

ICTS Seminar

- Title** : Linear and nonlinear dynamics of pulsating channel flow
- Speaker** : Benoit Pier, Laboratoire de mécanique des fluides et d'acoustique, École centrale de Lyon, France
- Date** : Wednesday, November 16, 2016
- Time** : 11:00 AM
- Venue** : Emmy Noether Seminar Room, ICTS Campus, Bangalore
- Abstract** : Pulsatile flows occur in a variety of engineering applications as well as in the human body. While many studies have addressed the dynamics of steady flow through channels or pipes with spatially varying diameters, surprisingly few investigations have considered time-dependent flows with uniform diameter. Hence, the purpose of the present work is to systematically establish both linear and fully nonlinear flow features prevailing in pulsatile channel flows.
- In this work we have analysed the behaviour of small-amplitude perturbations and the fully developed nonlinear dynamics resulting from unstable configurations. By investigating large regions of a multi-dimensional control-parameter space and considering both 2D and 3D fluctuations, essentially two types of fully developed dynamics have been identified: a "cruising" regime where nonlinearities are sustained throughout the entire pulsation cycle, and a "ballistic" regime consisting of linear and nonlinear phases that alternate, locked-in with the base flow pulsation.