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

**CIVE 6111 Graduate Seminar**

# Seismically Resilient Bridge through Hybrid Sliding-Rocking (HSR) and Polyurethane-enhanced Rocking Bridge Columns

**Petros Sideris, Ph.D.**
Assistant Professor at Zachry Department of Civil and Environmental Engineering
Texas A&M University, College Station, Texas

**Friday, April 1, 2022**
2:45pm-3:45pm
Classroom Business Building (CBB) - Room 122
Zoom: https://uh-edu-cougarnet.zoom.us/j/99404561519

**Abstract**
This presentation will discuss two seismically resilient bridge column designs, namely, the hybrid sliding-rocking (HSR) columns and the polyurethane-enhanced (PU-enhanced) rocking columns. The HSR columns are post-tensioned precast concrete segmental columns with end rocking joints and intermediate sliding joints. The internal unbonded posttensioning and the dry end rocking joints provide HSR columns with self-centering capabilities. The sliding joints significantly increase the energy dissipation of HSR columns and reduce their rocking-induced damage. The PU-enhanced rocking columns offer explicit damage control through damage-resistant end segments made of PU (or a bi-layered PU-concrete design), achieve self-centering through internal unbonded post-tensioning and provide energy dissipation and flexural stiffness/strength through external replaceable links in the form of buckling restrained yielding steel bars. The replaceability of these links can offer low-cost rapid post-earthquake retrofit without operation disruptions. This presentation will discuss basic concepts, response mechanisms, simulation strategies as well as the findings of two large-scale testing programs conducted at the testing facilities of Texas A&M's Center of Infrastructure Renewal.

**Bio**
Dr. Sideris is an Assistant Professor in the Zachry Department of Civil and Environmental Engineering at Texas A&M University. His research focuses on mitigating the effects of natural hazards on the built environment through understanding of the behavior of existing structures and the development of new resilient and sustainable designs combining novel response mechanisms, advanced materials and novel construction methods. Apart from his work on HSR and PU-enhanced columns, Dr. Sideris has been conducting research on 3D printing of concrete structures, aging effects of reinforced concrete structures, integration of energy harvesting in structural design, and advanced computational simulations techniques. Dr. Sideris serves as Chair of the ASCE/SEI Seismic Effects Committee, and member of the ASCE/EMI Computational Mechanics Committee, ASCE/SEI Performance-Based Design for Structures Committee, TRB AKB50 Standing Committee on Seismic Design and Performance of Bridges, and ACI 564 Committee on 3D Printing with Cementitious Materials