High-Fidelity Computational Models of Insects in Flight: Wing Deformation and Flight Maneuvers RAJAT MITTAL, LINGXIAO ZHENG, The George Washington University, TYSON HEDRICK, University of North Carolina Chapel Hill, VARUN GUPTA, James Madison High School — Highly accurate kinematical and geometrical models are used to examine the aerodynamics of insect flight. The simulations employ a sharp-interface immersed boundary method for the flow simulations, and the non-dissipative numerical method used, allows us to capture the vortex dynamics of the wake. One focus of the current study is on understanding the role of wing deformation in insect flight and for this, we examine the flight of a moth in hover with deformable and rigid wings. The second focus of the current work in on flight maneuvers in insects and the presentation will also show preliminary results from simulations of flight maneuvers in butterflies.

Rajat Mittal
The George Washington University