Time and Room:
- Time: Spring Quarter 2018, WF, 1:00 PM - 2:20 PM
- Room: CMU 228

Instructor: Joseph Salmon,
emails: jrsalmon@uw.edu or joseph.salmon@telecom-paristech.fr

Office Hours:
- Friday 10:30-11:30 AM, by appointment only.

Prerequisites
Stat 538, and Stat 535 (or CSE 546) or an equivalent first course in statistical learning.
Students are expected to be familiar with probability theory, multivariate analysis, linear algebra, advanced calculus, and convex optimization. Students should be able to complete short programming tasks using high level programming language (e.g. Python, Matlab, R/S-Plus).

Course description
This course will introduce the basis on robust statistics. On top of modeling and theoretical aspects (influence function, breaking point, depth, sensitivity curves, etc.), the course will cover some numerical optimization for implementing the introduced methods. Time permitting, each registered student will report on a topic of interest to her/him.

Grading
This course will be project oriented. Final projects will be proposed based on a selection of a short list of articles or according to students’ relevant propositions. This will be a credit / no credit course.

Topics include (as time permits):

1. Introduction. Examples. Basic concepts, equivariance, breaking point,
2. Location/scale estimates, M-estimates, Pseudo-observations, depth
3. L-statistics: Linear combination of order statistics
4. Gâteaux differentiability, Sensitivity curve, Influence Function
5. Numerical computation of M-estimates, reminders on non-smooth convex optimization, Iterative Reweighted Least Square (IRLS)
6. Smoothing non smooth problems
7. Robust regression for multivariate statistics
8. Quantile regression, “crossing”
Textbook:


Additional books


Additional articles


Course web page: