1051-76-90 **Eleftherios Gkioulekas*** (gkioulekase@utpa.edu), University of Texas-Pan American, Department of Mathematics, 1201 West University Drive, Edinburg, TX 78539-2999. *Dissipation range and anomalous sinks in steady two-dimensional turbulence.*

In my talk, I will discuss a new theoretical framework for understanding the robustness (or lack thereof) of the cascades of two-dimensional Navier-Stokes turbulence. The mathematical framework underlying our analysis is the infinite system of balance equations that govern the generalized unfused structure functions, first introduced by L'vov and Procaccia. As a point of departure we use a revised version of the system of hypotheses that was proposed by Frisch for three-dimensional turbulence. We show that both the enstrophy cascade and the inverse energy cascade are local in the sense of non-perturbative statistical locality. We also investigated the stability conditions for both cascades. We have shown that statistical stability with respect to forcing applies unconditionally for the inverse energy cascade. For the enstrophy cascade, statistical stability requires large-scale dissipation and a vanishing downscale energy dissipation. Finally, we have shown that the anomalous sink hypothesis follows as a consequence of our hypotheses. (Received August 17, 2009)