JOHNS HOPKINS
Center for Environmental & Applied Fluid Mechanics

Weekly CEAFM Seminar: Fall 2011

Date: **Friday, October 13, 2011**

Time: 11:00 AM

Location: Gilman 50 (Marjorie M. Fisher Hall)

Speaker: **Ari Glezer** (Georgia Institute of Technology)

Title: ***"Aerodynamic Flow Control by Virtual Surface Modification using Trapped Vorticity"***

Abstract

Flight control by distributed fluidic modification of the apparent aerodynamic shape of lifting surfaces, or virtual aerosurface shaping, will be discussed. Control is effected by the interaction of integrated arrays of fluidic actuators with the cross flow by leveraging the generation and regulation (trapping) of vorticity concentrations near the surface to alter its aerodynamic shape and thereby the aerodynamic forces and moments. Therefore, virtual aerosurface shaping can be used to effect global vehicle maneuvers, significantly reduce aerodynamic drag (in cruise), and stabilize and dampen structural modes of flexible airframes during powered flight and gliding without mechanical control surfaces.

Applications of steady and transitory aerodynamic flow control to fully attached and separated flows on lifting surfaces will be presented. The discussion will include the role of trapped vorticity concentrations in the modification of the aerodynamic forces on a lifting airfoil for effecting global maneuvers and response to sudden gusts without mechanical control surfaces.