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**Katie L Oliveras\*** ([oliveras@seattleu.edu](mailto:oliveras@seattleu.edu)), Mathematics Department, Seattle University, 912 12th Ave, Seattle, WA 98122. *Relationships between pressure, bathymetry, and wave-height.*

A new method is proposed to relate the pressure at the bottom of a fluid, the shape of the bathymetry, and the surface elevation of a wave for steady flow or traveling waves. Given a measurement of any one of these physical quantities (pressure, bathymetry, or surface elevation), a numerical representation of the other two quantities is obtained via a nonlocal nonlinear equation obtained from the Euler formulation of the water-wave problem without approximation. From this new equation, a variety of different asymptotic formulas are derived. The nonlocal equation and the asymptotic formulas are compared with both numerical data and physical experiments. This is joint work with Vishal Vasani and Daniel Ferguson. (Received September 26, 2017)