



## **ME 592 Graduate Seminar**

Department of Mechanical Engineering  
The University of New Mexico

# **Sanjay Kumar**

**The University of Texas at Brownsville**

**Friday, March 7, 2008 at 3:30 p.m. ME Bldg., Room 218**

## **Richtmyer-Meshkov Instability**

### **Abstract**

Richtmyer-Meshkov instability will be introduced by way of examples, both from the earth (inertial confinement fusion experiments) and heaven (imploding/exploding stars) and some of my flow visualization results. I will present relatively recent experimental results from a specific problem of stretching of material lines in this instability. A Mach 1.2 shock wave in air interacts with the cylindrical gaseous ( $\text{SF}_6$ ) inhomogeneities. The resulting flow is observed early in time (~first 250 micro-seconds after shock impact prior to the development of secondary instabilities) using planer laser induced fluorescence (PLIF). This high resolution data is used to measure material line stretching before the development of secondary instabilities even though the Reynolds number (based on circulation and mean kinematic viscosity) is of the order of 25000 to start with and Schmidt number  $\sim 1$ . PLIF flow visualization of the shock-wave refracting inside a cylindrical gaseous inhomogeneity will also be presented. The talk will conclude with an interesting historical/educational note on Rayleigh-Taylor instability.

#### **Education:**

1. Ph. D. 2003, Aeronautics, Graduate Aeronautical Laboratories, California Institute of Technology (GALCIT) (Cal Tech. - Pasadena, USA).
2. M.Tech. 1996, Aerospace Engineering, Indian Institute of Technology-Kanpur, India.
3. B.Tech. 1994, Aerospace Engineering, Indian Institute of Technology-Kanpur, India.

#### **Work-experience:**

1. Assistant Professor (January 01, 2006 - present), Department of Engineering (Mechanical), The University of Texas at Brownsville - Brownsville (USA).
2. Post Doctoral Fellow (April 2003-September 2005), Los Alamos National Laboratory (USA).

