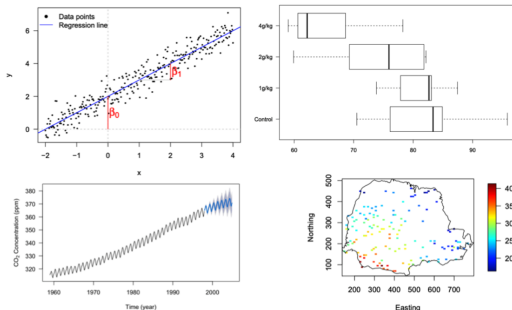


Lecture 0

Course Overview

DSA 8020 Statistical Methods II

Whitney Huang
Clemson University



About the Instructor

Class Policies

Class Overview

About the Instructor

About the Instructor

- **Fourth year** Assistant Professor of Statistics
- Born in Laramie, Wyoming, grew up in Taiwan



- Got a B.S. in Mechanical Engineering, switched to Statistics in graduate school



- Ph.D. in Statistics at Purdue, two-year postdoc at Research Triangle, NC and Victoria, Canada



University
of Victoria

How to reach me?

- **Email:** wkhuang@clemson.edu
- **Office:** O-221 Martin Hall
- **Office Hours:** Wednesdays 8:00pm - 9:00pm ET via Zoom and by appointment

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[Class Overview](#)

Class Policies

- There will be [three projects](#). The (tentative) due dates are:
 - **Project I:** Mar. 2, Thursday
 - **Project II:** Apr. 6, Thursday
 - **Project III:** May 4, Thursday
- There will be weekly R Labs:
 - To be uploaded to Canvas by 11:59 pm ET on the due dates
 - Worst grade will be dropped
- No lectures in the week Mar. 20-24 ([Spring Break](#))

- [Course syllabus / Announcements](#)
- [Lecture slides/notes/videos](#)
- [R Labs/Projects](#)
- [Data sets for lectures and labs](#)

- *An Introduction to Statistical Learning: with Applications in R*, 2nd Edition, Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani, 2021 [\[Link\]](#)
- *Linear Models with R*, 2nd Edition, Julian J. J. Faraway, 2014 [\[Link\]](#)
- *Extending the Linear Model with R*, 2nd Edition, Julian J. J. Faraway, 2016 [\[Link\]](#)
- *A First Course in Design and Analysis of Experiments*, Gary Oehlert, 2010 [\[Link\]](#)
- *Design and Analysis of Experiments*, 2nd Edition, Angela Dean, Daniel Voss, and Danel Draguljic, 2017 [\[Link\]](#)

Evaluation

Grades will be weighted as follows:

| | |
|-------------|-----|
| R Labs | 25% |
| Project I | 25% |
| Project II | 25% |
| Project III | 25% |

Final course grades will be assigned using the following grading scheme:

| | |
|---------------|----|
| ≥ 90.00 | A |
| 88.00 ~ 89.99 | A- |
| 85.00 ~ 87.99 | B+ |
| 80.00 ~ 84.99 | B |
| 78.00 ~ 79.99 | B- |
| 75.00 ~ 77.99 | C+ |
| 70.00 ~ 74.99 | C |
| 68.00 ~ 69.99 | C- |
| ≤ 67.99 | F |

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We will use software to perform statistical analyses.

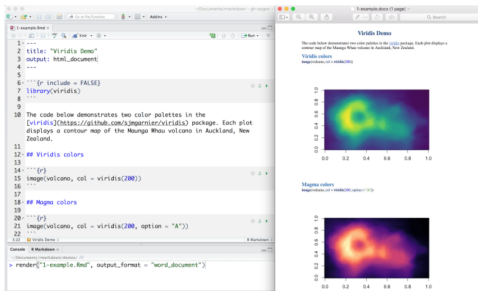
Specifically, we will be using R/Rstudio   RStudio

- a **free/open-source** programming language for statistical analysis
- available at <https://www.r-project.org/> (R);
<https://rstudio.com/> (Rstudio)
- We will use **R Markdown** for homework assignments

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Class Overview



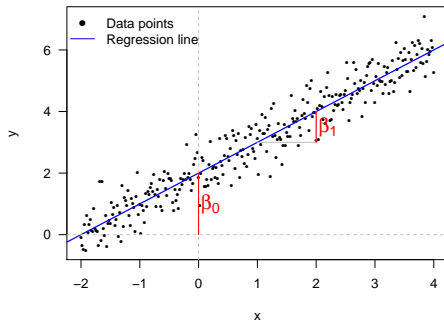
About the Instructor

Class Policies

Class Overview

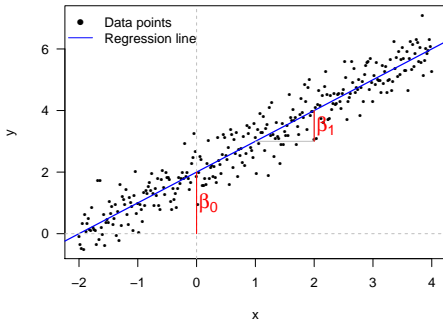
Class Overview

Part I: Regression Analysis (Week 1 - Week 7)



