The existence of global weak solutions for the isentropic compressible Navier-Stokes equations with density dependent coefficients vanishing on vacuum regions has been a long standing open problem. The primary focus of this talk is the recent result concerning existences of global in time weak solutions in three dimensional space for any $\gamma > 1$ with large initial data vanishing on vacuum regions. It should be remarked that our result naturally holds in two dimensional space with $\gamma = 2$. Thus, we resolved Lions’ open problem concerning weak solutions of the viscous shallow water equations. This is joint work with Alexis F. Vasseur. (Received January 23, 2014)