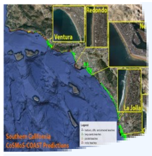
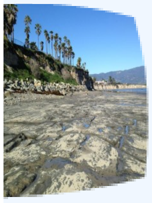
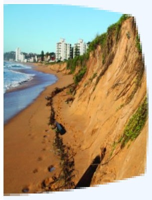






UCI Samueli School of Engineering | Department of Civil and Environmental Engineering

Presented By:
Sean Vitousek, Ph.D.
Assistant Professor
University of Illinois at Chicago
Civil & Materials Engineering

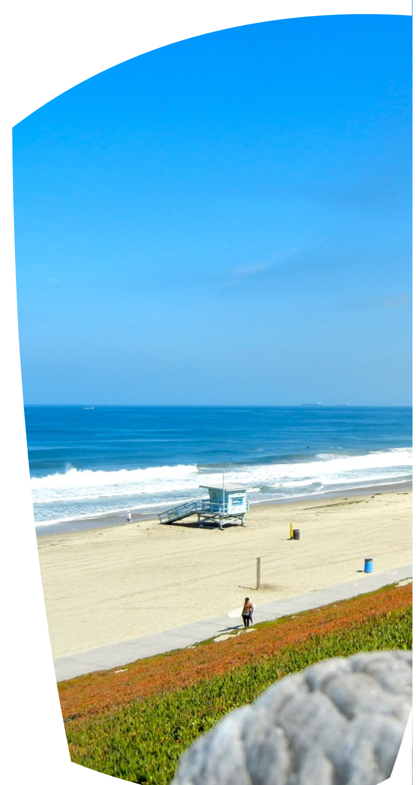
Environmental Engineering

Seminar Series

Friday, October 27, 2017
McDonnell Douglas Engineering Auditorium (MDEA)
1:30PM to 2:30PM

Can Beaches Survive Climate Change? Predicting Long-Term Coastal Change in Southern California

Anthropogenic climate change drives sea level rise, leading to numerous impacts on the coastal zone, such as increased coastal flooding, beach erosion, cliff failure, saltwater intrusion in aquifers, and groundwater inundation. Many beaches around the world are currently experiencing chronic erosion as a result of gradual, present-day rates of sea level rise (about 3-4 mm/year) and human-driven restrictions in sand supply (e.g., harbor dredging and river damming). Accelerated sea level rise threatens to worsen coastal erosion and challenge the very existence of natural beaches throughout the world. Understanding and predicting the rates of sea level rise and coastal erosion depends on integrating data on natural systems with computer simulations. Although many computer modeling approaches are available to simulate shoreline change, few are capable of making reliable long-term predictions needed for full adaption or to enhance resilience. Recent advancements have allowed convincing decadal to centennial-scale predictions of shoreline evolution. However, long-term coastal evolution, caused by the interaction of many geologic and hydrodynamic processes, is notoriously difficult to understand let alone predict. A newly-developed model (presented here), named CoSMoS-COAST, simulates shoreline change driven by longshore and cross-shore sediment transport by waves and sea-level rise. The model also implicitly accounts for natural and anthropogenic sediment supply estimated via data-assimilation. The proposed method allows for prediction of shoreline change on unprecedented spatiotemporal scales (e.g. multi-decadal predictions over 100's of kms). The model has been applied to predict shoreline change on 500 kms of Southern California Coast under a number of different climate and management scenarios. Predictions of shoreline change with limited human intervention indicate that 31% to 67% of Southern California beaches may become completely eroded by 2100 under sea level rise scenarios of 0.93 to 2.0 m.



Sean Vitousek was born and raised in Hawaii. He attended high school at Hawaii Preparatory Academy. Next, he attended Princeton University and majored in Civil & Environmental Engineering. Outside of the class room, Sean played on the Princeton volleyball team and was the president of the Princeton surf club. Sean received his Masters degree in Geology & Geophysics from University of Hawaii advised by Chip Fletcher. With a strong interest to pursue numerical modeling, he attended Stanford University and obtained his PhD in Civil & Environmental Engineering advised by Oliver Fringer and supported by the Department of Energy Computational Science Graduate Fellowship. Following his time at Stanford, he received a Mendenhall Postdoctoral Fellowship and worked at the US Geological Survey in Santa Cruz. Sean is now a research assistant professor in Civil & Materials Engineering at the University of Illinois at Chicago. In their spare time, Sean and his wife Sylvia enjoy playing with their 2.5 month old daughter, Merigold, who also likes to conduct fluid mechanics research during her bath time.

Questions? - cee@uci.edu - (949) 824-5333