**Introduction to R**

R Studio

Environment and Working directory

How to find help

Packages

Elementary Commands

Importing Data

Functions

**Models and Likelihoods**

A model is a thing that stands for a different thing and is intended to emulate it in some specified way.

Models of Phenomena: The billiard ball model of a gas, the Bohr model of the atom,

the double helix model of DNA, the scale model of a bridge, the Mundell-

Fleming model of an open economy, or the Lorenz model of the

atmosphere are well-known examples for models of this kind.

Models in Science, Stanford Encyclopedia of Philosophy

Scale models: Enlargements (the Harvard-Peabody glass flowers), miniatures (architectural models)

Idealizations. Deliberately simplified representations

Simple models and compound models: Models within models

Bernoulli within Binomial

Models for Experiments-- Probability Models/Random Variables/Statistical Models

Probability

Examples including binomial

Continuous model

Conditional probability

Statistics and Models

Likelihood and probabilities

Maximum Likelihood

Bayesian Statistics

Part 1. 90 minutes

Break 30 minutes

Part 2. 90 minutes

Introduce the goals of the summer school. Administrative announcements. Allow students to introduce themselves(?).

Learning goals:

Judgment: Models, probability and statistics from the point of view of experiments, Likelihoods, Frequentist and Bayesian points of view.

Practice: RStudio, Basic R syntax, getting help, importing data, programming and functions. graphics and plotting.

Mendel’s peas

Data

Mendel’s data.xlsx

Notes

Quote from Malcolm Rorty

Genetics pre-Mendel

Mendel’s model

Mendel’s experiment

Outcomes

Expected outcomes

Probabilitiesd

Likelihood

Read in Mendel’s data

Note that this single command strings together several simpler commands

View(MendelData)

Access elements by element: MendelData[3,4]

By row: MendelData[3,]

By column: MendelData[,4]

Compute proportions

Compare to experiments with known model

Describe Frequentisim

Bayesian approach and subjective probabilities

Commands

Import Data (GUI)

View(data\_frame)

ggplot

geom\_