Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Flow Measurements over Embedded Cavities Modeling the Microgeometry of Bristled Shark Skin[1] AMY LANG, PABLO HIDALGO, University of Alabama — Certain species of sharks (e.g. shortfin mako) have a skin structure that results in a bristling of their denticles (scales) during increased swimming speeds. This unique surface geometry results in the formation of a 3D array of cavities[2] (d-type roughness geometry) within the shark skin, thus causing it to potentially act as a means of boundary layer control. In order to further understand the effectiveness of this complex geometry, ProE was used to replicate the bristled shark skin of the shortfin mako using a rapid prototyping machine. Two simplified geometries of the shark skin, including 2D transverse cavities and a 3D array of staggered cavities, were also studied. Boundary layer measurements using DPIV were obtained and compared for all three geometries. Of particular interest is the role that the riblets, on the face of the denticles, appear to play in forming an organized array of embedded vortices within the surface.

[1]Support for this research by a NSF SGER grant CTS-0630489, Lindbergh Foundation Grant and a University of Alabama RAC grant is gratefully acknowledged.
[2]Patent pending.

Amy Lang
University of Alabama

Date submitted: 28 Jul 2008 Electronic form version 1.4