Libraries

- 10 years simulations starting from 2019 February to 2029 February
- Salary Distribution
- Trend of Salary Spending
Number of People in Different Positions in Library
Simulation of Data for 10 years

Mean Salary Spending is $5.5 millions
Curve Fitting for Salary Trending

Salary Spending = \(-0.017 \times \text{Months} + 7.178\)
Engineering Spending VS. Categories

Categories: BENEFITS, INTER DEPART BILLING, INTER DEPART CHARGES, PURCHASED SERVICES, SALARIES, SUPPLIES, TRANSFER OUT

Spending (in million dollar)
One single simulation

Number of Employees: Increasing
Salary Spending: Increasing
1000 Simulations

- **2019:**
  - Mean: $3.85M
  - Lower: $3.78M
  - Upper: $3.93M

- **2028:**
  - Mean: $4.6M
  - Lower: $4.4M
  - Upper: $4.9M
Regression

- $Y = 91797.7x + 3720955.3$
- Ex: 20 years later
  
  $Y = 83452.4 \times 20 + 3382686.6$
  
  = $5.5M$
Madison Police

- Police spending dominates the budget
- Majority of the Police expenses stem from salaries
10 Year Simulation

- Salary Spending in 2028 increased by 141% since 2018
- Number of Employees increased by 128% since 2018
Parameters

- Analyzed monthly changes for each position
- These numbers likely change over time
- Other factors could be taken into account
Main Takeaways

- Police Salaries will continue to increase. The budget going forward should recognize this.
- Retiring in higher positions will increase, thus creating more promotions.
- Library Salary is increasing and decreasing among each month but overall is decreasing.
- Engineering Salary will continue to increase. The budget for 2020 is very likely to be increased.
Looking Forward

- Treated parameters as independent of each other, but in reality they very much are not
- Fix some of the bugs and errors
- Try different simulation methods to be more precise
- Not compatible enough with other datasets
- Create better parameters from a more extensive dataset
  - Ex. Incorporate an employee’s age into the model