developed methods of studying these various questions under laboratory conditions, but in recent years we have made a strong push towards field-based research.

On the physical front, we have recently studied how wing flexion influences alters flight force generation in the flapping case. We experimentally showed that there is a tight connection between the configuration of the trailing edge and the magnitude of the leading edge vorticity which determines the aerodynamic forces. On the neurobiological front, we have been investigating the mechanosensory role of antennae and halteres in the control of flight maneuvers. To this end, we conduct detailed electrophysiological measurements of sensory inputs from sensory organs to the brain, and from the brain to the flight motor system. Using these methods, we have recently dissected how antennal positioning behavior, which is one of the key behaviors that occurs at the onset of flight, is actuated. In addition, we have also shown that this behavior depends on multi-modal inputs, including mechanosensory and visual feedback. These questions have been studied in the Oleander hawk moth, Daphnis nerii and detailed behavioral studies have also been conducted on the honey bee, Apis mellifera. In addition to the work on antennal mechanosensors, we have also been investigating the role of halteres in flight of Dipteran flies. Specifically, we have studied how wings and halteres are able to move in precise synchrony relative to each other.

Additional projects include the study of biodiversity of macroLepidoptera, specifically hawk moths, in the Western Ghats. This project was undertaken in large part to establish a basic data set that can allow us to identify migratory systems for future eco-physiological studies. In parallel, we are conducting research on two migratory systems – butterflies and moths at the Smithsonian Tropical Research Institute in Panama and noctuid ‘Bogong’ moths in New South Wales in Australia. Each of these systems offers a unique insight into various aspects of all of the questions outlined above.
COMPLETE LIST OF PUBLICATIONS AS A RAMANUJAN FELLOW

1. Truong, TQ; Phan, VH; Sane S.P; Park, HC* (in press, Journal of Bionic Engineering) Pitching moment generation in an insect-mimicking flapping-wing system


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