CENTER FOR THERMO-FLUID MECHANICS

SPRING 2019 SEMINAR SERIES

Non-cohesive Sediment Gravity Currents

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WHEN: April 5, 2019 1:00 PM - 2:00 PM
WHERE: MREB ROOM 200
Multi-disciplinary Research and Engineering Building BLD#484

ABSTRACT

Sediment gravity currents are buoyancy-driven horizontal flows caused by the density difference between the sediment-fluid mixture and the ambient fluid. This type of flows is an important sediment transport mechanism and ubiquitous in nature. Some examples are oceanic turbidity currents, river plumes, and underflows due to coastal disposal of the dredged sediment. In this seminar, new physical insights on non-cohesive sediment gravity currents from our recent laboratory experiments will be discussed. A large number of experiments were conducted in a lock-exchange type tank that models gravity currents from a constant-volume release source. In these experiments, two different non-cohesive particulates (glass beads and silicon carbide) with different median diameters and size distributions were used, and experimental gravity currents with two different sediment concentrations were considered. These experiments led to new findings on the propagation, deposited and suspended sediment, and concentration characteristics of non-cohesive sediment gravity currents, which will be the focus of this seminar. These findings are of importance for a fundamental understanding of these widely observed currents and their mathematical and computational modeling.

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BIO:

Firat Testik is a Professor of Civil and Environmental Engineering at the University of Texas at San Antonio (UTSA). Prior to joining to UTSA in 2015, he was a faculty member of the Glenn Department of Civil Engineering at Clemson University since 2006. His educational background (BSc, MSc, and PhD) is in Aerospace Engineering, and his research interests covers a variety of interdisciplinary topics at the interface of various engineering (e.g., civil, coastal/ocean, mechanical, aerospace, and environmental engineering) and science (e.g., hydrology, atmospheric science, meteorology, and geology) disciplines. His research efforts have been on various fluid mechanics problems related to the coastal environment (e.g. sediment transport, wave mechanics, gravity/turbidity currents), atmospheric environment (e.g. rainfall), natural hazards and mitigation (e.g. hurricanes, tsunamis, efficacy and failure of engineered structures such as levees, breakwaters, bridges), and solution/technology development (e.g. instrumentation development, remote sensing techniques), among others. He authored numerous journal and conference publications (~ 100 publications), edited a research book, and has been actively serving a variety of scientific journals (>20 different journals) and federal agencies in various capacities.