00137960: Statistical Thinking

Lectures: 每周一 8:00–9:50 am 和双周三 3:10–5:00 pm, 二教 401。期末考试：6 月 22 日星期一上午

Teaching Assistant: 陈志文 (chenzhiwen@stu.pku.edu.cn)

Course Description:

This course provides a compact and accessible introduction to statistics, focusing on the most important ideas that have shaped the field and have influenced our ways of viewing and understanding the world. Essential concepts including data, models, algorithms, sampling, likelihood, information, hypothesis testing, regression, and causality will be motivated and introduced. A comparative overview of frequentist and Bayesian inference will be presented. The discussion will be illustrated by examples from the physical, biological, and social sciences.

References:

1. Poldrack, R. A. (2023). *Statistical Thinking: Analyzing Data in an Uncertain World*. Princeton University Press. A free version of the book is available at https://statsthinking21.org/.
2. Efron, B. and Hastie, T. (2021). *Computer Age Statistical Inference: Algorithms, Evidence, and Data Science* (student ed.). Cambridge University Press.
3. Cox, D. R. (2006). *Principles of Statistical Inference*. Cambridge University Press.
4. Stigler, S. M. (2016). *The Seven Pillars of Statistical Wisdom*. Harvard University Press.
5. Salsburg, D. (2001). *The Lady Tasting Tea: How Statistics Revolutionized Science in the Twentieth Century*. W. H. Freeman and Company.
6. Porter, T. M. (2020). *The Rise of Statistical Thinking, 1820–1900* (new ed.). Princeton University Press.
7. Lin, X., Genest, C., Banks, D. L., Molenberghs, G., Scott, D. W. and Wang, J.-L. (eds) (2014). *Past, Present, and Future of Statistical Science*. CRC Press.

Homework:

There will be several homework assignments due in class. If you missed the class, contact the TA to turn in your homework by the end of the day. No late homework will be accepted.

Exams:

There will be closed-book mid-term and final exams. Each student should also write a report (due June 03) of no more than 5 pages on an idea, principle, or method that plays a key role in the development of statistics.

Grading:

The course grade breaks down as follows: homework 30%, mid exam 20%, report 20%, and final exam 30%.