

Finding a satisfying explanation for the elevated aerodynamic performance of flapping biofoils is one of the most challenging tasks in modern flight Biophysics. Insects have evolved a sophisticated unique set of aerodynamic mechanisms that enhance their locomotor capacity several fold over conventional aircrafts. Exploring these mechanism has general implications on the energetics and control of locomotory forces in flying animals, and opened a window to a new comprehensive theory of flapping flight. We tackle flight from two different perspectives: first, by flying small fruit flies in a flight simulator and second, by employing dynamically scaled robotic wings. The discovery of unsteady aerodynamic phenomenons currently drives the construction of miniature-sized autonomous robotic micro air vehicles.