1030-35-352 **David M. Ambrose*** (dambros@clemson.edu), Department of Mathematical Sciences, Martin Hall, Clemson, SC 29634. *3D Vortex Sheets and Water Waves.*

In this talk, I will discuss my recent proofs (joint with Nader Masmoudi) of well-posedness of the 3D vortex sheet with surface tension and the 3D water wave. The fluids under consideration are taken to be irrotational and of infinite depth. For the vortex sheet, this is the first proof of well-posedness, but for the water wave, this is a new proof of the theorem of Wu. The method involves first suitably reformulating the problem and then making energy estimates. The main ingredients in the formulation are a favorable choice of parameterization of the free surface and the identification of leading-order terms from the singular integrals involved. If possible, at the end, I will say a few words about singularity formation in the vortex sheet with surface tension. (Received August 06, 2007)