Passive control of instabilities in hypersonic flow - Sharon Stephen

The transition process from laminar to turbulent flow in hypersonic boundary layers is associated with large changes in both heat transfer and skin friction drag. For design purposes of hypersonic vehicles, for instance in thermal protection systems, predicting the location of transition becomes important. The use of passive porous walls to delay transition is investigated here for viscous modes of instability on a sharp slender cone. Asymptotic results will be presented for a weakly nonlinear stability analysis. The stabilizing or destabilizing effect of porous walls will be discussed.