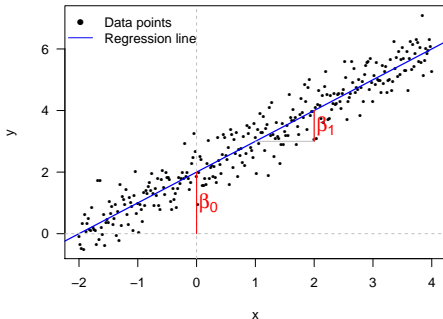
● Multiple Linear Regression

Part I: Regression Analysis (Week 1 - Week 7)



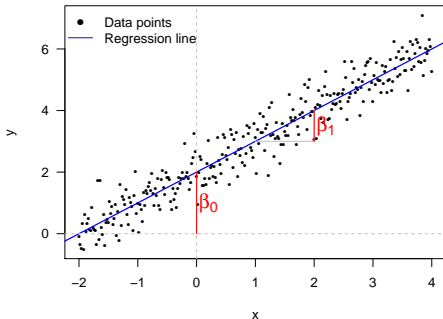
- Multiple Linear Regression
- Regression with Quantitative and Qualitative Predictors

Part I: Regression Analysis (Week 1 - Week 7)



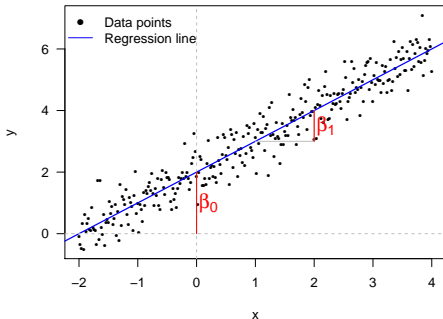
- Multiple Linear Regression
- Regression with Quantitative and Qualitative Predictors
- Nonlinear and Non-parametric Regression

Part I: Regression Analysis (Week 1 - Week 7)



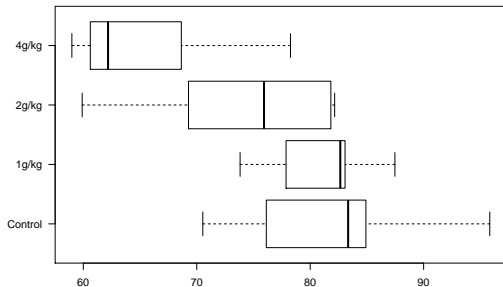
- Multiple Linear Regression
- Regression with Quantitative and Qualitative Predictors
- Nonlinear and Non-parametric Regression
- Ridge Regression and Lasso

Part I: Regression Analysis (Week 1 - Week 7)



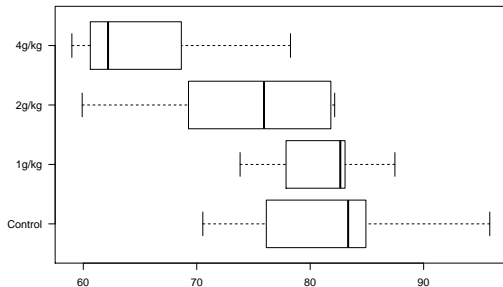
- Multiple Linear Regression
- Regression with Quantitative and Qualitative Predictors
- Nonlinear and Non-parametric Regression
- Ridge Regression and Lasso
- Logistic Regression and Poisson Regression

Part II: Experimental Design (Week 8 - Week 12)



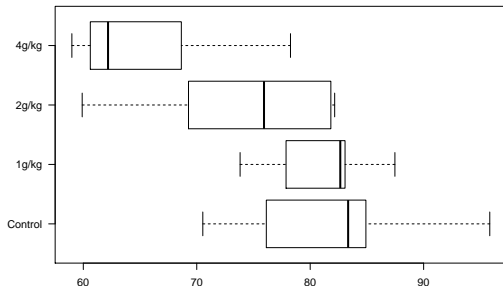
- Introduction to Experimental Design

Part II: Experimental Design (Week 8 - Week 12)

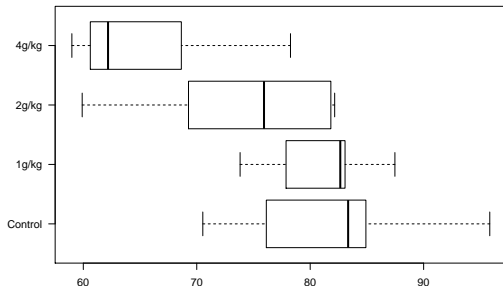


- Introduction to Experimental Design
- Completely Randomized Designs, Block Designs, Nested and Split-Plot Designs

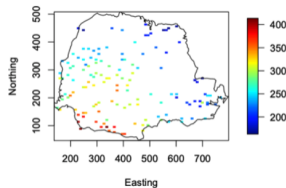
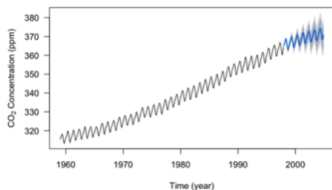
Part II: Experimental Design (Week 8 - Week 12)



- Introduction to Experimental Design
- Completely Randomized Designs, Block Designs, Nested and Split-Plot Designs
- Random and Mixed Effects Models



- Introduction to Experimental Design
- Completely Randomized Designs, Block Designs, Nested and Split-Plot Designs
- Random and Mixed Effects Models
- Computer Experiments



- Stationary Processes, Autocovariance Function
- Autoregressive Integrated Moving Average (ARIMA) Models and Seasonal Models
- Stationarity and Isotropy, Covariance Function
- Gaussian Process Spatial Interpolation (aka Kriging)