1125-76-2206 **Longhua Zhao*** (lxz315@case.edu), **Angela Chuang**, **Iordanka N. Panayotova**, **Kimberly S. Sheldon**, **Lydia Bourouiba** and **Laura A. Miller**. *Flying Spiders: Simulating and modeling the dynamics of ballooning.*

Certain species of spiders can use a type of aerial dispersal called "ballooning" to move from one location to another. In order to balloon, such a spider releases a silk dragline from its spinnerets and when the movement of air relative to the dragline generates enough force, the spider takes off. Yet, the detailed physics driving this process remains little understood. We developed and numerically solved a two-dimensional fully-coupled fluid-structure interaction mathematical model to identify the crucial physical phenomena driving spider ballooning. We used the immersed boundary method to solve the multi-scale motion of flexible dragline through air. We explored three critical stages for ballooning: take-off, flight, and settling. Our numerical simulations allowed us to quantify how the dynamics of ballooning is significantly influenced by the spider mass and the length of the dragline, and other key properties such as dragline bending modulus. We will discuss our results and their implications for ecological events of long-distance population dispersal. (Received September 19, 2016)