

**Flexible wing-and body-based strategies for bio-inspired flight system:**

**aerodynamics and flight control**

*(Talk #5)*

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Flying animals are capable of sophisticated, aerodynamic force production and precise, agile maneuvering, which are achieved through more straight-forward sensorimotor pathways to modulate power output from the steering muscles to the wing. Flight control requires complicated motor systems in response to multimodal sensory inputs and the coordination of multiple muscles across the body. Flexible structures of wing and body in flying animals have been pointed out to hold great potentials in enhancing aerodynamic performance and steering maneuverability in flapping-wing flight. The flexible strategies in biological flights and bio-inspired flight system associated with micro air vehicles very likely play an important role in the control and sensorimotor of flapping-wing flight. In this lecture, we will give an overview on how the flexible wing and the body flexion work aerodynamically in terms of aerodynamic force-production and dynamic flight stability as well as flight control. We will also discuss how the bio-inspired flexible wing-and body-based strategies are applied and implemented in designing bio-inspired flapping wings for micro air vehicles.

References:

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[2] T. Nakata and H. Liu, *Proc. R. Soc. B.* 279 (1729): 722-731 (2012).