Centre for Biosystems Science and Engineering

S E M I N A R

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Seminar Hall, MRDG, Biological Sciences

Airflow sensing in flying insects

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Insects are capable of extraordinary feats of navigation. For instance, in addition to their routine flights, many insects can also migrate over great distances, and sometimes even across continents. During the course of these flights, insects depend on multiple sensory organs to acquire information about their own speeds, and to sustain their speed and direction over long distances. However, when flying in unpredictable conditions, sensory cues from a single sensory modality are unreliable for measuring ambient environmental parameters. For instance, purely optic-flow-based measurements of body speed can be misleading for insects which experience sideslip while flying in a crosswind. In such situations, sampling from multiple sensory cues reduces the ambiguity arising from variability in feedback from single modalities. Hence, the integration of multimodal cues is essential for most natural locomotory behaviours. In my seminar, I will discuss how insects use antennal mechanosensors to sense ambient airflows, and use this information to coordinate flight-related reflexes over its entire body. They combine this information with visual feedback from their compound eyes, to maintain position of their antennae.

About the speaker:

Sanjay Sane completed his bachelors degree from St. Stephen's College in University of Delhi, followed by a Master's in Physics from the University of Poona, specializing in Non-linear Dynamics and Astronomy & Astrophysics. During this time, he got very interested in the aerodynamics of insect flight. After completing his Master's degree, he was briefly at the Tata Institute of Fundamental Research in Mumbai, and the National Centre for Biological Sciences in Bangalore where he switched to studying biology of insect flight muscles. He completed my PhD from Michael Dickinson's laboratory at the University of California, Berkeley on the topic of "Aerodynamics of flapping flight" and then joined as a post-doc with Dr. Tom Daniel at the University of Washington, Seattle where he studied questions relating to the sensory neurobiology of insect flight. He returned to India as a faculty member at the National Centre for Biological Sciences in Bangalore in late 2007, where he is currently serving as an Associate Professor.