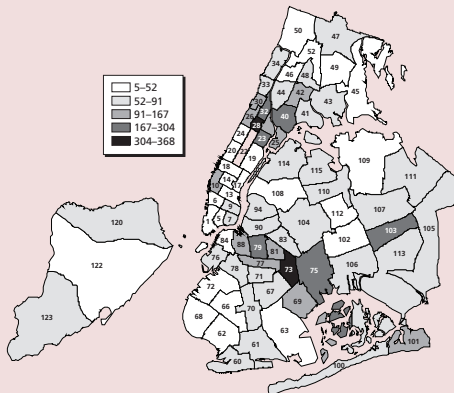# Introduction

Why Bayesian analysis?

Figure 2.1
**Stops per 1,000 People (estimated daytime population)**

SOURCE: Number of stops computed from NYPD (2006). Daytime population figures are from the New York City Planning Department as reported in Spitzer (1999, Appendix I).
RAND *TR534-2.1*

Course book:

- Good book.
- Non mathematical, focus on interpretation and modeling.
- Lecture videos, and lecture notes on homepage.

Homepage:http://xcelab.net/rm/statistical-rethinking/
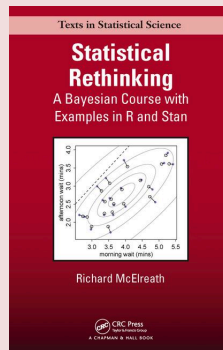
This is the, approximate, schedule of the course:

Week	Chapters (parts)	Learning
1	2,3	Bayesian ideas, sampling
2	4,5	Normal distribution, linear regression
3	6,7	model comparison, model interactions
4	9	RStan, Generalized linear models
5	8	Markov chain Monte carlo (MCMC)
6	12	Multilevel model
7	11	Mixture models

Homepage of the course:
https://github.com/JonasWallin/BayesianMethods_STAE02

There grading of the course will relay on two parts:

- 50% of the points are from the four labs. To pass you must have successfully completed the mandatory parts of the labs.
- 50% of the points will be from exam. Pass you need to get above 50% of the points.

To pass the course you must pass both.

The first lab will be about:

- Basic use of R.
- Basic sampling to solve integrals.
- Basic Bayesian calculations.

Deadline:
On the homepage there are links to tutorials of both R and Rstudio. If you are uncertain do them.

The second lab will be about:

- Handling multivariate distributions, marginal distribution and conditional distributions.
- Linear regression in a Bayesian setting.
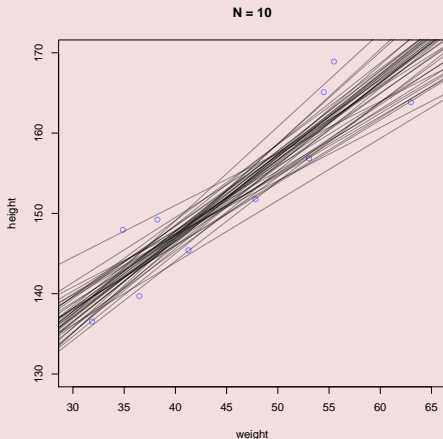- Model comparison.

Deadline:

N = 10

height

weight

Figure : Posterior functions $\mu_i(x)$

The third lab will be about:

- Coding with Rstan.
- Diagnostic checks for Markov chain Monte carlo (MCMC).
- Bayesian model beyond the Normal model (linear model).
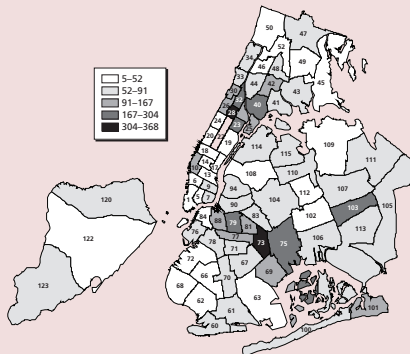
Deadline:

The Fourth lab will be about:

- More advanced Bayesian models: Mixture models, Multilevel models.
- Fitting the models using Rstan.
- Interpretation about the models.

Deadline:

Figure 2.1
Stops per 1,000 People (estimated daytime population)

5–52
52–91
91–167
167–304
304–368

SOURCE: Number of stops computed from NYPD (2006). Daytime population figures are from the New York City Planning Department as reported in Spitzer (1999, Appendix I).
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