The Central Plains Water Science Center Presents:

Science Seminar Series

April 8th, 2026
12:00pm CDT

Enhancing Urban Flash Flood Preparedness and Response through Real-Time IoT Sensor Networks

Bill Selbig and Sean Thiboldeaux

Flash floods can develop quickly from extreme rainfall events, sometimes leaving just minutes to react. The mounting risk of flash floods became clear in 2025, when the National Weather Service issued the highest number of warnings in nearly four decades. As more communities experience an increasing frequency of severe rainfall events, urban flash flood detection systems, or "smart utilities", are becoming ever more important to provide advance warning of impending floods at vulnerable locations. In 2021, the USGS implemented a sentinel network of low-cost Internet-of-Things (IoT) devices for detection and advanced warning of flood conditions in the city of Madison, WI. Data from the IoT network are populated into a custom GIS dashboard which can help visualize areas immediately impacted by localized heavy rainfall with maps of flood extents at the neighborhood scale. Integrating these innovative technologies into a cost-effective, scalable monitoring network that improves situational awareness of urban flash flooding in real time can help cities adapt to the increasing potential of fluvial flash floods.

Bill is a Research Hydrologist with the Upper Midwest Water Science Center and has more than 25 years of experience in urban stormwater science. Much of his work has been done in close partnership with municipalities around the country, where is his research has advanced the understanding and management of complex urban hydrologic systems. He has played a leading role in developing innovative technologies for urban stormwater monitoring, including the creation of two patented systems. Sean is a Hydrologic Technician with the Upper Midwest Water Science Center, specializing in the design, implementation, and modernization of USGS urban hydrologic monitoring systems. Sean has extensive experience leveraging IoT technologies and AWS cloud infrastructure to develop dataflow and telemetry solutions on a variety of USGS monitoring efforts. Sean also has an extensive background in GIS and Python programming which he has used to enhance the accessibility of these monitoring efforts through custom web applications and real-time alert systems.

Access the Microsoft Teams Presentation Here:

[Click here to join the meeting](#)