

## **Weekly Seminar: Fall 2009**

**Date: October 2**

Time: 11:00 AM

Location: Maryland Hall 110

Speaker: Patrick Lynett

Department of Civil Engineering, Texas A&M

Title: *"Towards Capturing the Complex Flow of a Tsunami Inundating the Built Environment"*

### **Abstract**

The presentation will summarize recent physical modeling and numerical studies of tsunami evolution in shallow water and the interaction of these long waves with flow obstacles, such as buildings. In experimental work through the NSF NEESR program, long wave breaking over a triangular-shaped shallow water shelf with has been examined in detail. Experimental data such as free surface elevation maps, 2D turbulent kinetic energy surfaces, and vertical profiles of velocity and turbulence information have been obtained. In addition, overhead video and dye studies are used to visualize flow patterns. This experimental data will not only contribute to the fundamental understanding of the wave breaking process, but also be used to validate numerical models. With the use of this data, a new set of depth-integrated equations, including turbulent and rotational physics, are calibrated. This model should permit higher confidence predictions of the turbulent dynamics necessary to predict processes such as scalar or sediment transport. Example applications of this developed numerical model will be shown, including as tsunami flow through a realistic city building layout and the turbulent dynamics of a tsunami flooding a harbor.