

## Blue Infrastructure: Sewer Pipes that Think

Blue Cities Conference 2017 Luis Montestruque, Ph.D. Storm Water Management Combined Sewer Overflows Separate Sewer Overflows Basement Backups Surface Flooding

# **Traditional Solutions**





#### Problem:

Largest ever infrastructure spend for many cities Poorest citizens face largest economic burden

# Dynamic Optimization of Urban Watersheds

Objective: maximize the use of existing infrastructure

### Blue Infrastructure / Smart Infrastructure

Let's maximize what we have!

Internet of Things/ Edge Computing



### **Big Data Analytics**



#### Machine Learning





# #1 Turn on the Lights



Max Stream Radio 1 Watt, 900MHz SS, 115kbps

Cam Lock Mechanism Prevent cover from popping out

# #1 Turn on the Lights





# #1 Turn on the Lights







# #2 Bring in the Model





# #2 Bring in the Model



## #3 Operate the Sewershed



Agent-based computing generates rules to achieve global optimization of storage, conveyance, and energy consumption.

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### #3 Operate the Sewershed



## #3 Operate the Sewershed





2015-03-11 18:34:16: Rainfall predictions updated through 2014-12-12 09:00





70% reduction in overflow volume



Median E. coli concentration [cfu/100 mL]

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55% reduction in E. Coli contribution

# Thank You!

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