

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

CIVE 6111 Graduate Seminar

Advancing Fluid-Structure Interaction Knowledge to Characterize Flexibility Effects in Hurricane-Induced Structural Responses



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2:45pm-3:45pm

Classroom Business Building (CBB) - Room 104

Zoom: <https://uh-edu-cougarnet.zoom.us/j/95702511696?pwd=VFlybkh4emhETHNITGV0dXRHS3pIZz09>

Abstract

Fluid-structure interaction (FSI) phenomena involve coupling between the laws of fluid and structural mechanics. Many of these phenomena are encountered in civil infrastructure, including the interaction of structures with fluid motions that are generated by hurricanes, tornados, and tsunamis. As the human footprint in coastal regions increases, understanding this interaction becomes more and more critical. In addition to lab experiments, computational FSI simulations can provide significant insight into the responses of structures to fluid-induced loading. This presentation discusses research studies that have been undertaken for this purpose. In one study, the interaction between elevated coastal housing and ocean waves was examined to investigate the effects of timber connections and foundation flexibility to the house responses. Computational simulations were conducted with a commercially available Finite Element Framework. In the second study, an in-house developed FSI framework is introduced that combines an Arbitrary Lagrangian-Eulerian (ALE) framework with skeleton-based structural models consisting of force-based frame elements—a much favored approach in structural modeling. This development enables interaction of two- and three-dimensional computational fluid domains with frame elements through a methodology that captures the physical structural geometry in the domain coupling.

Bio

Dimitrios Kalliontzis is an Assistant Professor at University of Houston. His research focuses on the behavior of reinforced concrete and masonry structures. His group is also working on understanding hurricane-induced fluid-structure interaction. Prior to joining University of Houston, Dimitrios was a postdoctoral researcher at UC San Diego and earned his Ph.D. Degree from University of Minnesota. Prior to joining University of Minnesota, he worked as a Technical Intern at SGH Inc. and earned his MSc from Iowa State University with a Research Excellence Award. He completed his Diploma Degree in Civil Engineering at Aristotle University of Thessaloniki, Greece.