

Date: April 18

Time: 11:00 AM

Location: Maryland Hall 110

Speaker: Dr. Tim Janssen

Naval Postgraduate School

Title: *"Nonlinear ocean waves across the continental shelf"*

Abstract

As ocean wind waves propagate across the shelf from deep water onto beaches, their nonlinearity transitions from a deep-water (Stokes) regime to a shallowwater (Boussinesq) regime. The physics is distinct. Deep-water nonlinearity takes place on relative long time and space scales and is linked, among others, to the occurrence of extreme ocean waves, sometimes referred to as ‘freak’ or ‘rogue’ waves. Shallow-water nonlinearity on the other hand, results in transfer of energy to harmonics and infragravity waves, which plays an important role in e.g. sand bar migration and sediment transport. In this talk we will present new modeling approaches to these nonlinear wave regimes and, on the basis of simulations and observations, discuss their implications: 1) the contribution of nonlinearity to ‘freak’ wave events in realistic oceanic conditions and 2) the role of the wave third-order moment in shoaling or dissipative wave conditions.