

# UTILIZING UNIVERSAL PANEL TESTER TO STUDY SHEAR BEHAVIOR OF ULTRA-HIGH-PERFORMANCE CONCRETE

**WEDNESDAY MAY 24, 12 PM – 12:50 PM**

**LOCATION: STUDENT CENTER- DOLORES**

**HUERTA PHILIP VERA CRUZ ROOM**

**[HTTPS://UCSD.ZOOM.US/J/92578286539](https://ucsd.zoom.us/j/92578286539)**

### **Abstract:**

To prevent brittle failures of Ultra-High-Performance Concrete (UHPC) members due to diagonal shear cracks, it is crucial to better understand the shear-dominated mechanisms of UHPC. These mechanisms can be affected by the tension and compression fields developed in UHPC, which is investigated in this study through experiments of combined shear and axial loading. The experimental work is carried out with the Universal Panel Tester (UPT) at the University of Houston, where four unreinforced UHPC elements are tested, representing web elements cut out from large-scale UHPC beams. Via UPT, characterization of the state of stress within one element is used to understand the shear behavior of the full structure. The key variable in these tests is the level of compressive and tensile axial loading applied to the web elements. Future work will synthesize the test results to inform the development of shear design equations with consideration to axial load effects. Our research also extends the Softened Membrane Model (SSM) to simulate the shear responses of the UHPC elements that are being tested in the UPT. To achieve good accuracy, a parametric study was conducted to calibrate a number of modeling parameters involved in SMM. With the proposed modifications, the goal for SMM, named as UHPC-SMM, is to enable reliable calculations for the shear resistance of UHPC members. The intent of our research is to incorporate UHPC-SMM in existing finite element frameworks and derive simplified equations for shear design.

### **Speaker Biography:**

Dimitrios Kalliontzis is an Assistant Professor at University of Houston. His research focuses on the behavior of reinforced concrete and masonry structures. He is a voting member of ACI 239-C Structural Design on UHPC, Associate member of ACI 357 Offshore and Marine Concrete Structures, and TMS member. His group is also working on understanding the interaction between hurricane-induced wave flows and coastal structures. 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, Twin Cities. Prior to joining University of Minnesota, he worked as a Technical Intern at SGH Inc. at New York 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.

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