The 2021 Kappe Lecturer

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Virtual via Zoom:
45-min lecture + 15-min Q&A

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Water Technologies for Emerging Regions
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Climate Change Adaptation and Environmental Engineering: Evolving Practices and New Tools

The climate is changing globally and across the U.S., with different types and extent of change in different regions. Observed changes include sustained deviation from long-term trends in atmospheric temperatures, water temperatures, precipitation amounts, drought duration, storm frequency, wind velocities, snow melt timing, flood frequency and characteristics, permafrost melting, and other phenomena. These changes are affecting civil and environmental infrastructure and leading to demand for modification of infrastructure designs and operations. New approaches are needed in infrastructure design and operation guidelines, codes, and procedures to account for changing climate conditions.

New tools are coming into use in infrastructure engineering for projection of changing climate conditions, especially downscaled global climate model (GCM) products. Depending on the type of engineering application and purpose of required future climate information, various climate model projections are being applied and utilized, with different temporal and spatial resolution, type of downscaled GCM products employed, and post-processing methods for calibration of the results to regional and local scale.

This talk will examine the need and challenge of climate change projection in particular locations, the scale at which infrastructure engineering projects take place. Evolving practices and tools will be presented, and demonstrated through some environmental engineering applications. The use of climate projection results from several different GCMs and downscaled products and from an ensemble of multiple GCMs will be explored in the context of the applications. The importance and utility of historical long-term observations for particular locations will also be examined. Opportunities to access, learn about, and exploit these new tools for environmental engineering will be discussed.