Structural Engineering Seminar Series

CEE595S

Hurricane Hazards and Risk in a Changing Climate

Ning Lin

Associate Professor, Princeton University

Abstract: Hurricanes, with their strong winds, heavy rainfall, and storm surges, cause much damage and loss of life worldwide. The impacts of these storms may worsen in the coming decades because of rapid coastal development coupled with sea-level rise and possibly increasing hurricane activity due to climate change. Here we present a framework of modeling hurricane hazards and risk in a changing climate. First, we introduce a new probabilistic hurricane model that can be used to generate large numbers of synthetic storms with physically correlated characteristics under observed or projected climate conditions. Second, we discuss about hurricane wind, rainfall, and surge hazard modeling and the coupling with the hurricane model to estimate hazard probabilities in a changing climate. Then, we discuss about the development of hurricane risk mitigation strategies, concerning the existence of deep uncertainties in climate science and the benefit of continuous learning and updating.

Bio: Ning Lin is an Associate Professor of Civil and Environmental Engineering from Princeton University. She received her Ph.D. degree in 2010 from Princeton University and her M.S. degree in 2005 from Texas Tech University. Before joining Princeton University, she worked in Massachusetts Institute of Technology (MIT) as the NOAA Climate and Global Change (C&GC) Postdoctoral Fellow. She received Faculty Early Career Development (CAREER) Award from National Science Foundation and Howard B. Wentz, Jr. Junior Faculty Award from Princeton University. She is interested in Natural Hazards and Risk Assessment, Stochastic Modeling, Wind Engineering, Coastal Engineering, Climate Change Impact and Adaptation, and Built Environment and Sustainability. Specifically, her current research integrates science, engineering, and policy to study tropical cyclones and associated weather extremes (e.g., strong winds, heavy rainfall, and storm surge), how they change with climate, and how their impact on society can be mitigated. The methods will be extended to study other natural hazards, in the context of multi-hazard risk analysis.

Monday, March 25th, 4:00-5:00pm

1310 Yeh Student Center