

## **Advancing modeling capabilities for simulating the combined coastal and inland hazards from high-impact hurricanes**

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This presentation will discuss the efforts at the University of Rhode Island to advance modeling capabilities for assessing the impacts of landfalling hurricanes, as part of the U.S. Department of Homeland Security Coastal Resilience Center of Excellence. Our primary focus is on using multiple, independent models to create an ensemble of model solutions to provide the best possible guidance to end users and combining physical and damage impact models and visualization tools in one unified computational framework. While landfalling hurricanes pose a serious danger along the entire U.S. East and Gulf Coasts, this project focuses on Southern New England identified by FEMA as “the Achilles heel of the Northeast” because of its hurricane vulnerability. This area is selected as a testbed for the Northeast that experiences high-impact, but low-frequency hurricanes with storm characteristics that are different than hurricanes affecting the Southeast and Gulf Coasts.

We will discuss the implementation of the URI air-sea coupling module developed for NOAA operational hurricane models to coupling storm surge and wave models. We will present the evaluation of the SWAN and WAVEWATCH III wave models in hurricane conditions for different spatial grid configurations and model physics packages and their effects on storm surge predictions. As part of this effort, we have implemented into the ADCIRC storm surge model a hurricane boundary layer model for more accurate modeling of the onshore and offshore wind magnitude and structure during hurricane landfall.