Depiction by Reginald Marsh of a rather stochastic effort at height optimization. "Coney Island Beach", 1934. Yale Art Gallery.

STAT 637

Deterministic and Stochastic Optimization

Time TBD

Room 107, 24 HLH

Mokshay Madiman

Welcome to STAT 637, "Deterministic and Stochastic Optimization". This topics course treats selected theoretical and algorithmic background for the very important subject of optimization, which is crucial to many application areas including statistics, engineering, physics and economics. Grad students and advanced undergraduates are welcome.

Study of the theory and algorithms used to solve optimization problems in both deterministic and stochastic settings, with an emphasis on the latter. Topics include:

- duality theory and descent methods in deterministic optimization
- simulated annealing, motivated by the global optimization problem
- stochastic approximation, motivated by the need to optimize in the presence of noisy measurements
- the theory of optimal transportation, an important example of an infinite-dimensional optimization problem.

Familiarity with stochastic processes (e.g., STAT 551b) is assumed. Knowledge of ordinary differential equations and real analysis is recommended.