1096-35-1011 **Chongsheng Cao** and **Edriss S. Titi*** (etiti@math.uci.edu), Department of Computer Science & Applied Math, Weizmann Institute of Science, 76100 Rehovot, Israel. *Regularity "in large" for the 3D Salmon's planetary geostrophic model of ocean dynamics.*

In this talk we will consider a mathematically ill-posed non-viscous planetary geostrophic model of ocean dynamics. The ill-posedness is due to the fact that the no-normal flow physical boundary condition implicitly produces an additional boundary condition for the temperature at the lateral boundary. This additional boundary condition is different, because of the Coriolis forcing term, than the no heat flux physical boundary condition. Consequently, the second order parabolic heat equation is over determined with two different boundary conditions. In a previous work we proposed one remedy to this problem by introducing a fourth-order artificial hyper-diffusion to the heat transport equation and proved global regularity for the proposed model. Another remedy for this problem was suggested by R. Salmon by introducing an additional Rayleigh-like friction term for the vertical component of the velocity in the hydrostatic balance equation. In this talk we prove the global, for all time and all initial data, well-posedness of strong solutions to the three-dimensional Salmon's planetary geostrophic model of ocean dynamics. That is, we show global existence, uniqueness and continuous dependence of the strong solutions on initial data for this model. (Received September 12, 2013)