



Civil and Environmental Engineering Department Seminar

Quantifying Multi-Hazard Resilience across Urban Scales

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Join Zoom Meeting

URL: <https://cwru.zoom.us/j/92502635986?pwd=dkZEMWVocGZWL0UvQlJudlM4bHl5Zz09>

Meeting ID: 925 0263 5986 Passcode: 151477

Abstract

Our structures and urban 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. Even a given natural hazard event, such as a hurricane event, brings complex multi-hazard storm conditions that challenge the performance of built infrastructure along with modern risk assessment tools. This presentation examines two pervasive themes in civil engineering, namely resilience and sustainability of urban infrastructure, and explores their intersection and quantification, progress and opportunities. This presentation is organized around case studies leveraged to examine select questions that underpin the characterization of multi-hazard resilient and sustainable infrastructure. For example: What are the relative risks posed by various threats to infrastructure performance and how do they interact? How have the risks to infrastructure co-evolved with policies and socio-demographic shifts? What technological or computational tools enable the advancement of future resilient and sustainable infrastructure? Case studies using bridge and transportation infrastructure as well as energy and industrial infrastructure illustrate risk-based frameworks for quantifying indicators of infrastructure resilience and sustainability while probing alternative design and management strategies.

Bio sketch



Jamie E. Padgett is the Stanley C. Moore Endowed Chair and Professor in the Department of Civil and Environmental Engineering at Rice University. Padgett's research focuses on risk assessment of structures and infrastructure, and the subsequent quantification of resilience and sustainability in the face of multiple hazards. Her group develops methods to evaluate and mitigate the consequences of such hazards as hurricanes, earthquakes and flooding ranging from the individual structure to the infrastructure system to the community scale. Ongoing and recent projects consider transportation, energy and industrial infrastructure, such as bridges, roadway networks, port systems, storage tanks and petrochemical facilities. She has published over 250 articles in journals or archived conference proceedings in the general area of structural response, reliability, resilience and life-cycle assessment. Dr. Padgett was the founding Chair of the ASCE/SEI technical committee on Multiple Hazard Mitigation, and currently serves on the leadership of the ASCE Technical Council on *Life-Cycle Performance, Safety, Reliability, and Risk of*

Structural and Infrastructure Systems. Padgett is an associate editor for several journals including the *ASCE Journal of Structural Engineering*, *Natural Hazards Review*, *Sustainable and Resilient Infrastructure*, and *Structure and Infrastructure Engineering*. Dr. Padgett has received several awards and recognitions including Fellow of the Structural Engineering Institute (2020), EMI Objective Resilience Distinguished Lecturer (2019), and the ASCE Walter L. Huber Civil Engineering Research Prize (2017). Padgett currently serves in leadership roles within the NIST Center of Excellence for Community Disaster Resilience, the NSF NHERI Cyberinfrastructure "DesignSafe-CI", and the Severe Storm Prediction Education and Evacuation from Disasters (SSPEED) Center.