## Abstract Submitted for the DFD09 Meeting of The American Physical Society

No slip locomotion of hatchling sea turtles on granular media NICOLE MAZOUCHOVA, School of Biology/ Georgia Tech, CHEN LI, School of Physics/Georgia Tech, NICK GRAVISH, School of Physics/ Georgia Tech, ANDREI SAVU, School of Physics/Georgia Tech, DANIEL GOLDMAN, School of Physics/ Georgia Tech — Sea turtle locomotion occurs predominantly in aquatic environments. However after hatching from a nest on a beach, the juvenile turtles (hatchlings), must run across several hundred meters of granular media to reach the water. To discover how these organisms use aquatically adapted limbs for effective locomotion on sand, we use high speed infrared video to record hatchling Loggerhead sea turtles (Caretta caretta) kinematics in a field site on Jekyll Island, GA, USA. A portable fluidized bed trackway allows variation of the properties of the granular bed including volume fraction and angle up to the angle of repose. Despite being adapted for life in water, on all treatments the turtles use strategies similar to terrestrial organisms when moving on sand. Speeds up to 3 BL/sec are generated not by paddling in sand, but by limb movement that minimizes slip of the flippers, thus maintaining force below the yield stress of the medium. We predict turtle speed using a model which incorporates the yield stress of the granular medium as a function of surface angle.

> Nicole Mazouchova School of Biology/Georgia Tech

Date submitted: 06 Aug 2009 Electronic form version 1.4