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मौलिक विज्ञान प्रकर्ष केन्द्र

The Physics and Neurobiology of Insect Flight

Prof. S. P. Sane, NCBS, Bengaluru

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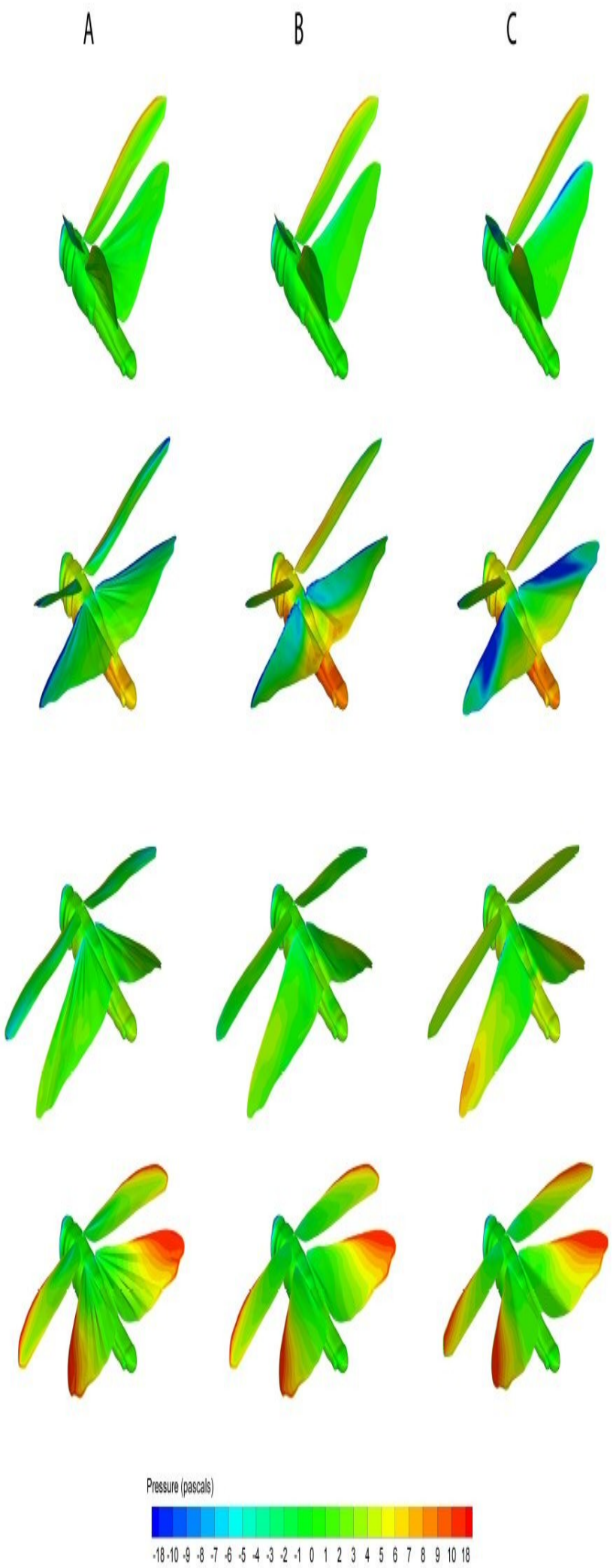

Insects were the first animals to evolve flight and remain the masters of the aerial habitat. The evolution of flight allowed insects to be an enormously successful group, of all multicellular animals. Across various scales of size and neural complexity, insects can fly with exquisite speed, control and manoeuvrability. However, at the smaller scales, flight is an extremely demanding mode of locomotion and poses steep challenges to the body and nervous systems of the insects. Their wings flap at amazing speeds, with each wing stroke finely controlled by a sensory motor system that acquires and processes information at similarly rapid rates. Feedback from visual, olfactory, mechanosensory, hygro and thermal sensors is communicated to the central nervous system, which then generates appropriate motor responses in the form of movement of head, legs, wings etc. The movement of wings then generate aerodynamic forces which are carefully controlled to generate the desired manoeuvres.

A rigorous understanding of the inner workings of these various processes, from acquisition of sensory input to generation of motor output and aerodynamic forces requires integration of techniques from various disciplines ranging from aerodynamics of flight to sensory-motor neurobiology and behavior. In this seminar, it will be described how we use multiple approaches to understand these diverse aspects of insect flight to get a fascinating glimpse into the reasons underlying their evolutionary success.

ALL ARE WELCOME