

## **Numerical Modeling and Laboratory Experiments of Wave Propagation over Fringing Reefs**

By

**Volker Roeber**

Research Assistant  
Department of Ocean & Resources Engineering  
University of Hawaii at Manoa

Wednesday, April 15, 2009

**MSB 114**

3:00-3:30 pm Coffee Hour

3:30-4:30 pm Seminar

Please join us for the coffee hour near the seminar venue a half hour  
before the seminar, 3:00 – 3:30 pm

### **Abstract**

Numerical modeling can effectively describe nearshore wave processes to provide guidelines for coastal structure design and hazard assessment. Most water wave models have been developed for continental shelf coasts with gently sloping bathymetry. But in many cases destructive waves such as tsunamis or hurricanes affect locations in the tropics that are sheltered by fringing reefs making the coastal wave processes far more complex. We have developed a numerical model based on Boussinesq-type equations that accurately simulates wave propagation over exposed and submerged reefs and wave breaking as bores. We have also performed a series of large-scale experiments at the Oregon State University Hinsdale Wave Research Laboratory on wave breaking and bore development over fringing reefs to understand and quantify the physical processes. These experiments complement the existing technical literature by providing data for model validation. The validated model provides proper simulation of hazardous waves in tropical coastal environments and supplies important information pertaining to coastal inundation and loads on infrastructure for performance-based tsunami engineering. The seminar will cover important concepts for the development and validation of the numerical model for nearshore applications.