

# **Predicting the Potential Risks of Coastal Flooding for Public and Private Property Ownership and Estimation of Financial Damage**



# Introduction

- Importance of coastal flood estimation

## **Economic Impacts**

- More than half of the U.S. economic productivity is located in coastal areas [NOAA, 2014]
- Major roads, railroads, and airports have been constructed on low-lying lands
- Hurricane Katrina 2005; \$125 billion damage
- Hurricane Ike 2008; \$30 billion
- Hurricane Sandy 2012, \$65 billion
- Hurricane Harvey 2017; \$125 billion

## **Life Threat**

- About half the world's population lives within 100km of the coast [World resources, 1996-97]
- Much of the Gulf Coast and Atlantic coastline lies less than 3m above mean sea level [CCSP, 2008]
- Deadliest phenomenon associated with hurricanes in coastal regions [Ludlam, 1963]
- Hurricane Katrina, 2005; 1800 deaths; Hurricane Sandy, 2012; 170 deaths

# Motivation

- Rising sea levels are changing the way people think about real estate and insurance policy.
- We hear more questions like:
  - How close the home is to the water's edge?
  - How many feet above sea level?
  - Is it fortified against storm surges and recurrent nuisance flooding?
- Studies found that current modelling underestimates the future risks of Sea Level Rise (SLR) to property

# Goal

- Revisiting flood insurance policies and producing new and innovative fast data analysis techniques to provide important information to businesses

## Research design and methods

- Hampton Roads region is experiencing a high and increasing rate of flood as well as the highest rate of RSLR in the U.S. East Coast
- Light Detection and Ranging (LiDAR) dataset consists of 1400 terrain files
- Compound flooding:
  - Consider different sea-level rise scenarios
  - Use the Hurricane Databases (HURDAT)