# Transportation Analytics

Final Project - Uber Load Management

April 18, 2018

**Optimization Variables**

- $m_{ij}$ := The number of cars relocated from location $i$ to location $j$.

**Model Parameters**

- $D_i$ := true demand for Ubers from location i
- $x_{ij}$ := probability customers in location i will select Uber given it is in location j
- $N_{0j}$ := number of cars in location j prior to relocation
- $N_{1j} = N_{0j} + \sum_i m_{ij} - \sum_i m_{ji}$ := number of cars in location j after relocation
- $c_{ij}$ := cost of relocating Uber from location i to location j
- $r$ := revenue from picking up a customer

**Model**

$$\max \left[ \min \left[ \sum_i \left( \sum_j x_{ij} D_i \right), \sum_j N_{1j} \right] \right] \cdot r - \sum_i \sum_j n_{ij} c_{ij}$$

$$\text{such that } N_{1j} = N_{0j} + \sum_i m_{ij} - \sum_i m_{ji} \quad \forall j$$

$$N_{0j} \geq \sum_i m_{ij} \quad \forall j$$