*The Department of Earth and Environmental Sciences presents:*

Dr. Greg Stock

Thursday, December 13, 2012

1:00 – 2:00PM

Peters Business Building, 191

**“Rock fall dynamics and deposition: an integrated analysis of the 2009 Ahwiyah Point rock fall, Yosemite National Park, USA”**

We analyzed a combination of airborne and terrestrial LiDAR, high-resolution photography, seismic, and acoustic data in order to gain insights into the initiation, dynamics, and talus deposition of a complex rock fall. A large (46 700?m3) rock fall originated from near Ahwiyah Point in eastern Yosemite Valley and fell a total of 730?m to the valley floor on 28 March 2009. Analyses of remote sensing, seismic, and acoustic data were integrated to reconstruct the rock fall, which consisted of (1) the triggering of a 25 400?m3 rock block in an area of intersecting and sometimes highly weathered joint planes, (2) the sliding and subsequent ballistic trajectory of the block from a steeply dipping ledge, (3) dislodging of additional rock from the cliff surface from beneath the rock fall source area, (4) a mid-cliff ledge impact that detached a volume of rock nearly equivalent in volume to the initial block, (5) sliding of the deteriorating rock mass down the remainder of the cliff, and (6) final impact at the base of the cliff that remobilized the existing talus downward and outward and produced an airblast that knocked down hundreds of trees. The depositional geomorphology indicates that the porosity of the fresh talus is significantly lower than that expected for typical blocky talus slopes, likely because the rock debris from this event was pulverized into smaller, more poorly sorted fragments and densified via dynamic compaction when compared to less energetic, fragmental-type rock falls. These results suggest that accumulation of individual rock-fall boulders tends to steepen talus slopes, whereas large, energetic rock falls tend to flatten them. Detachment and impact signals were recorded by seismic and acoustic instruments and highlight the potential use of this type of instrumentation for generalized rock fall monitoring, while LiDAR and photography data were able to quantify the cliff geometry, rock fall volume, source and impact locations, and geomorphological changes to the cliff and talus. Published in 2012. This article is a US Government work and is in the public domain in the USA