

Date: September 28th

Time: 11:00 AM

Location: Maryland Hall 110

Speaker: Dr. Yu Lin Young

Princeton University

Title: *"Physical and Numerical Modeling of Tsunami Erosion and Soil Failure"*

Abstract

As demonstrated by the 2004 Indian Ocean Tsunami, high intensity wave run-up and drawdown can mobilize substantial amount of sediment deposits. The resulting erosion and scour damage can undermine building foundations, roadways, sea walls, embankments and may even lead to the eventual collapse of the coastal structure due to wave-induced soil failure. In this seminar, we will focus on the physical and numerical modeling of tsunami erosion/deposition and potential soil failure mechanisms. We will talk about two sets of experiments designed specially to examine the complex physics and various scaling effects of tsunami erosion and soil failure. The first experiment focuses on tsunami-induced sediment transport and scour and was conducted at the 160-ft long tsunami wave basin at Oregon State University using natural Oregon beach sand. The second experiment focuses on the study of enhanced transport due to pore pressure gradients and related soil failure mechanisms, and will be conducted at the 30-ft long flume in the hydraulics lab at the University of Hawaii using multiple grain sizes. In addition to the physical modeling, we will talk about the development and validation of a numerical tsunami erosion model which considers the effect of wave breaking, dispersion, and interaction with sediments and underlying soil deposits. We will discuss similarities and differences in transport mechanisms for tsunami, wind wave and current type environments, as well as related scaling issues for movable bed studies.