Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

High Speed Tomographic PIV Measurements of Copepod Sensory Cues DONALD R. WEBSTER, DAVID MURPHY, School of Civil and Environmental Engineering, Georgia Institute of Technology, JEANNETTE YEN, School of Biology, Georgia Institute of Technology — A steady siphon flow is commonly used to mimic the aquatic suction feeding of piscine predators in studies of zooplankton sensory ecology. The sensory and escape behavior of copepods, with their long, highly enervated, setae-bearing antennules, has been investigated using this prescribed flow field, modeled analytically as a point sink. The position of the animal when it escapes provides a threshold for the species-specific strain rate value (as low as 0.4 s^{-1}) that evokes this ecologically-important behavior. Understanding the actual mechanics of copepod sensing, however, requires more than just correlation analysis based on position in the strain rate field. Knowledge of the setae-bending flow field along the length of the antennules during the time leading up to the escape jump is needed to fully understand the sensory mechanism. Measurements of this type have not been practical using traditional planar PIV techniques. We present time-resolved tomographic PIV measurements of the flow around the sensory appendages of *Acartia* spp. copepods responding to siphon flow and provide insight into copepod behavior in response to fluid mechanical stimuli.

David Murphy
School of Civil and Environmental Engineering,
Georgia Institute of Technology

Date submitted: 06 Aug 2011 Electronic form version 1.4