

# Inference on Sexual Dimorphism in Pygoscelis Penguins

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## Why This Question

[Write your personal motivation here...]

## Introduction

We assume that the Culmen Depth ( $X$ ) of penguins follows a Normal distribution:

$$X \sim \mathcal{N}(\mu, \sigma^2)$$

## Theoretical Framework

### Derivation of MLE

The likelihood function for  $n$  i.i.d. observations is:

$$L(\mu, \sigma^2) = \prod_{i=1}^n \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left(-\frac{(x_i - \mu)^2}{2\sigma^2}\right)$$

[Insert your calculus steps here]

## Data Analysis

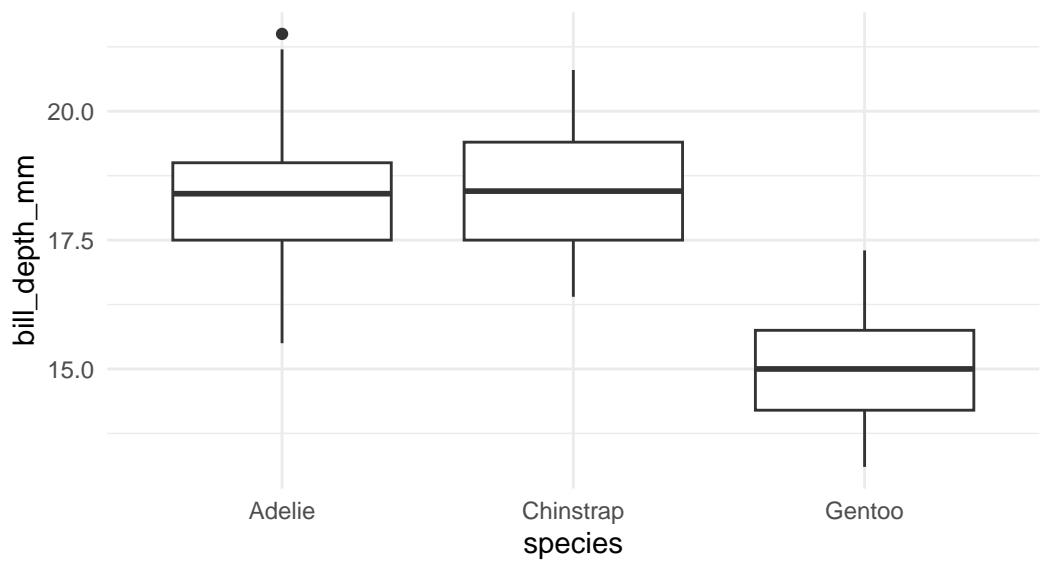


Figure 1: Distribution of Culmen Depth by Species