Project Title: Intense flood-generating rainfall over Baltimore City: Magnitude, duration and frequency

UMBC mentor name & department: Dr. Andrew Miller, Geography & Environmental Systems

Partner mentor name & institution: Kim Grove, P.E., Baltimore City Department of Public Works

Brief project description:

Evidence suggesting increased frequency of local flooding related to intense rainfall in Baltimore City has raised concerns about how best to assess the likelihood of and hazards associated with these events. Existing databases from the National Weather Service may not be sufficient to characterize the relationship between magnitude, duration and frequency of intense short-duration storms. Working with colleagues at Princeton University, we seek to use a 20-year record of radar rainfall over the region to assess spatial patterns and frequency of intense rainfall and to work with the Department of Public Works to provide improved estimates that can help in identifying and responding to resulting hazards.
Project Title: Spatial pattern of flood hazards associated with intense rainfall events in Baltimore City

UMBC mentor name & department: Dr. Andrew Miller, Geography & Environmental Systems

Partner mentor name & institution: Kim Grove, P.E., Baltimore City Department of Public Works

Brief project description:

There is increasing concern in Baltimore City and other jurisdictions about the frequency of flooding related to intense rainfall events. This includes both riverine flooding and street flooding that occurs when short-duration cloudbursts generate flows that exceed the capacity of the storm sewers. The goal of this research is to work with the city to analyze the spatial distribution, intensity, and frequency of local flooding events of different types; and to characterize the hazards associated with these events in order to assist the city in developing policies to manage the risk more effectively.
Project Title: Evaluation of stream temperature data from Baltimore City to detect illicit discharges to the storm sewer system

UMBC mentor name & department: Dr. Claire Welty, Chemical Biochemical, and Environmental Engineering

Partner mentor name & institution: Kim Grove, P.E., Baltimore City Department of Public Works

Brief project description:

Baltimore City DPW is in the process of replacing the gages of their existing flood monitoring system throughout the city. As part of this network, ambient air temperature sensors and stream temperature sensors will be deployed. The goal of this project is to evaluate the collected data, to pinpoint stream temperature anomalies that may be indicate illicit discharges to the storm sewer system and to track down those sources for repair and removal from the storm drain system. These discharges may include water main breaks and sanitary sewer cross-connections or exfiltration. The potential impact is to enhance the current illicit discharge detection and elimination program.
Project Title: Evaluation of basement flooding in Baltimore from groundwater sources

UMBC mentor name & department: Dr. Claire Welty, Chemical Biochemical, and Environmental Engineering

Partner mentor name & institution: Kim Grove, P.E., Baltimore City Department of Public Works

Brief project description:

Evidence from a number of sources points to rising water tables as a cause of basement flooding in Baltimore. The goal of this project is to collect and synthesize all evidence of this phenomenon, map locations where this is a problem, and propose potential solutions. The long-term impact could be to relieve building occupants from this source of property damage.