Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

**DNS of transitional pulsatile flow through a constriction: coherent structures and Reynolds stress budgets**[1] NIKOLAOS BERATLIS, ELIAS BALARAS, Dept. Mechanical Engineering, University of Maryland, College Park, MD 20742 — Direct Numerical Simulations of pulsatile flow through channels and pipes with a constriction will be presented. Overall our simulations verify some of flow features reported in earlier experiments in the literature. In particular, during the acceleration phase a shear layer that forms at the stenosis becomes unstable and sheds an array of vortices. The vortices break down as they interact with the wall leading to the formation of boundary layers with turbulent-like characteristics shortly after the mean reattachment point. The simulations provide a detailed description of the instantaneous flow and the spatial-temporal evolution of the structures responsible for the generation of turbulence. The relation of theses structures to the phase averaged statistics and especially the budgets of turbulent kinetic energy and the Reynolds stresses will be discussed in detail. Finally the effect of Reynolds number and the frequency and amplitude of the oscillating flow rate on the flow patterns will be given.

[1]Research supported by the National Institutes of Health ( Grant R01-HL-07262) and the National Science Foundation (Grant CTS-0347011)

Elias Balaras
Dept. Mechanical Engineering, University of Maryland, College Park, MD 20742

Date submitted: 04 Aug 2005 Electronic form version 1.4