1035-76-842 **David P. Nicholls*** (`nicholls@math.uic.edu`), Department of Math, Stat., and C.S., 851 South Morgan Street (MC 249), Chicago, IL 60607, and **Mark Taber**. *Detection of Ocean Bathymetry from Surface Wave Measurements.*

The detection of ocean bathymetry is one of the most important and difficult problems in oceanography. In this lecture we describe an algorithm which relies upon nonlinear dynamical properties of the ocean surface to detect information about the ocean floor. Unlike similar methods in the literature, our technique does not rely solely upon the variations in the dispersion relation, rather, we utilize the entire dynamic water wave problem. Using a formulation of the water wave problem due to Zakharov, and Craig & Sulem, and the analyticity of the "Dirichlet-Neumann operator" we find surprisingly convenient formulas involving the ocean bathymetry. Of course, these formulas are ill-conditioned and nonlinear, however, we have found that application of standard techniques from the theory of inverse problems allow us to predict the shape of bottom topography with excellent precision. (Received September 16, 2007)