1107-35-155 **Tarek M Elgindi***, PACM, Fine Hall, Washington Road, Princeton, NJ 08544. *Some results on singular transport equations.*

The talk will focus on transport equations with singular-integral forcing. These are equations of the form:

$$\partial_t f + b \cdot \nabla_x f = R_x(f)$$

where b is a given divergence-free vector field and R_x is a singular integral operator. This type of transport equation shows up often in the study of fluid equations and can be seen as a prototype for many equations which exhibit local and non-local forces. We are interested in solutions in L^p spaces.

When b is a Lipschitz function:

(1) The singular transport equation may be ill-posed in L^∞ in the sense that bounded initial data may become unbounded immediately.

(2) The singular transport equation is well-posed in the class of functions of bounded mean oscillation (BMO).

(3) The singular transport equation exhibits "well-behaved" growth properties in L^p.

When b is only taken to be bounded:

(1') The singular transport equation may have what we call "cascading solutions" starting from smooth initial data. These solutions belong to L^p for all $p < \infty$ with L^p norms growing on the order of $exp(p)$.

We will discuss most of these results quickly and then focus on the constructions which lead to (1'). (Received January 12, 2015)