MARK ABLOWITZ, University of Colorado, Boulder
Rogue waves in water and light

Large amplitude rogue waves can be generated by the interaction of two oblique interacting waves in deep water. A 'rogue' condition is found which links the angle of interaction with the group velocities of these waves. With this condition the analysis is reduced to a coupled nonlinear Schrodinger (CNLS) system. For a range of interactions this CNLS system exhibits many more extreme events than does the one-dimensional scalar NLS system. Elliptically polarized birefringent light waves also satisfy a CNLS system. The generation of rogue waves is frequently associated with modulation instability. It is often expected that since the CNLS equations exhibit larger growth rates they would produce more rogue events than their scalar counterparts. This is found to occur only when both equations are focusing. When at least one component is defocusing, the CNLS equations may still exhibit larger growth rates, compared to the scalar system, but that does not necessarily result in more or larger events. The nature of the rogue event will also be discussed.