E201/ME160 UC Berkeley Ocean Engineering Seminar

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From granular collapse to impulse waves

By

Professor Alban Sauret

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2:30pm-4:00pm

Abstract Tsunami waves are among the most destructive natural disasters for human coastal settlements. While events generated by earthquakes are well known, several past or potential occurrences of high-amplitude waves arising from large-scale landslides have also been reported in the last decades. In particular, the 1958 Lituya Bay tsunami, featuring the highest recorded wave run-up of 524 m, is reminiscent of the need to understand how these disasters arise. We experimentally model the generation of impulse waves by landslide at the laboratory scale. The landslide is modeled by the sudden release of a rectangular granular column, which then impacts a still water layer and generates a wave. Different regimes of nonlinear waves of different shapes are observed through experiments varying both the column dimensions and the initial water height. By first modeling the dynamics of the granular collapse and the wave hydrodynamics, we provide a model for the maximum amplitude of the generated wave that only depends on the initial parameters.

Speaker Biography Professor Alban Sauret is an Associate Professor in the Department of Mechanical Engineering. He did his undergraduate and graduate studies in France, followed by a postdoctoral training at Princeton University. After a few years working as a CNRS researcher in a joint CNRS/Saint-Gobain laboratory near Paris (France), he joined UC Santa Barbara in 2018. Alban's research aims at understanding the couplings between the fluid dynamics, interfacial effects and particle transport mechanisms involved in environmental, industrial and geophysical processes. This understanding is critical to model the contamination of surfaces and flows by pollutants or the transport of sediments in geophysical situations. It can also be leveraged to develop new coating processes and materials. Particle/fluid interactions emerge from complex couplings. Understanding such systems thus requires multi-scale methods. His research also involves a multidisciplinary approach through experiments, analytical modeling and numerical simulations to describe particle/fluid interactions, design and optimize new systems to control these interactions. In his spare time, he enjoys trail running in the Santa Barbara area.

Hosted by: Prof. Evan Variano (variano@berkeley.edu)