

# MATHEMATICS & STATISTICS COLLOQUIUM ANNOUNCEMENT

Thursday, March 15, 2007  
4:00 p.m.  
ARTS 214

## **SPEAKER**

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and  
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## **TITLE**

*Particle flows and turbulence*

## **ABSTRACT**

The evolution of the velocity vector field of a free particle flow can be described by the compressible Euler equation with constant pressure. Considering the space periodic case we show that the above equation is globally solvable iff the initial state  $u_0$  is degenerate, i.e. the Jacobi matrix of  $u_0$  is everywhere nilpotent. For viscous flows we show that a degenerate initial state corresponds to a laminar flow, while non-degenerate initial states develop large spatial derivatives (turbulence) in finite time. A simple purely geometrical reformulation of the degeneracy condition is possible in the 2D case. A similar question is open for higher dimensions.

Coffee and Cookies at 3:30 pm in the lounge.