Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Free-surface tracking of submerged features to infer hydrodynamic flow characteristics TRACY MANDEL, ITAY ROSENZWEIG, JEFFREY KOSEFF, Stanford University — As sea level rise and stronger storm events threaten our coastlines, increased attention has been focused on coastal vegetation as a potentially resilient, financially viable tool to mitigate flooding and erosion. However, the actual effect of this green infrastructure on near-shore wave fields and flow patterns is not fully understood. For example, how do wave setup, wave nonlinearity, and canopy-generated instabilities change due to complex bottom roughness? Answering this question requires detailed knowledge of the free surface. We develop easy-to-use laboratory techniques to remotely measure physical processes by imaging the apparent distortion of the fixed features of a submerged cylinder array. Measurements of surface turbulence from a canopy-generated Kelvin-Helmholtz instability are possible with a single camera. A stereoscopic approach similar to Morris (2004) and Gomit et al. (2013) allows for measurement of waveform evolution and the effect of vegetation on wave steepness and nonlinearity.

Tracy Mandel
Stanford University

Date submitted: 01 Aug 2016 Electronic form version 1.4