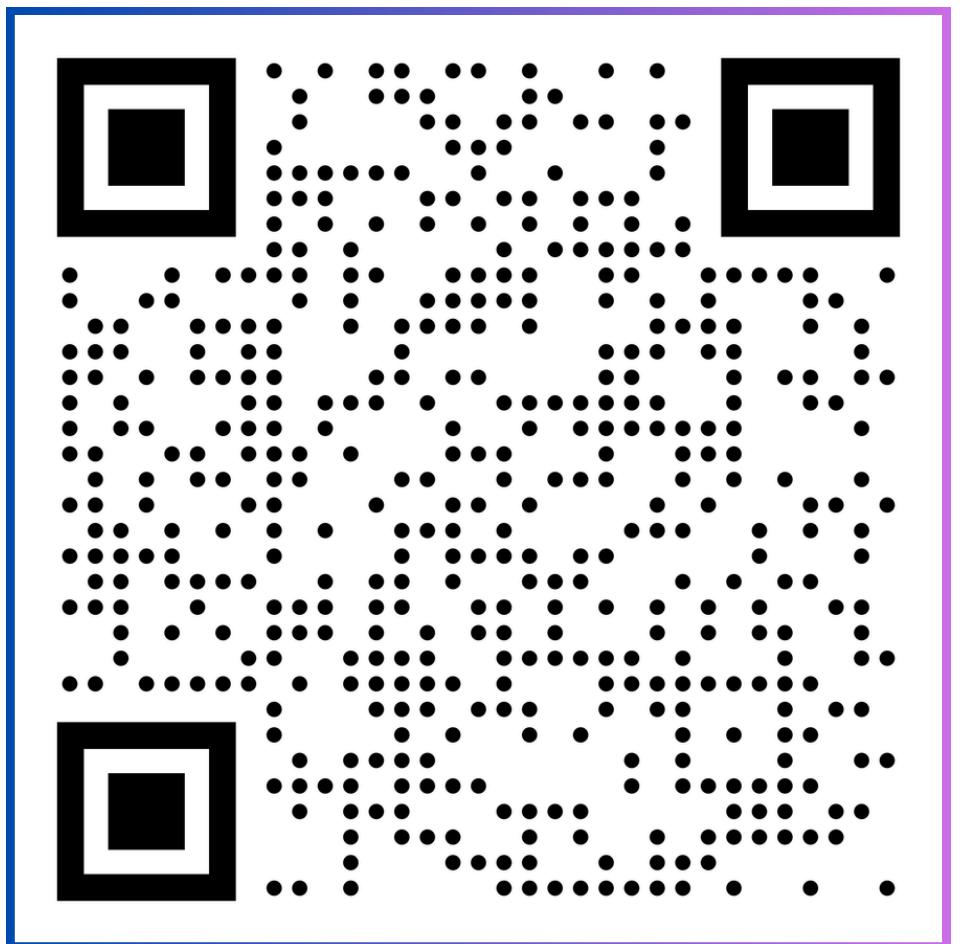
## 1 Introduction

The objective of this report is to demonstrate a **data analysis workflow** using the `palmerpenguins` package, which offers an excellent dataset for data *exploration* and *visualization*.

### 1.1 Palmer Penguins

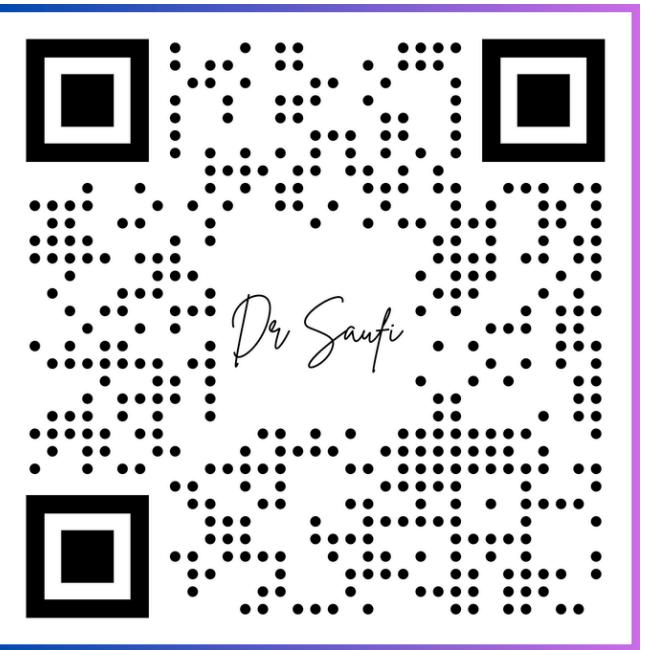
The package contains data on *344 penguins* across three species, collected from three different islands in the **Palmer Archipelago, Antarctica**<sup>1</sup>. The data was gathered by **Dr. Kristen Gorman** and the **Palmer Station, Antarctica LTER**<sup>2</sup>.

CHINSTRAP!  
GENTOO!  
ADÉLIE!



drsaufi.github.io/  
Intro-Quarto/Penguins

# Contact Me



[drsaufimbch@gmail.com](mailto:drsaufimbch@gmail.com)



[drsaufi.github.io](https://drsaufi.github.io)



R conference 2024

**Thank You**  
For Your Attention