Georgia Institute of Technology

# *SEMINAR*

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**Title:** The kinematics of giant submarine landslides: Tango or waltz?
**Date:** January 13, 2006
**Time:** 12:00 pm
**Location:** Mason 142A

## Abstract:

Three-dimensional (3D) seismic data from the continental margin offshore Israel (Eastern Mediterranean) have been used to analyze the compressional structures within the toe regions of two major buried submarine landslides. These landslides are developed within a Plio-Pleistocene slope succession composed predominately of claystones and silty claystones. The Israel Slump Complex is Late Pliocene in age, and covers 4,800 $km^2$, and the T20 Slump covers an area of 60$km^2$. The high spatial resolution provided by the seismic data has allowed a detailed analysis of the geometries and deformational structures within the toe regions of these two slump masses, and this has been used to develop a qualitative mechanical model for their development. Importantly, it has been recognized that submarine landslides may be divided into two main types according to their form of frontal emplacement: frontally confined and frontally emergent. In the former, the landslide undergoes a restricted downslope translation and does not overrun the undeformed downslope strata. In the latter, much larger downslope translation occurs because the landslide is able to ramp up from its original basal shear surface and translate in an unconfined manner over the seafloor.

The division of submarine landslides into these two classes is of critical importance as their respective mechanisms of formation, downslope propagation and emplacement are fundamentally different, and hence need to be taken into consideration when analysing their kinematics. It seems likely, though this is untested as yet, that frontally confined landslides occur through a lengthy duration (1000's yrs) of repeated episodes of propagation along the radially expanding basal shear surface, whereas frontally emergent slides are more likely to exhibit catastrophic modes of failure lasting only a few hours. The former are thus less likely to result in tsunami generation.