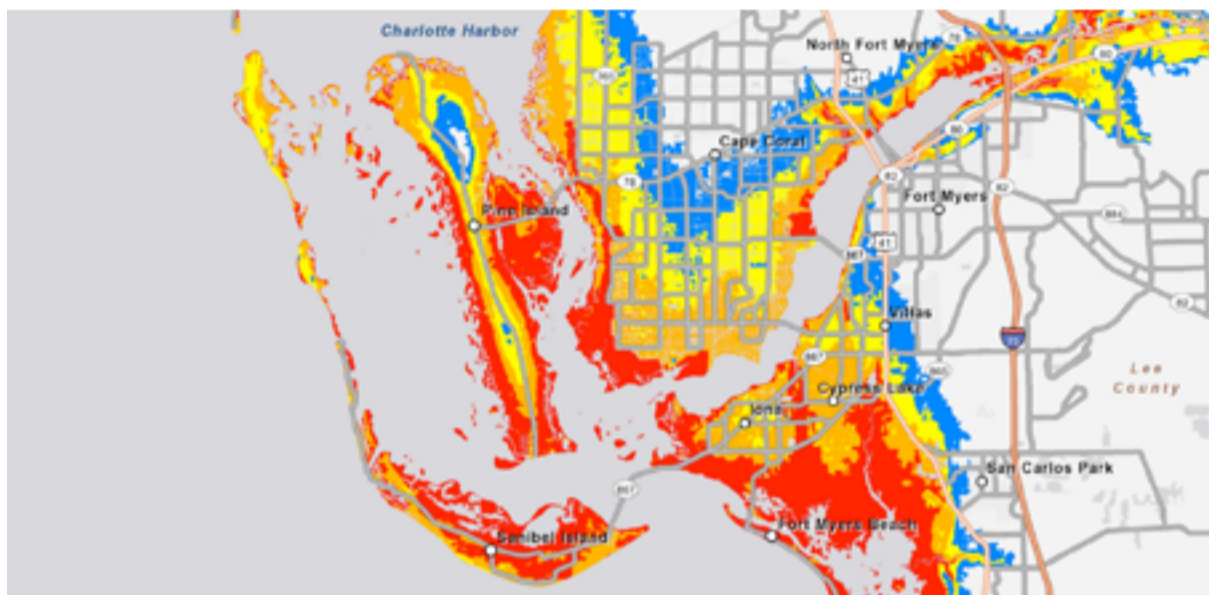




School of Architecture and Design  
PROCULT Project

# PERFORMANCE-BASED HURRICANE ENGINEERING: A MULTI-HAZARD APPROACH



**Camerino** Wednesday **11 june 2014** at 10:30

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**Abstract.** Hurricanes are among the most costly natural hazards, in terms of both property damage and loss of life. Given that different hazard sources are involved, a multi-hazard methodology is required to accurately estimate the risk due to hurricanes and to provide guidance to insurers, emergency administrators, constructors, and owners on how to reduce the potential losses. This presentation will introduce a novel probabilistic Performance-Based Hurricane Engineering (PBHE) framework that disaggregates the risk assessment analysis into independent elementary components, namely hazard analysis, structural characterization, interaction analysis, structural analysis, damage analysis, and loss analysis. The framework innovatively accounts for concurrent and interacting hazard sources, i.e., storm surge and water bodies that can cause flooding, windborne debris, rainfall, and strong winds. It also accounts for the possible sequential effects of these distinct hazards. The proposed PBHE framework and life-cycle cost benefit analysis are used to compare different design alternatives. The relationships between the costs of different mitigation techniques and their benefits are explicitly quantified and thereby facilitate effective decision making for investment in the safety of the buildings.