The Department of Civil and Environmental Engineering at the University of Houston presents...

CIVE 6111 Graduate Seminar

From bridge structure to intermodal network scale: Resilience modeling of transportation infrastructure

Jamie E. Padgett, Professor and Department Chair
Department of Civil and Environmental Engineering Rice University

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2:45pm-3:45pm
Classroom Business Building (CBB) - Room 104
Zoom: https://uh-edu-cougarnet.zoom.us/j/94589160391

Abstract

Our structures and infrastructure systems are exposed to an array of threats throughout their lifetime, including both chronic and acute stressors that pose a risk of damage and cascading consequences to social, environmental and economic systems. These stressors include aging and deterioration, increased demand by a growing population, and natural hazards that may become more frequent with climate change. This presentation provides an overview infrastructure resilience modeling considering exposure to multiple hazards. Emphasis is placed on transportation infrastructure, given its vulnerability in past hazard events, as well as its essential role in supporting both emergency response as well as long term recovery of a region. Recent advances in multi-hazard vulnerability modeling and hybrid metrics of resilience are described. Case studies are leveraged to illustrate key input to the resilience modeling framework, such as fragility models and restoration functions, and to quantify indicators of infrastructure resilience. These case studies cut across hazards, systems and scales—from bridges to intermodal transportation networks subjected to earthquakes, floods, or hurricane hazards—to demonstrate model integration and probe alternative practical questions of design, management and risk mitigation. We conclude with a discussion of challenges and opportunities to propel the field toward smart and equitable resilience modeling in hazard prone communities.

Bio

Jamie E. Padgett is the Stanley C. Moore Professor and Department Chair of Civil and Environmental Engineering at Rice University. She received her PhD from Georgia Tech and BS from the University of Florida both in Civil Engineering. Padgett is a structural engineer whose research is focused on multi-hazard risk and resilience modeling of structures and infrastructure systems, while understanding their impacts on communities. Padgett is a Fellow of ASCE's Structural Engineering Institute (SEI) and the founding Chair of its technical committee on Multiple Hazard Mitigation. Among other advisory and professional service roles, Padgett serves on Editorial Boards for such journals as the ASCE Journal of Structural Engineering, Natural Hazards Review, and Sustainable and Resilient Infrastructure. Padgett serves in leadership roles within several large national research efforts including the NIST funded Center of Excellence for Risk-based Resilience Planning, the NSF funded Natural Hazards Engineering Research Infrastructure (NHERI) Cyberinfrastructure "DesignSafe-CI", and the Severe Storm Prediction Education and Evacuation from Disasters (SSPEED) Center. She is the Faculty Director of the inaugural Gulf Scholars Program at Rice University funded by NASEM's Gulf Research Program.